2000-0186

TÜBİTAK

TÜRKİYE BİLİMSEL VE
TEKNİK ARAŞTIRMA KURUMU

THE SCIENTIFIC AND TECHNICAL
RESEARCH COUNCIL OF TURKEY

AVRUPA'DA GIDA TÜKETİMİ VE KOMPOZİSYONU VERİLERİNİN KALİTE VE UYGUNLUĞUNUN GELİŞTİRİLMESİ

2000-0186

PROJE NO: COST 99

Tarım Orman ve Gıda Teknolojileri Araştırma Grubu

Agriculture Forestry and Food Technologies Research Grant Commitee

AVRUPA'DA GIDA TÜKETİMİ VE KOMPOZİSYONU VERİLERİNİN KALİTE VE UYGUNLUĞUNUN GELİŞTİRİLMESİ

PROJE NO: COST 99

PROF.DR. SUAT UNGAN

NİSAN 2000
ANKARA

ÖNSÖZ

COST 99 Projesinin genel amacı Avrupa'da gıda tüketimi ve gıda komposizyonu verilerinin kalitesinin ve uygunluğunun geliştirilmesidir. Bu amaçla:

1) Avrupa içinde; yorum, tarif ve bilgi alışverişine elverişli kalitede bir gıda tüketimi ve gıda kompozisyonu veri tabanı tasarlanarak bir bilgi iletişim ağı oluşturulacaktır.

2) Gıda dengesi ve Hane Halkı Tüketim Harcamaları anketlerinden elde edilecek gıda tüketimi ve piyasada bulunabilme (arz) verilerinin toplanmasının sürekliliği sağlanacak ve bu verilerin kalitesinin iyileştirilmesi ve uyumluluğu sağlanacaktır.

3) Oluşturulacak veri tabanının kalite ve uygunluğu geliştirilerek, gıda kompozisyonu tablolarının ve/veya veri tabanlarının bu veri tabanına eklenebilirliği sağlanacaktır.

4) Mevcut gıda kodlama sistemleri, gıda tüketimi ve kompozisyonu verilerinin alışverişininde verimliliği sağlamak amacıyla gözden geçirilerek iyileştirilecektir.

Ayrıca, bu projenin bir diğer amacı da Avrupa'nın gıda arzı ve beslenme paterni ile tüketilen gıda maddelerinin besleyici veya besleyici olmayan komponentleri hakkında bilgi birikimi sağlamaktır.

1995 yılında yukarıda belirlenen amaçlarla yeterli sayıda ülkenin katılımı ile başlayan projeye, 1998 yılı sonunda 27 Avrupa ülkesi COST üyesi olarak, Rusya, İsrail ve Yeni Zelanda da gözlemci olarak katılmıştır. Bu katılım ile COST 99 projesi diğer COST projeleri içinde en çok katılımı olan proje olmuştur. Türkiye ODTÜ, Gıda Mühendisliği Bölümü olarak projeye ilk aylarda katılmak üzere müracaat etmiş ve uygun görülerek TÜBİTAK, Tarım, Orman ve Gıda Teknolojileri Araştırma Grubu'nca desteklenmiştir.

İÇİNDEKİLER

TABLO ve ŞEKİL LİSTESİ

TABLOLAR

Sayfa No

ŞEKİLLER

ÖZET

Bu projede, Devlet İstatistik Enstitüsü'nce 1994 yılında yapılan Hane Halkı Tüketim Harcamaları Anketi verileri kullanılarak, Türkiye'de günlük kişi başına ortalama protein, yağ, karbonhidrat, enerji, posa, yağ asitleri, kolesterol, vitamin ve mineral alımları hesaplanmış ve değerler Tavsiye Edilen Günlük Alım ve Günlük Referans Değerleri ile karşılaştırılmıştır.

Gıdalar tahıl ve tahıl ürünleri, et ve et ürünleri, balık, süt ve süt ürünleri, yumurta, meyveler, sebzeler, şeker ve şekerlemeler, tuz, baharatlar, hazır yemekler ile diğer gıdalar ve içecekler olarak gruplandırılmıştır. Gıdaların nem, enerji, protein, yağ, karbonhidrat, posa, yağ asitleri, kolesterol, vitamin - mineral içeriklerine göre kompozisyon tabloları oluşturulmuş ve her besin ögesinin hangi gıda grubundan ne oranda alındığı incelenmiştir.

Ortalama enerji ve protein alımı tavsiye edilen miktar düzeyindedir. Karbonhidrat - yağ alımlarının ise tavsiye edilen günlük miktarın üzerinde olduğu tespit edilmiştir. Sadece Güneydoğu Anadolu ve Doğu Anadolu bölgelerinde protein alımı tavsiye edilen en düşük günlük alım miktarının altında bulunmuştur.

Bütün bölgelerde en çok tüketilen gruplar sırasıyla tahıl ve tahıl ürünleri ile sebzelerdir. Et fiyatlarının diğer besin gruplarına nazaran daha pahalı oluşu, et tüketimini etkilediği gözlenmiştir. Buna bağlı olarak günlük hayvansal protein alımının tavsiye edilen değerlerin altında olduğu tespit edilmiştir.

Ortalama günlük alım değerlerine incelendiğinde demir ve kalsiyum alımının önerilene yakın, çinko alımının ise önerilenin çok altında olduğu görülmektedir. Diğer mineral alımlarının yeterli olduğu gözlenmiştir. Düşük demir ve çinko alım değerleri bu besin maddelerini en çok içeren hayvansal gıdaların az tüketilmesinden kaynaklanmaktadır.

Anahtar Kelimeler: Hane Halkı Tüketim Harcamaları Anketi, Beslenme, Gıda Kompozisyonları, Günlük Gıda Alımı, Tavsiye Edilen Günlük Alım, Günlük Referans Değerleri

ABSTRACT

In this study, Household Budget Survey Data of State Statistics Institute (1994) is analysed to calculate the average protein, fat, carbohydrate, energy, ash, fatty acids, cholesterol, vitamin and mineral per capita daily intake. Calculated values are compared with Recommended Daily Allowance and Daily Reference Values.

Foods consumed are grouped as: cereal and cereal products, meat and meat products, milk and milk products, eggs, fruits and vegetables, sugar and confectioneries, salt and spices, ready meals, beverages, and other foods. Composition tables of foods according to contents of water, energy, protein, fat, carbohydrate, ash, fatty acids, cholesterol, vitamins and minerals are prepared. Amount of nutrient intake from each food group is determined.

The average energy and protein intake in Turkey is found to be satisfactory. Carbohydrate and fat intake values are found to be higher than recommended daily amount. Protein intake is found to be lower than minimum recommended daily amount only in Southeast and East Anatolia regions.

Cereal and cereal products and vegetables are the mostly consumed groups in all regions. It is observed that the high meat prices affect consumption of meat and meat products and nutrient intake from this group.

Intake level for iron and calcium are slightly below the recommended values but zinc intake is well below the recommended value. Intake level of other minerals are found to be sufficient. Low iron and zinc intake values are due to the low consumption foods of animal origin.

Key Words: Household Budget Survey, Nutrition, Food Compositions, Daily Food Intake, Recommended Daily Allowance, Daily Reference Values

I- GİRİŞ

COST 99 Projesinin genel amacı Avrupa'da gıda tüketimi ve gıda komposizyonu verilerinin kalitesinin ve uygunluğunun geliştirilmesidir. Bu amaçla:

1) Avrupa içinde; yorum, tarif ve bilgi alışverişine elverişli kalitede bir gıda tüketimi ve gıda kompozisyonu veri tabanı tasarlanarak bir bilgi iletişim ağı oluşturulacaktır.

2) Gıda dengesi ve hane halkı bütçesi araştırmalarından elde edilecek gıda tüketimi ve piyasada bulunabilme verilerinin toplanmasının sürekliliği sağlanacak ve bu verilerin kalitesinin iyileştirilmesi ve uyumluluğu sağlanacaktır.

3) Oluşturulacak veri tabanının kalite ve uygunluğu geliştirilerek, gıda kompozisyonu tablolarının ve/veya veri tabanlarının bu veri tabanına eklenebilirliği sağlanacaktır.

4) Mevcut gıda kodlama sistemleri, gıda tüketimi ve kompozisyonu verilerinin alışverişininde verimliliği sağlamak amacıyla gözden geçirilerek iyileştirilecektir.

Ayrıca, bu projenin bir yan amacı olarak Avrupa'nın gıda arzı ve beslenme paterni ile tüketilen gıda maddelerinin besleyici veya besleyici olmayan komponentleri hakkında bilgi birikimi sağlanacaktır.

Proje kapsamında gıda tüketimi ve kompozisyonu verileri derlenerek oluşacak veri tabanlarının ulusal ve uluslararası düzeyde bir bilgi iletişim ağına bağlanması sağlanacaktır. Araştırma sonuçları düzenlenecek uluslararası toplantılarda ve seminerlede tartışılacak, bilgi toplama sırasında izlenecek yöntemlerin ve analiz metodlarının ülkeler düzeyinde uyumluluğu sağlanarak, bilgi depolanması için genel çerçeveler oluşturulacaktır.

Proje çalışmalarının;

1) gıda tüketim verileri,
2) gıda kodlaması ve
3) gıda kompozisyonu verileri,

olarak üç alt başlık altında toplanması öngörülmüştür. En kısa zamanda Avrupa Gümrük Birliği'nin kurulacağı düşüncesiyle bu verilerin her ülkenin kendine özgü yöntemde ve kapsamda toplanması mümkün görülmemektedir. Bu amaçla projenin ilk bir kaç yılında yeni veri toplama metodlarının geliştirilmesine çalışılacaktır. Mevcut gıda kodlama sistemleri Avrupa'da genel kullanıma kabul edilmeden önce test ve dokümante edilecektir. Bu amaçla proje kapsamında oluşturulacak yönetim kurulları mevcut kodlara yenilikleri eklemekle ve dokümante etmekle görevlendirileceklerdir. Bir bilgi iletişim ağının kurularak bilgileri kuruluşlar arasında alışverişe açmadan önce; verilerin kalitesinin değişkenlik sınırları, örnekleme ve analiz metodları, gıda bileşkenlerinin ortak ifade tarzı, dönüşüm katsayıları, veri tabanlarının oluşturulma yöntemi ve bilgi alışverişi için gerekli minimum şartlar hakkında görüş birliği sağlanacaktır. Ayrıca projenin tüm katılımcıları elektronik posta sistemine bağlanarak yayınlayacak düzenli bir haber bülteninden yararlanacaklardır.

II- GELİŞMELER

II. 1- 1995 YILI ÇALIŞMALARI

II.1.1- I. Yürütme Komitesi Toplantısı, Brüksel, Belçika (13 Ocak 1995)

Toplantıda yıllık olağan üç toplantının tarihleri tespit edilmiş ve çalışma grupları belirlenmiştir. Ülkemiz bu tarihte COST 99 projesine resmi olarak katılabilmesi için gerekli formaliteleri yerine getiremediği için toplantıya gözlemci olarak katılınmış ve çalışma gruplarının seçimi ve diğer idari konularla ilgili oylamalarda oy kullanamamıştır. Aşağıda belirtilen grupların teşkiline karar verilmiştir:

Veri Kalitesi: Prof. Agget
EURONIMS: Dr.Möller
Gıda Analizleri ve öncelikleri: Ms Ireland
Veri Değişimi-EURONIMS: Dr.Möller
Avrupe Beslenme Veri Tabanı: Prof. West
Hane Halkı Tüketim Harcamaları: Prof. Trichopoulou

Ayrıca Brüksel'de Avrupa Birliği'nde Türkiye Tarım Ataşesi Prof. Dr. Ersin İstanbulluoğlu ile de bir toplantı düzenlenmiş ve Tarım ve Köyişleri Bakanlığının projeye katılımı hususları görüşülmüştür. Toplantıya Proje Yöneticisi Prof. Dr. Suat Ungan katılmıştır.

II.1.2- II. Yürütme Kurulu Toplantısı, Bratislava, Çek Cumhuriyeti (29 Mayıs 1995)

Toplantıda geçen toplantı tutanakları görüşülerek oylandıktan sonra grup başkanları çalışmaları ile ilgili bilgiler sunmuşlardır. Prof. Hendricks gıda eşleme dokümanlarında kullanılması düşünülen karşılaştırma yaklaşımlarında bazı düzeltmeler gerektiğini, Hane Halkı Tüketim Harcamaları ile ilgili grup başkanı ise Romanya ve Türkiye gibi gelişmekte olan ülkelerin verileri ile olumlu katkılar sağlanacağını, eldeki verilerin en kısa zamanda sonuçlandırılarak yayınlanacağını belirtmiştir. Mevcut verileri kişisel bazda inceleyen grup üyesi Dr.Haroldsdottir, çalışmalarında kişiyi tanımlayan faktörlerin neler olması gerektiği hakkında tam bir fikir birliğinin sağlanamadığını, bu yüzden çalışmanın halen ön araştırma safhasında olması nedeniyle ileri bir toplantıya kadar süre istemiştir. Gıda Tanımlama ve Sınıflandırma Grubunun kurulmasına ve başkanlığına Ms Ireland'ın getirilmesi kararlaştırılmıştır. Toplantıya Proje Yöneticisi Yardımcısı Prof.Dr.Faruk Bozoğlu katılmıştır.

Bu arada Tarım ve Köyişleri Bakanlığı, Gıda Kontrol Genel Müdürlüğü ile temasa geçilerek projeye katılımları sağlanmıştır. Adı geçen kuruluşun, COST 99'a katılımları ile, 24.6.1995 tarihinde Bakanlar Kurulu'nun KHK/560 kararı (Gıdaların Üretimi, Tüketimi ve Denetlenmesine Dair Kanun Hükmünde Kararname) ile kendilerine verilmiş yetkiler ve ayrıca Avrupa Birliğine uyum çalışmaları çerçevelerinde, proje kapsamında yapılacak çalışmaların kendilerine çok fayda sağlayacağı tespit edilmiştir. Bu kapsamda, COST 99 Yürütme Kurulunun gıda kompozisyonu ve tüketimi çalışmalarındaki mevcut durumu değerlendirmek amacıyla hazırlamış olduğu bir anket

Gıda Kontrol Genel Müdürlüğü yetkilileri ve proje yöneticisi ile birlikte doldurularak yetkililere iletilmiştir. COST 99 üyesi tüm ülkelerce doldurulacak olan bu anketin sonuçları 1995 yılının son Yürütme Komitesi toplantısında (26 Ağustos 1995, Lahti-Finlandiya) incelenecektir.

II.1.3- III. Yürütme Komitesi Toplantısı, Lahti (Finlandiya) (30-31 Ağustos 1995)

Bu toplantıya 21 ülkeyi temsilen 37 üye ve gözlemci katılmıştır. Ayrıca bu toplantı 30 Ağustos 1995 tarihinde Lahti'de düzenlenen II. Uluslararası Gıda Veri Tabanı Konferansı ile ilişkilendirilerek, bu konferansın sonuçları 31 Ağustos 1995 günü devam eden Yürütme Komitesi toplantısında değerlendirilmiştir. II. Uluslararası Gıda Veri Tabanı Konferansı'nda, COST 99 projesi kapsamında geliştirilmekte olan LANGUAL veri tabanı programında kullanılacak; gıda tanımları ve kompozisyon tanımlarının standardlaştırma çalışmalarına devam edilmiştir.

COST 99 Yürütme Kurulunun gıda kompozisyonu ve tüketimi çalışmalarındaki mevcut durumu değerlendirmek amacıyla hazırlamış olduğu bir anket Gıda Kontrol Genel Müdürlüğü ve TÜBİTAK - MAM'ne iletilmişti. COST 99 üyesi tüm ülkelerce doldurulacak olan bu anketin sonuçları halen elde edilemediği için Lahti toplantısına sunulamamıştır.

Bu rapor döneminde ise Gıda Kompozisyonları Çalışma Grubunca "Ulusal Gıda Kompozisyonu Veri Tabanı için Analitik Öncelikler" adlı bir anket hazırlanarak üye ülkelere sunulmuştur. Bu anket Türkiye'de aşağıda belirtilen kuruluşlara iletilmiştir:

Ege Üniversitesi, Gıda Mühendisliği Bölümü
Hacettepe Üniversitesi, Gıda Mühendisliği Bölümü
Hacettepe Üniversitesi, Beslenme Bölümü
Gaziantep Üniversitesi, Gıda Mühendisliği Bölümü
İstanbul Teknik Üniversitesi, Gıda Mühendisliği Bölümü
TÜBİTAK, MAM
Merkez Hıfzıssıhha Enstitüsü

Veri tabanının bir bölümünü oluşturacak Hane Halkı Tüketim Harcamaları ile ilgili çalışmalar Devlet İstatistik Enstitüsü'nce ülkemizde de sonuçlandırılmıştır. Bu konuda Devlet İstatistik Enstitüsü Başkan Yardımcıları Prof.Dr. Ziya Aktaş ve Hakkı Özel ile temasa geçilmiştir. COST 99 projesi için kullanılacak format Yürütme Komitesi tarafından belirlendikten sonra halkımızın gıda tüketimleri, ilgili harcamaları ve tüketilen gıdaların kompozisyonları aynı veri tabanında birleştirilerek gerekli yorumların yapılabilmesi sağlanacaktır.

II.2- 1996 YILI ÇALIŞMALARI

II.2.1- IV. Yürütme Komitesi Toplantısı, Stuttgart (Almanya) (8-9 Mart 1996)

Bu toplantıya 22 ülkeyi temsilen 38 üye ve gözlemci katılmıştır. COST 99 Yürütme Kurulunun gıda kompozisyonu ve tüketimi çalışmalarındaki mevcut durumu değerlendirmek amacıyla hazırlamış olduğu bir anket Gıda Kontrol Genel Müdürlüğü ve TÜBİTAK - MAM'ne iletilmişti. Bu anket ilgili Üniversitelere de iletilmiş olup, cevap veren Ege ve Hacettepe Üniversitelerinin formları Danimarka'da değerlendirilmek üzere Dr. Möller'e iletilmiştir. Diğer Üniversiteler bu konuda COST 99 proje yöneticiliğine herhangi bir bilgi ulaştırmamışlardır. COST 99 üyesi tüm ülkelerce doldurulacak olan bu anketin sonuçları 18-21 Ekim 1996 tarihinde Wageningen (Hollanda) de yapılacak V. Yürütme Komitesi toplantısında ve takip eden çalıştayda irdelenecektir.

Veri tabanının bir bölümünü oluşturacak Hane Halkı Tüketim Harcamaları ile ilgili çalışmalar Devlet İstatistik Enstitüsü'nce ülkemizde de sonuçlandırılmıştır. Bu konuda Devlet İstatistik Enstitüsü (DİE) Başkan Yardımcıları Prof.Dr. Ziya Aktaş ve Hakkı Özel ile yeniden temasa geçilmiştir. COST 99 projesi için kullanılacak format Yürütme Komitesi tarafından belirlendikten sonra halkımızın gıda tüketimleri, ilgili harcamaları ve tüketilen gıdaların kompozisyonları aynı veri tabanında birleştirilerek gerekli yorumların yapılabilmesi sağlanacaktır. Bu konu'da yüksek lisans öğrencisi Kılıçhan Kaynak görevlendirilmiş olup çalışmalara başlamıştır. Bu kapsamda DİE'den elde edilecek anket sonuçları tüketilen gıda maddelerinin kompozisyonları ile eşleştirilerek halkımızın gelir gruplarına ve coğrafik bölgelere göre beslenme alışkanlıkları tespit edilmeye çalışılacaktır.

Veri tabanı değişimi programı için ilgili Bakanlıktan Gıda Kontrol Genel Müdür Yardımcısı İsmail Mert Türkiye temsilcisi olarak teklif edilmiş ve Yürütme Komitesi tarafından bu teklifimiz uygun görülmüştür.

II.2.2- V. Yürütme Komitesi Toplantısı Wageningen, Hollanda (20-21 Ekim 1996)

Bu toplantıya ilgili Devlet Bakanlığınca gerekli iznin verilmemesi nedeniyle katılınamamıştır.

II.3- 1997 YILI ÇALIŞMALARI

II.3.1- VI. Yürütme Komitesi Toplantısı Norwich, İngiltere (18-20 Nisan 1997)

V Yürütme Komitesi Toplantısı ile ilgili çalıştaylar ise 18-20 Nisan 1997 tarihleri arasında Norwich (İngiltere) de yapılmıştır. Türkiye'de bu sırada tatil olması nedenilye bu toplantıya da katılınması mümkün olmamıştır.

Veri tabanının bir bölümünü oluşturacak Hane Halkı Tüketim Harcamaları ile ilgili çalışmalar Devlet İstatistik Enstitüsü'nce ülkemizde de sonuçlandırıldığı yukarıda belirtilmişti. Bu anketle ilgili verileri istenilen formatta alabilmek için DİE'ne başvurulmuş ve protokol (bakınız: EK 1 veya EK 2) karşılıklı imzalanarak veriler disketler halinde elde edilmiştir. Bu çalışmaları yürütmek üzere yüksek lisans öğrencileri Kılıçhan Kaynak'a ilaveten Reyhan Ünsalan'da görevlendirilmiştir. Gıda kompozisyonları, internet aracılığı ile Amerika Birleşik Devletleri Gıda ve İlaç İdaresinden ve H.Ü. Beslenme Bölümü'nden temin edilmiştir. Ülkemize has olup da kompozisyonu bilinmeyen bazı gıdalar için hammadde kompozizyonlarından hesaplama veya laboratuvarda tayin yolları kullanılmıştır.

II.3.2- VII. Yürütme Komitesi Toplantısı, Varşova, Polonya (13-15 Eylül 1997)

Toplantı 13 - 15 Eylül 1997 tarihleri arasında yapılmıştır ve toplantıya Prof. Dr. Suat Ungan ile birlikte Prof. Dr. Faruk Bozoğlu katılmışlardır. Bu toplantıya 28 ülkeyi temsilen 42 üye ve 22 gözlemci katılmıştır. Son yılda olan katılımlarla COST 99 projesi, tüm COST üyelerinin katıldığı ilk ve tek proje haline gelmiştir.

II.3.3- Bölgesel Gıda Tüketimi Verilerinin Değerlendirilmesi

Devlet İstatistik Enstitüsü'nce 1995 yılında yapılan anketlerden elde edilen bölgesel gıda tüketim miktarları ve harcamaları verilerine gıda komposizyonları eklenerek bölgesel gıda tüketimlerinin kompozisyonları tespit edilmiştir.

II.4- 1998 YILI ÇALIŞMALARI

II.4.1- VIII. Yürütme Komitesi Toplantısı, Turku, Finlandiya (25-27 Nisan 1998)

Toplantı 25-27 Nisan 1998 tarihleri arasında yapılmıştır. Toplantıda bu proje kapsamında yapılan çalışmalar ile ilgili bir sunum gündeme aldırılmıştır. Ancak toplantı davetiyesi Easter ve Kurban Bayramı tatillerinin birbiri arkasına gelmesi sonucu toplantı gününden iki gün önce alınmış ve bu nedenle katılmak mümkün olamamıştır.

Sunumun sonbaharda Wageningen'de (Hollanda) yapılacak toplantıya ertelenmesi için gerekli girişimde bulunulmuştur.

II.4.2- Bölgesel Gıda Tüketimi Verilerinin Değerlendirilmesi

Devlet İstatistik Enstitüsü'nce 1995 yılında yapılan anketlerden elde edilen bölgesel gıda tüketim miktarları ve harcamaları verilerine gıda komposizyonları eklenerek bölgesel gıda tüketimleri, kompozisyonları (enerji, protein, karbonhidrat ve yağ) ve beslenme alışkanlıkları bulunmuştur.

Ayrıca tez öğrencisi Kılıçhan Kaynak mineral ve vitamin tüketimleri ile ilgili benzer çalışmalara devam etmiştir.

II.4.3- H.Ü. Beslenme ve Diyetetik Bölümü ile Ortak Toplantı (11 Haziran 1998)

Proje sonuçlarının bir ön değerlendirmesi ilgili Bölüm Başkanı ve öğretim üyelerinin katılımı ile Hacettepe Üniversitesi'nde gerçekleştirilmiştir. Benzer toplantı 22 Haziran 1998 tarihinde teknik amaçlı olarak tekrarlanmıştır.

II.4.4- Devlet İstatistik Enstitüsü ile Ortak Toplantı (6 Temmuz 1998)

DİE tarafından sağlanan anket sonuçlarının yapılan protokol çerçevesinde gizli tutulması gerekmektedir. Proje sonuçlarının yayınlanması hakkında İşgücü, Hizmetler Fiyat İstatistikleri ve İndeksler Dairesi Başkanı Yusuf Yardımcı ve ilgili yardımcısının da katıldığı bir toplantı yapılmıştır. Sonuçların DİE'ne sunulmasına ve DİE ile birlikte yapılacak bir toplantıda irdelenmesine karar verilmiştir.

II.4.5- IX. Yürütme Komitesi Toplantısı, Wageningen, Hollanda (24-26 Ekim 1998)

Toplantı 24Ekim 1998 de Wageningen International Center'da 9.30–12.30 saatleri yapılmıştır.

Gündem dışı olarak, projenin 1999 yılı ortalarında tamamlanmasından sonra aynı başlık ve kapsamda bir proje teklifinin bu projenin devamı olarak hazırlanması ve Avrupa Birliği (AB) tarafından desteklenecek 5.Çerçeve Projeler (framework) kapsamında sunulmasına hususu görüşülmüştür. Projenin bundan böyle COST kapsamından çıkarılıp AB'den desteklenmesi amaçlanmıştır. AB üyeleri için avantaj sağlayacak bu durum Türkiye'nin projeye katılımını imkansız duruma getirmiştir. Bu durumda projenin bir bölümünün, gerek duyulursa, AB tarafından, Türkiye'deki deneyimli bir kuruluşa ücreti karşılığı yaptırılması söz konusu olabilecektir.

II.4.6- COST 99 Çalıştayı (Workshops), Wageningen, Hollanda (24-26 Ekim 1998)

Bu çalıştayın gündemi, AB'ye yakın zamanda üye olacak orta ve doğu Avrupa ülkelerin hazırlanması için gerekli çalışmaların planlamasına ayrılmıştır.

II.4.7- Bölgesel Gıda Tüketimi Verilerinin Değerlendirilmesi

Devlet İstatistik Enstitüsü'nce 1995 yılında yapılan Hane Halkı Tüketim Harcamaları anketinden elde edilen bölgesel gıda tüketim miktarları ve harcamaları ile ilgili çalışmalar büyük ölçüde tamamlanmış ve bölgesel ve Türkiye genelindeki beslenme alışkanlıkları bulunmuştur. Yüksek Lisans öğrencileri, Reyhan Ünsalan ve Kılıçhan Kaynak tez çalışmalarını tamamlamışlardır **(EK 1 ve EK 2).**

II.5- 1999 YILI ÇALIŞMALARI

II.5.1- DİE Araştırma Sempozyumu '98, Ankara (23-25 Kasım 1999)

Proje kapsamında yapılan çalışmalar DİE tarafından düzenlemen Araştırma Sempozyumu'nda sunulmuştur.

II.5.2- Türkiye'de Sebze ve Meyva Tüketimi Alışkanlığı

DİE verileri kullanılarak bölgeler itibariyle sebze ve meyva tüketimi ve tüketimin bölgenin geliri ile ilişkilendirilmesi konusunda bir araştırma lisans öğrencisi Eylem Zengin tarafından Bitirme Ödevi olarak yapılmıştır

II.5.3- Türkiye'de İçecek Tüketimi Alışkanlığı

DİE verileri kullanılarak bölgeler itibariyle içecek tüketimi ve tüketimin bölgenin geliri ile ilişkilendirilmesi konusunda bir araştırma lisans öğrencisi Deniz Girgin tarafından Bitirme Ödevi olarak yapılmıştır.

II.5.4- X. Yürütme Komitesi Toplantısı, Roma, İtalya, (4-8 Temmuz 1999)

Yürütme Komitesi toplantısı 4 Temmuz ve 8 Temmuz günleri Roma'da FAO binasında yapılmıştır

Toplantıda görüşülen konular aşağıda özetlenmiştir:

1. Toplantıda projenin bütçesi üzerinde genel görüşme açılmış ve kalan meblağın proje bitim tarihi olan Ekim 1999 dan itibaren yaklaşık 6 ay süre ile kullanılabileceği AB , DG XII, Bilimsel Sekreteri Dr. F. Serra tarafından bildirilmiştir.

2. Araştırma grupları başkanları projenin son durumu hakkında raporlarını sunmuşlar ve kalan kısımların tamamlanabilmesi için küçük gruplar halinde birkaç toplantının daha düzenlenmesi gereği üzerinde durmuşlardır. Son genel toplantının Mayıs 2000 de Yunanistan'da yapılması kararlaştırılmıştır.

3. Langual'ın ortak kullanıma açılabilmesi için son aşamaya gelindiği ancak bunun yaklaşık 6 ay sonra gerçekleşebileceği bildirilmiştir.

4. Projenin mümkünse AB V. Çerçeve Programı Projeleri kapsamında devamı konusunda genel görüşme açılmış ve bu konuda gerekli hazırlıkların yapılmasına karar verilmiştir.

II.5.5- COST 99 Çalıştayı (Workshop), Roma, İtalya (4 ve 8 Temmuz 1999)

Grup başkanları projenin geleceği ile ilgili görüşlerini sunmuşlar ve çalıştay bu konudaki genel görüşme ile sonuçlanmıştır.

II.5.6- Türkiye'de Besin Ögeleri Alımı ve Gıda Grupları Tüketimi Alışkanlığı Araştırmaları:

DİE verileri kullanılarak, daha önceden yapılmış bulunan Sebze ve Meyva ile İçecek gruplarına ilaveten, aşağıda belirtilen grupların tüketim analizleri bölgeler bazında ODTÜ, Gıda Mühendisliği öğrencileri tarafından bitirme ödevi olarak yapılmıştır.

Konu	Öğrencinin adı
Tahıl ve Tahıl Ürünleri	Nuray Gürtekin
Süt ve Süt Ürünleri	Elif Özsoy
Et ve Et Ürünleri	Asuman Uğrasız
Şeker ve Şekerli Ürünler	Nuray Akıncıoğlu

Bu araştırmaların sonuçları aşağıda de verilmiştir:

Birleşmiş Milletler, Gıda ve Tarım Örgütünün hazırlamış olduğu Gıda Arzı Haritasına göre ülkemiz birinci sıradaki grupda, yani günde 3200 kcal enerji arzına sahip ülkeler arasında yer almaktadır. Ayrıca bu haritaya göre ülkeler bulundukları coğrafik bölgeye ve endüstrileşme seviyesine göre de sınıflandırılmışlar; ve her sınıf için günlük enerji arzının hangi gıda gruplarınca sağlandığı belirtilmiştir. Özetle, endüstrileşmiş ülkelerdeki gıda arzının % 25 ini tahıl ve tahıl ürünleri, Türkiye'nin bulunduğu sınıfta ise % 50 sini bu grup sağlamaktadır.

Çalışmalar 1994-1995 yılı içinde Devlet İstatistik Enstitüsünün yapmış olduğu Hane Halkı Tüketim Harcamaları Anketi'nin gıda alımları ile ilgili kısmının analizini içermektedir. Yapılan bu ankette örnekleme ile seçilen 26,256 hanenin, hangi malları ne miktarda ve ne kadar ödeyerek aldıkları yıl boyunca izlenerek tespit edilmiştir. Bu anketler diğer bütün ülkelerde aynı yöntemlerle ve belirli zaman aralıkları ile yapılmaktadır. Ülkemizde de aldığımız duyuma göre 2000 yılı içinde tekrarlanacaktır.

II.5.6.1- GIDA ÖGELERİ İTİBARİYLE TÜRKİYE'DE GIDA ALIMI

Bu anketin gıda maddeleri ile ilgili bölümü, coğrafik bölgeler bazında, ilgili kuruluştan (DİE) temin ederek, gıda grupları ve gıda ögeleri bakımından incelenmiştir. Bu çalışma, Türk halkının gıda tüketimi paternini tespit etmeye yönelik bu kapsamda yapılmış ilk ve tek araştırmadır. Yaklaşık 900 gıda maddesi; enerji, protein, yağ, karbonhidrat, toplam lif, doymuş/doymamış yağlar, kolesterol, vitaminler ve benzeri besin ögeleri miktarları açısından analiz edilmiştir. Sonuçta Türkiye toplamında ve bölgelerimiz bazında halkımızın bu besin ögelerini ne miktarlarda ve hangi gıdalardan aldıkları tespit edilmiş ve bu veriler dünyaca kabul edilen değerlerle karşılaştırılmıştır **(Tablo 1)**. Elde edilen değerler Tavsiye Edilen Günlük Gıda Alımları rakkamlarının alt veya üst limitleri içindedir. Enerji alımı en yüksek olan bölgemiz Karadeniz olup, bunu Ege ve Marmara bölgelerimiz takip etmektedir. Genelde demir, kalsiyum ve özellikle çinko değerlerimiz tavsiye edilen miktarların oldukça altındadır. İçme suyu bu araştırma kapsamında bulunmadığından, kalsiyum değerindeki düşüklüğün, içme suyu ile karşılandığı kabul edilebilir. Ancak demir ve çinko değerlerindeki düşük miktar hayvansal gıdaların az tüketilmesinden kaynaklanmaktadır. Bilindiği gibi demir, kansızlık ile ilgili sorunlar yaratmakta, çinko ise büyüme, stres ve dikkat dağılımı gibi sorunlara neden olmaktadır. Türkiye'deki trafik kazaları ile çinko yetersizliğinin beslenme uzmanlarınca değerlendirilmesi gerekir.

Türk halkının enerji alımının % 52 si (dünya ortalaması % 50) tahıl ve tahıl ürünlerinden, % 4 ü (dünya ortalaması % 8) hayvansal gıdalardan, % 7 si (dünya ortalaması % 5) süt ve süt ürünlerinden, % 16 sı (dünya ortalaması % 11) yağlardan, % 12 si (dünya ortalaması % 14) sebze ve meyvelerden ve % 8 i (dünya ortalaması % 9) şeker ve şekerlemelerden temin edilmektedir.

Besin ögeleri bakımından incelediğinde ise, enerjimizin % 58 i karbon-hidratlardan, % 30 u yağlardan ve % 12 si proteinden gelmektedir.

Görüldüğü gibi hayvansal gıdalardaki tüketimimiz dünya ortalamasının yaklaşık yarısıdır ve bu konu üzerinde ilgililerin önemle durması gerekmektedir **(Tablo 2** ve **Şekil 1)**.

Diğer önemli bir besin ögesi de bilindiği gibi proteindir. Protein alımımız, tüm bölgelerimizde, tavsiye edilen miktarın üzerinde bulunmaktadır. Ancak, bunun hangi gıda grubundan temin edilmekte olduğunu incelediğinde hayvansal gıda tüketimimizin düşük olması nedeniyle, halkımız proteinin % 55 ini tahıl ve tahıl ürünlerinden elde etmektedir. Besin ögeleri itibariyle de protein alımımız % 72 oranında bitkisel, % 28 oranında ise hayvansal kaynaklıdır **(Şekil 2)**.

Halkımızın gıda harcamalarını incelendiğinde yine en büyük payı % 28 ile tahıl ve tahıl ürünleri almaktadır. Bunu % 24 ile sebze, % 15 ile meyve, % 12 ile süt, süt ürünleri ve yumurta grubu takip etmektedir. Et ve et ürünleri ise gıda harcamalarımızın sadece % 3 ünü oluşturmaktadır. Bunun nedeni de, et ürünlerin diğer tüm ürünlerin ortalama fiyatının yaklaşık 5 katı olmasından kaynaklanmaktadır. Sonuçta gelir düzeyinin düşük olması nedeniyle halkımız ucuz gıdalara yönelmektedir **(Şekil 3)**.

II.5.6.2- TÜRKİYE'DE GIDA TÜKETİM ALIŞKANLIĞI

Çalışmanın ikinci kısmında halkımızın hangi gıda maddesini ne miktarlarda tükettiği özetlenmiştir.

Tahıl ve tahıl ürünleri grubunu incelediğinde, bu grubun % 65 ini ekmeğin oluşturduğunu görüyoruz. Bu grubun enerjimizin % 52 sini temin ettiğini anımsarsak, sadece ekmeğin tek başına enerji kaynağımızın % 35 inin sağladığını görmekteyiz. Bunu % 24 ile buğday unu takip etmektedir. Yani evlerde un kullanarak yaptığımız yiyecekler. Bu rakkamın ilavesi ile enerji alımımızın % 46 sı ekmek ile buğday unundan kaynaklanmaktadır. Bu rakkam üzerinde de beslenme uzmanlarımızın ve diğer ilgililerin önemle durması gerektiği kanaatındayım (**Şekil 4**).

Süt ve süt ürünleri grubunu incelediğinde, tüketimin % 54 ünün süt, % 39 unun yoğurt ve % 13 ünün de peynir şeklinde olduğunu görmekteyiz (**Şekil 5**).

Taze sebze, meyva ve kuru baklagiller grubunda da ilginç sonuçlar ortaya çıkmaktadır. Halkımız sebze olarak, en çok tomates, sırasıyla da patates, biber, salatalık, patlıcan, soğan, fasülye tüketmektedir (**Şekil 6**).

Taze meyve tüketimimizin en büyük kısmını karpuz, bunu, sırasıyla da elma, portakal, limon, kavun, üzüm ve diğerleri takip etmektedir (**Şekil 7**).

Bakliyat tüketiminde ise kuru fasülyeyi, mercimek ve nohut takip etmektedir (**Şekil 8**).

II.5.7- Gıda Güvensizliği ve Hassaslık Olasılığı Bilgi Haritalama Sistemi (FIVIMS – Food Insecurity and Vulnerabilty Information Mapping System) Çalışmaları, Ankara (17-18 Mayıs 1999)

Dünya Gıda Zirvesi Çerçevesinde FAO tarafından 17 – 18 Mayıs 1999 tarihlerinde Ankara'da Tarım ve Köyişleri Bakanlığı, Koruma ve Kontrol Genel Müdürlüğü organizatörlüğünde hassas grupların belirlenmesi amacılya düzenlenen "beyin fırtınası" toplantısı yapılmıştır. Bu toplantıya Prof. Dr. Suat Ungan ve Yük. Müh. Reyhan Ünsalan COST 99 projesi kapsamında yapmış oldukları çalışmalar nedeniyle davet edilmişlerdir. Prof. Dr. Suat Ungan grup başkanı olarak seçilmiş ve toplantıyı yönetmiştir.

Tablo 1- TAVSİYE EDİLEN GÜNLÜK ALIM (TGA) VE GÜNLÜK REFERANS DEĞERLERİN (GRD) TÜRKİYE GENELİNDE ve BÖLGELER BAZINDA KARŞILAŞTIRMASI

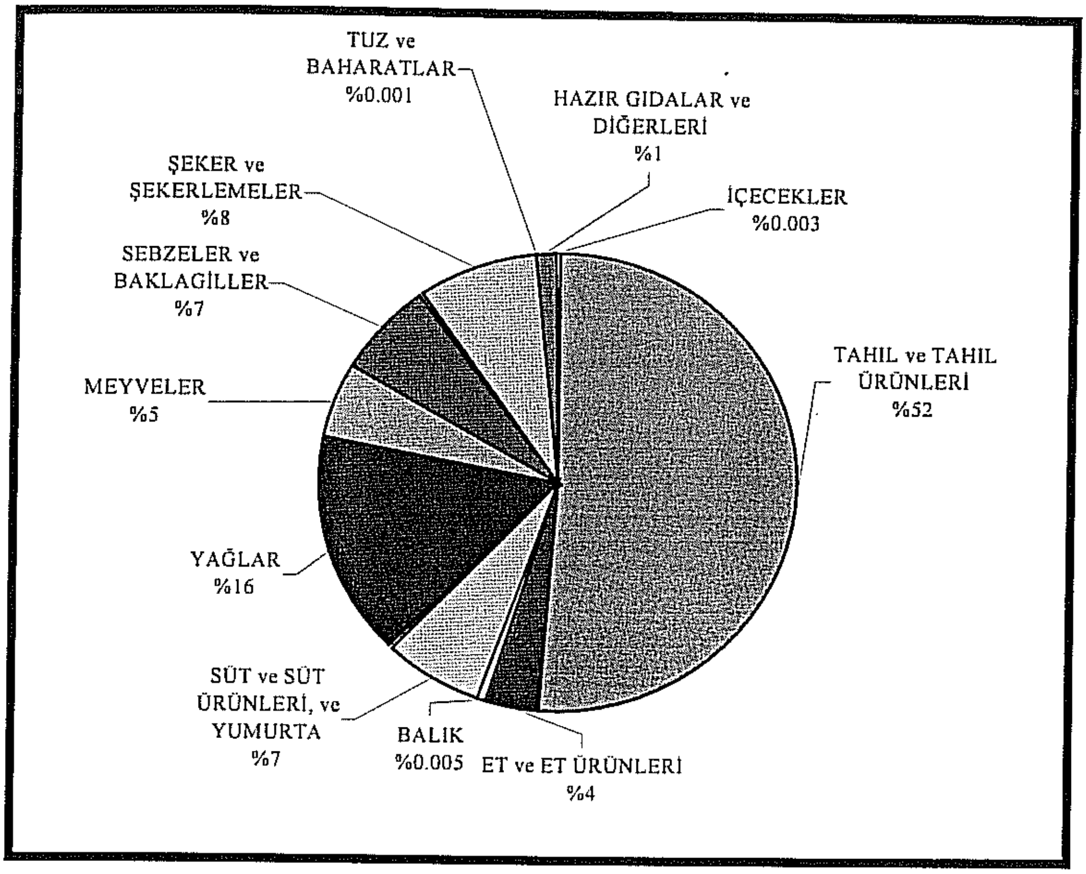
BESİN	TGA - 33% *	TGA, GRD	TGA + 33% *	Türkiye geneli	İç Anadolu	Akdeniz	Ege	Karadeniz	Marmara	G.Doğu. Anadolu	Doğu Anadolu
Enerji (kcal)	1366	2040	2713	2023	2123	2103	2120	2282	2120	1728	1822
Protein (g)	30.284	45.20	60.116	56.73	56.46	57.64	59.05	62.32	58.69	51.74	52.09
Lif (g)	16.67	25.00	33.33	21.37	20.54	23.71	22.12	22.15	20.58	21.35	19.40
Kalsiyum (g)	0.67	1.00	1.33	0.56	0.59	0.57	0.63	0.60	0.59	0.47	0.47
Demir (mg)	12.00	18.00	24.00	15.97	15.96	13.35	16.11	17.23	16.12	15.35	14.69
Çinko (mg)	10.00	15.00	20.00	6.76	6.73	7.02	7.04	7.27	6.95	6.13	6.28
Vitamin A (mcg Re)	583.34	875.00	1166.66	1555.91	1848.52	1755.60	2025.60	1509.29	1577.18	1055.50	1254.00
Vitamin E (mg Alpha-Te)	6.00	9.00	12.00	6.09	6.76	6.66	8.23	6.58	7.13	3.67	4.32
Thiamin (mg)	1.00	1.50	2.00	2.15	2.14	2.17	2.17	2.34	2.13	2.13	1.97
Riboflavin (mg)	1.13	1.70	2.27	1.77	1.82	1.82	1.86	1.96	1.84	1.56	1.56
Niacin (mg)	13.33	20.00	26.67	21.79	21.81	21.47	21.33	23.94	22.09	21.26	20.47
Folate (mg)	0.27	0.40	0.53	0.28	0.28	0.31	0.33	0.30	0.29	0.25	0.24
Vitamin C (mg)	40.00	60.00	80.00	111.61	117.64	132.08	141.98	112.24	104.57	89.69	92.19
Doymuş Yağ Asitleri (g)	less than 20.00			19.35	19.49	19.19	19.11	21.52	20.45	15.42	20.28
Doymamış Yağ Asitleri (g)	less than 45.00			39.09	39.38	40.98	43.92	44.59	45.72	27.93	33.09
Kolesterol (mg)	less than 300.00			134.48	145.24	130.34	147.04	157.78	159.40	83.79	122.72
Yağ (g)	less than 65.00			66.7	68.28	68.77	72.00	74.72	73.84	50.07	61.43
Carbohydrate (g)	less than 300.00			306	326.59	319.22	315.09	344.09	309.44	268.40	267.07

Tablo 2. TÜRKİYE'DE GIDA GRUPLARINA GÖRE BESİN ÖGELERİNİN GENEL DAĞILIMI

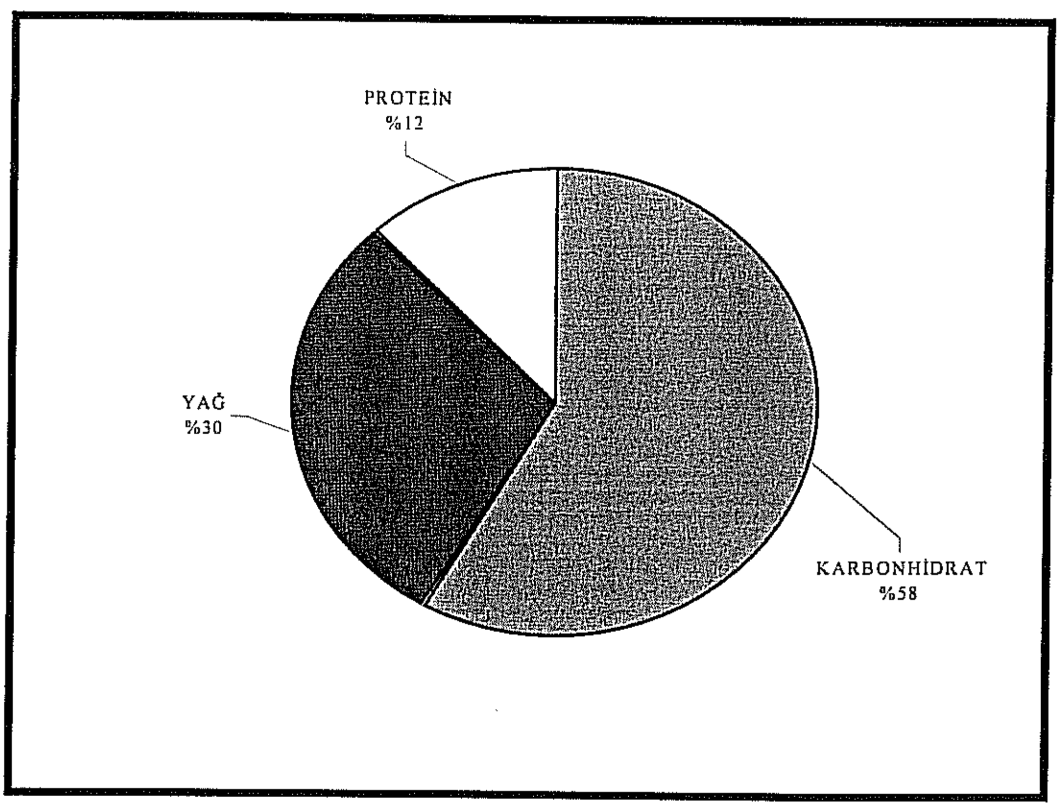
	Tahıl ve Tahıl Ür. %	Et ve Et Ür. %	Balık %	Süt ve Süt Ür., ve Yumurta %	Yağ %	Meyve %	Sebze, Baklagil %	Şeker ve Şekerleme %	Tuz ve Baharat %	Hazır Gıda ve Diğerleri %	İçecek %
Enerji	52	4	0	7	16	5	7	8		1	0
Protein	55	10	3	15	0	4	12	1		1	0
Yağ	15	8	3	13	55	3	1	1		1	0
Karbonhidrat	66	0	0	2	0	9	9	13		0	1
Lif	47.9	0	0	0	0	15.6	33.3	0.4	0.6	0.8	1.3
Kalsiyum	36.3	0.8	1	38.6	0.2	5.3	12.3	1.6	0.7	0.4	2.7
Demir	66.2	3.6	0.8	2.2	0.6	3.4	18.1	1.9	0.7	0.6	1.9
Çinko	44.6	13.4	1.2	15.7	0.2	4.8	15	0.7	0.4	0.7	3.3
Vit A	0.1	2.8	0.1	6.6	2	20.6	62.7	0.1	2.2	2.6	0
Vit E	11.8	1.2	0.5	4.6	48.2	15.4	15.2	0.3	0.3	2.5	0
Thiamin	77.5	1.3	0.3	3.1	0	5.8	10.8	0.4	0.1	0.5	0.2
Riboflavin	58.4	4.7	0.7	19.5	0.1	3.5	8.6	0.9	0.2	0.6	2.7
Niacin	69.5	9	2.3	0.9	0	3.1	9.8	0.3	0.1	0.7	4.2
Folate	33.2	2.4	0.2	6.2	0	9	45.2	0.1	0.2	0.9	2.5
Vit C	0	0.2	0	0.8	0	32.4	62.5	0	0.2	2.4	1.3
Doymuş Yağ Asitleri	11.4	9.6	0.4	25.2	49.6	1.3	0.7	1.4	0.1	0.1	0.1
M.Doymamış Yağ Asitleri	6.9	6.4	0.4	7.8	74.7	2.6	0.3	0.7	0.1	0.1	0
P.Doymamış Yağ Asitleri	40.4	4.7	1.1	4.5	36	8.1	3.8	0.3	0.5	0.5	0.1
Kolesterol	0.3	18.9	3.2	66.4	10.7	0	0	0.3	0	0.1	0.1
Tüketim Dağılımı	29	3	1	12	3	15	24	4	1	1	7

ŞEKİL 1

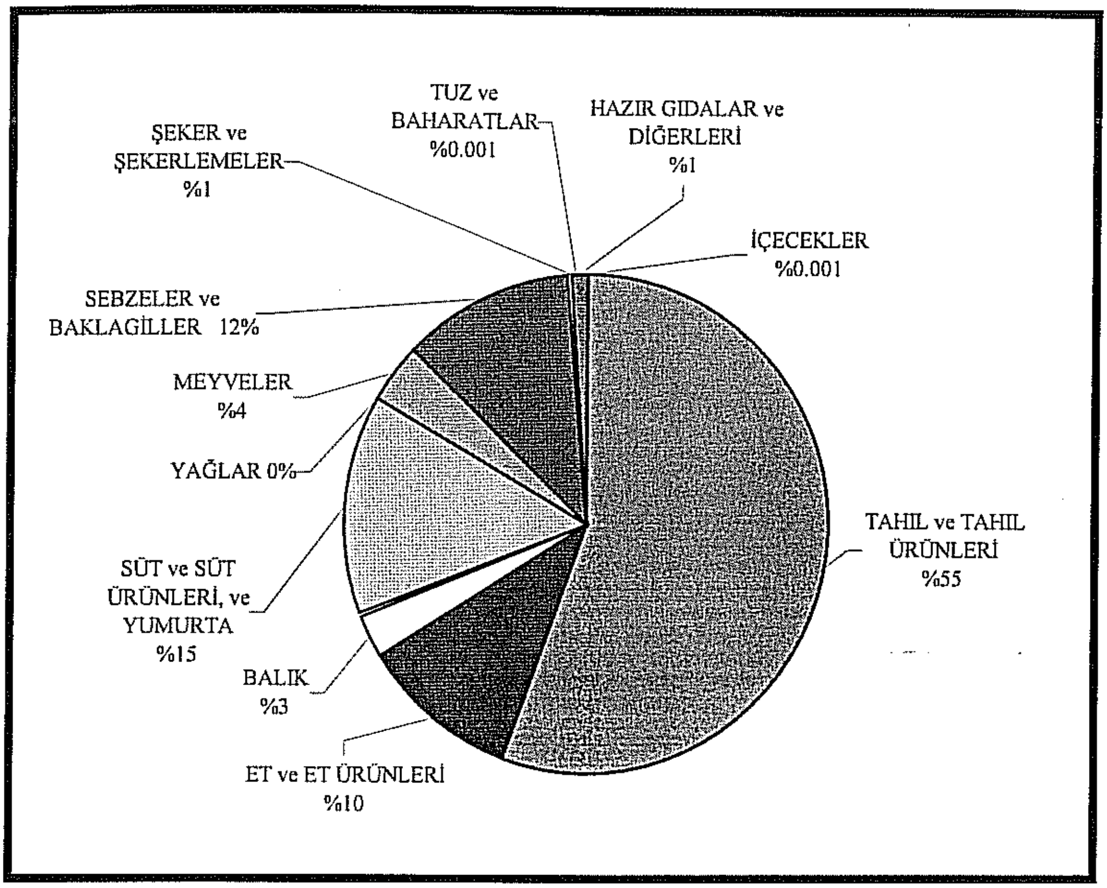
GÜNLÜK ENERJİMİZİ HANGİ GIDALARDAN ALIYORUZ?



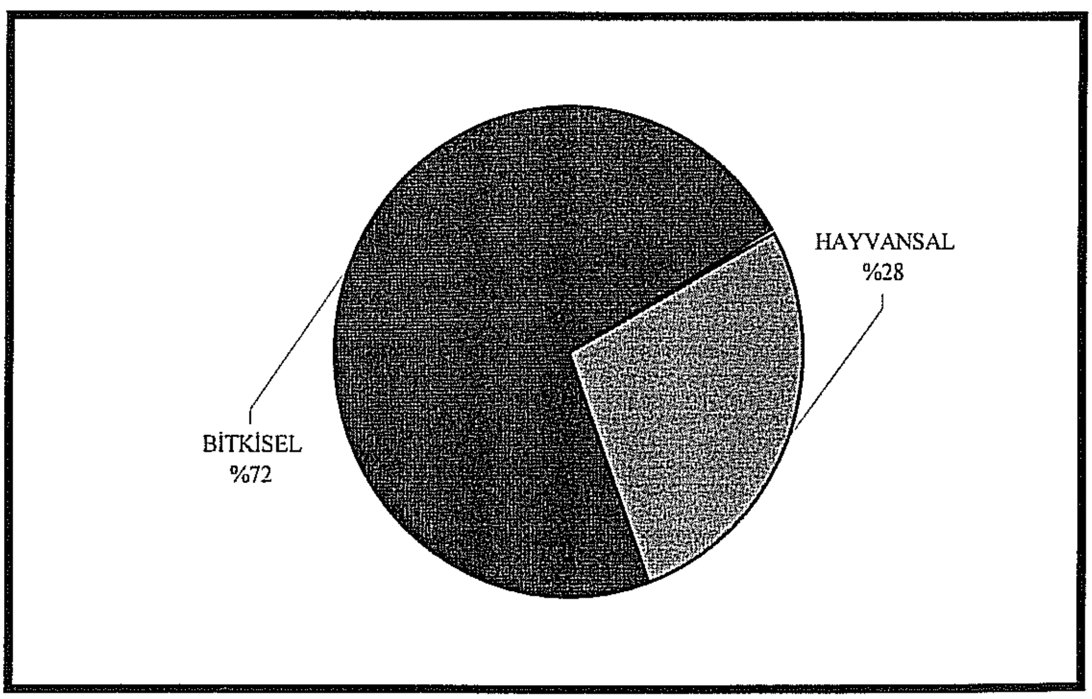
GÜNLÜK ENERJİ ALIMINDA GIDA ÖGELERİNİN PAYI



ŞEKİL 2
GÜNLÜK PROTEİNİ HANGİ GIDALARDAN ALIYORUZ?

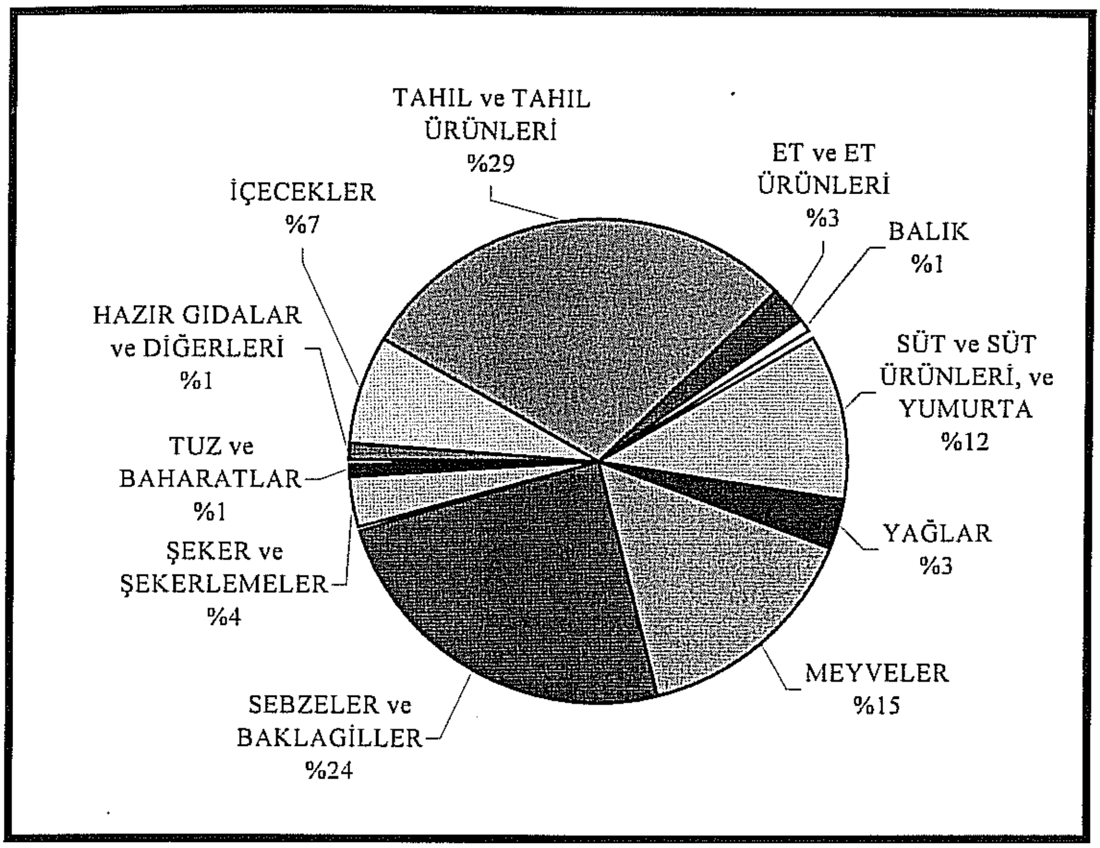


PROTEİN KAYNAKLARI

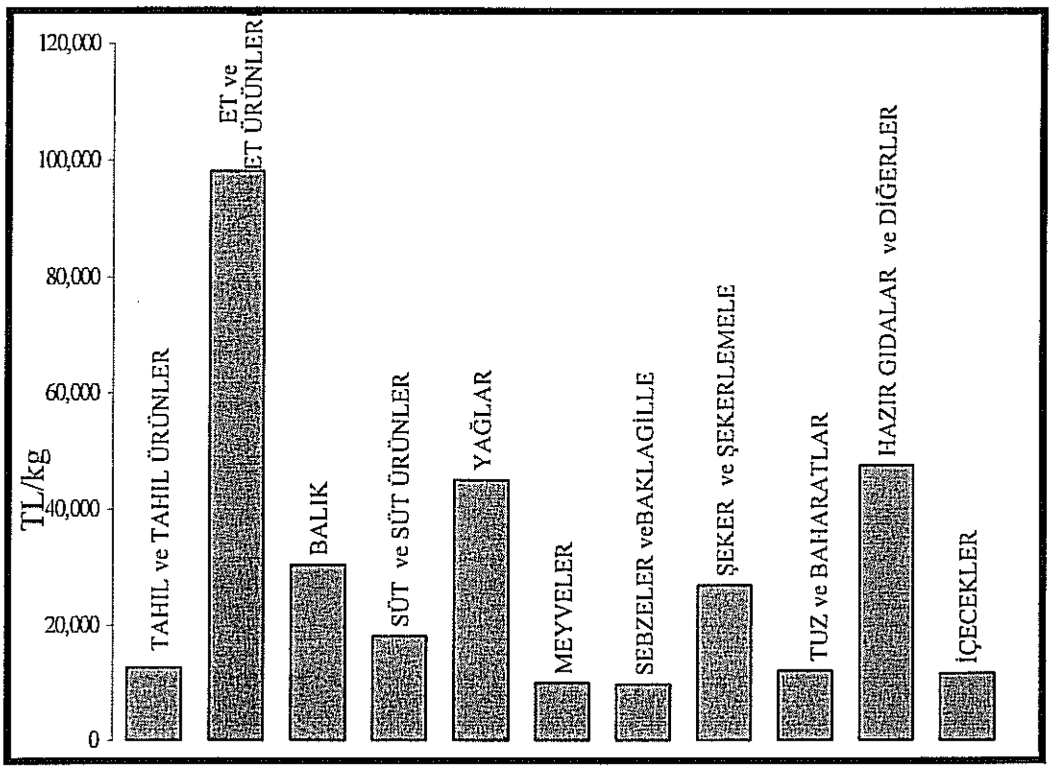


ŞEKİL 3

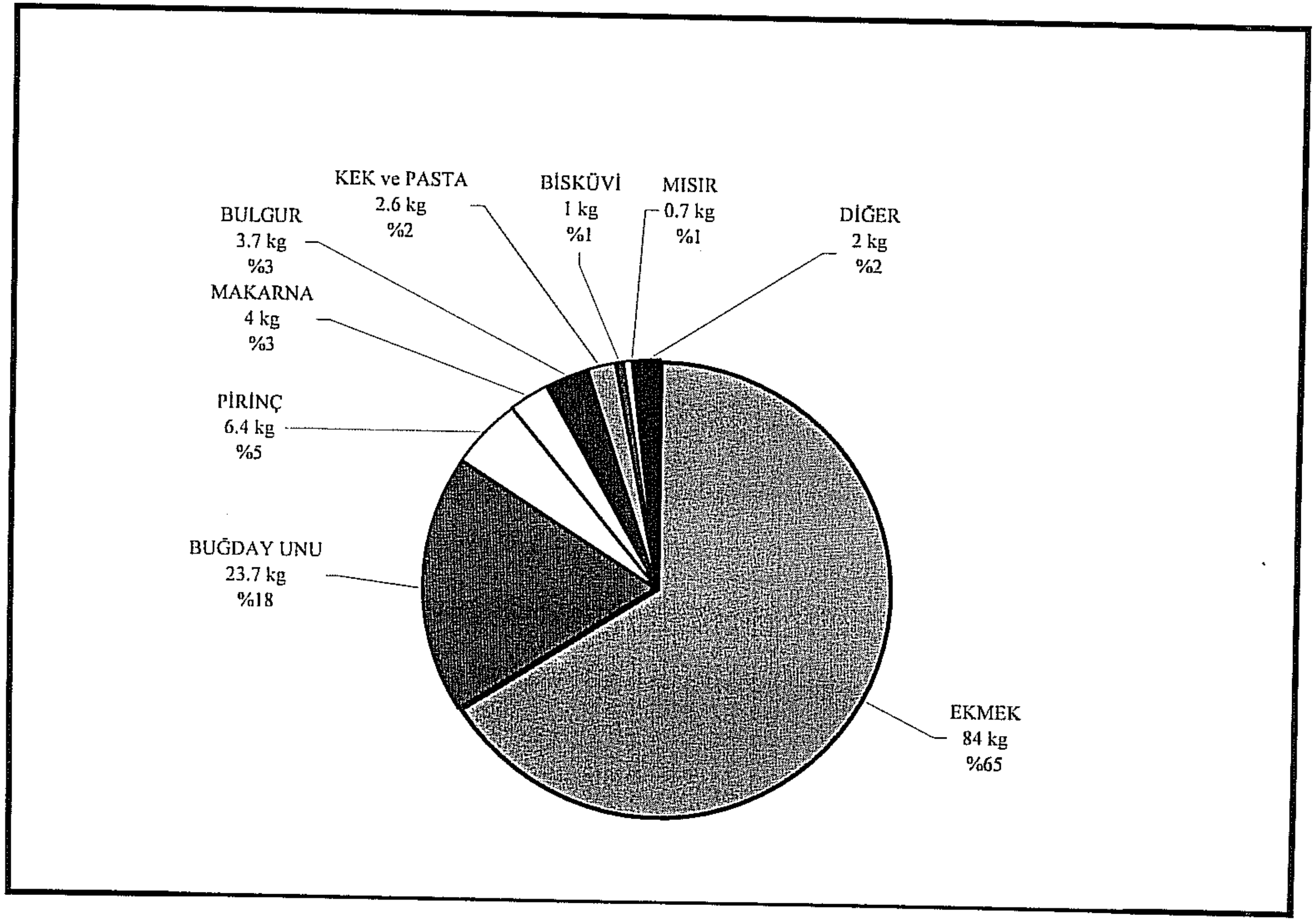
TÜRKİYE'DE GIDA GRUPLARININ TÜKETİMİ, (%)



GIDA GRUPLARININ ORTALAMA BİRİM FİYATLARI (1994)

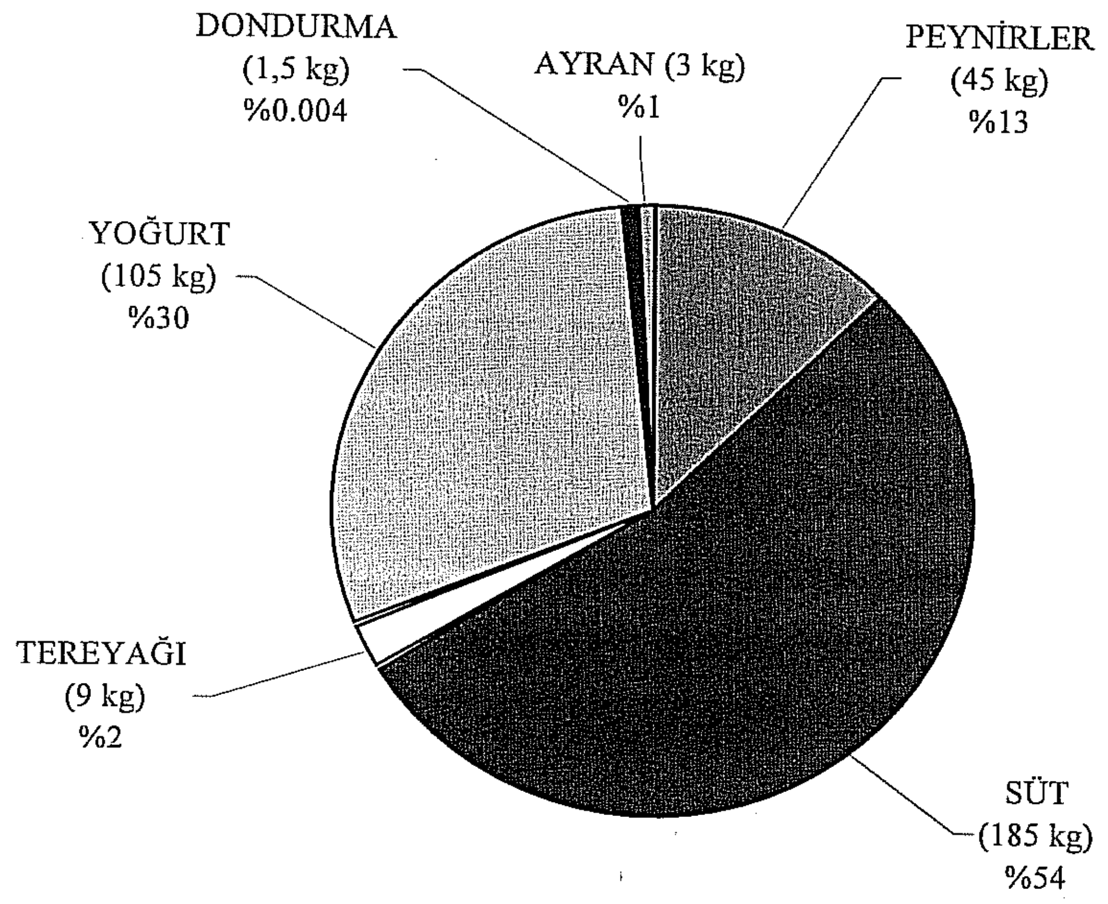


ŞEKİL 4
Tahıl ve Tahıl Ürünleri (yıllık – kişi başına)

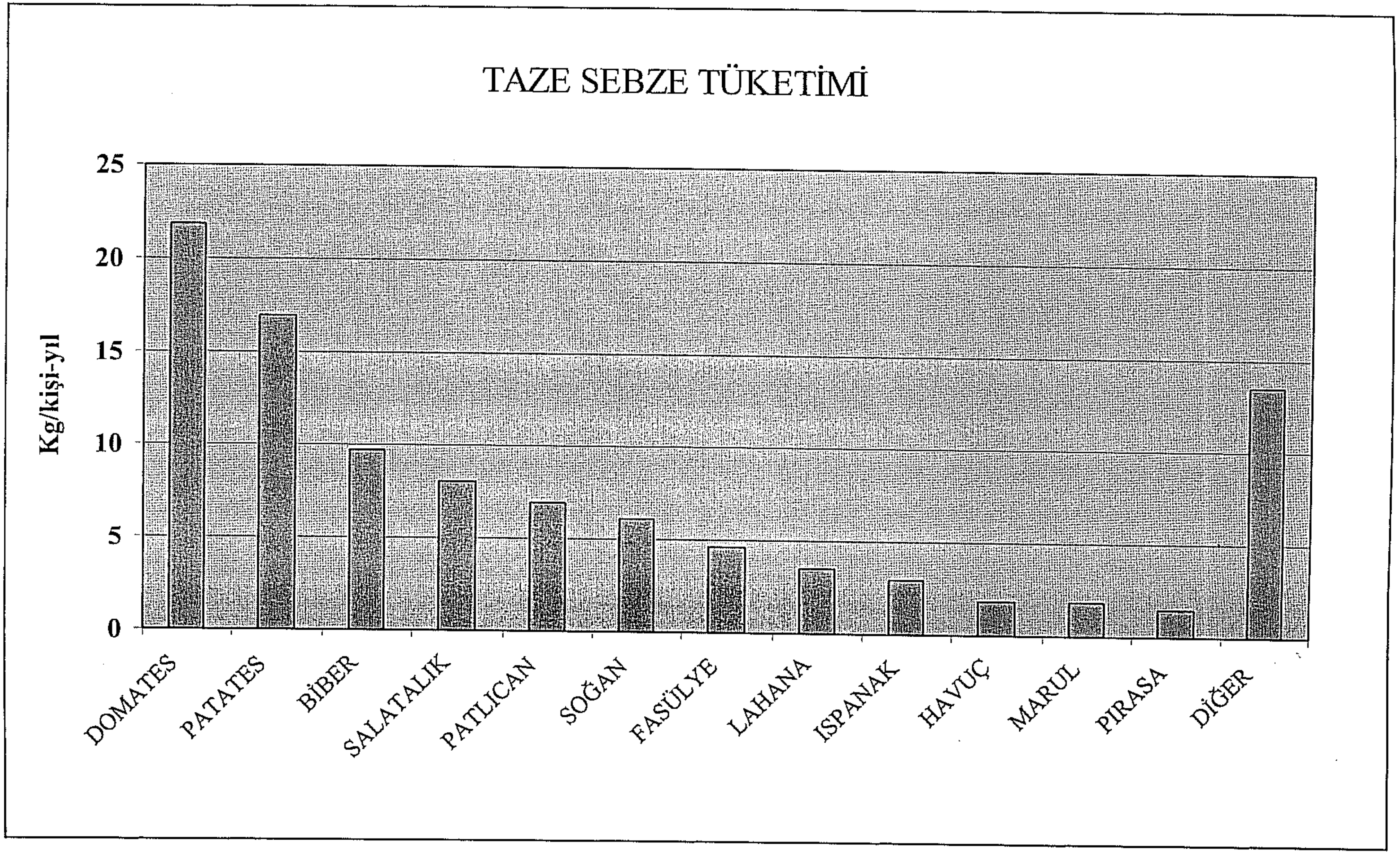


ŞEKİL 5

SÜT VE SÜT ÜRÜNLERİ TÜKETİMİ (yıllık kişi başına)

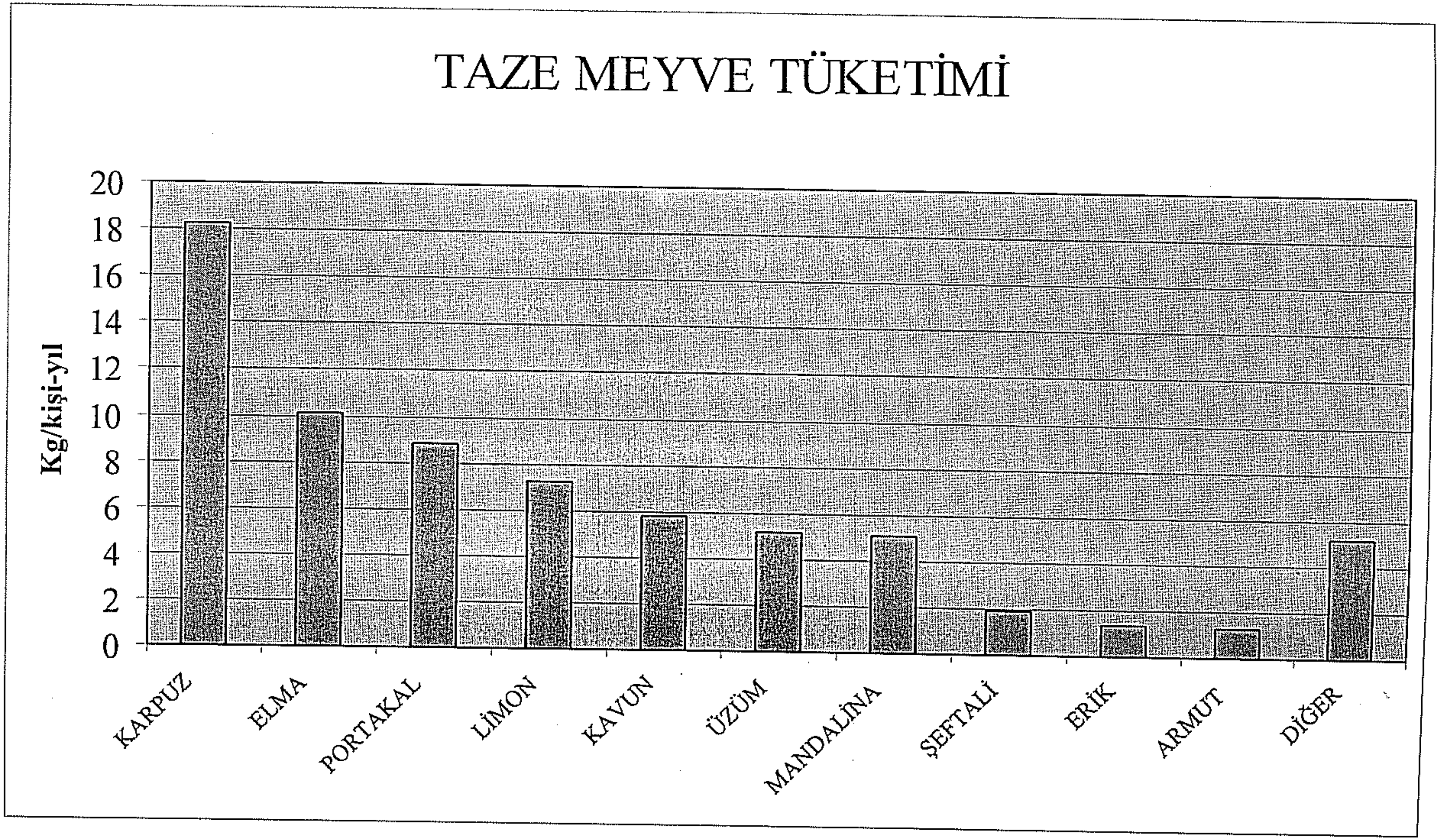


ŞEKİL 6

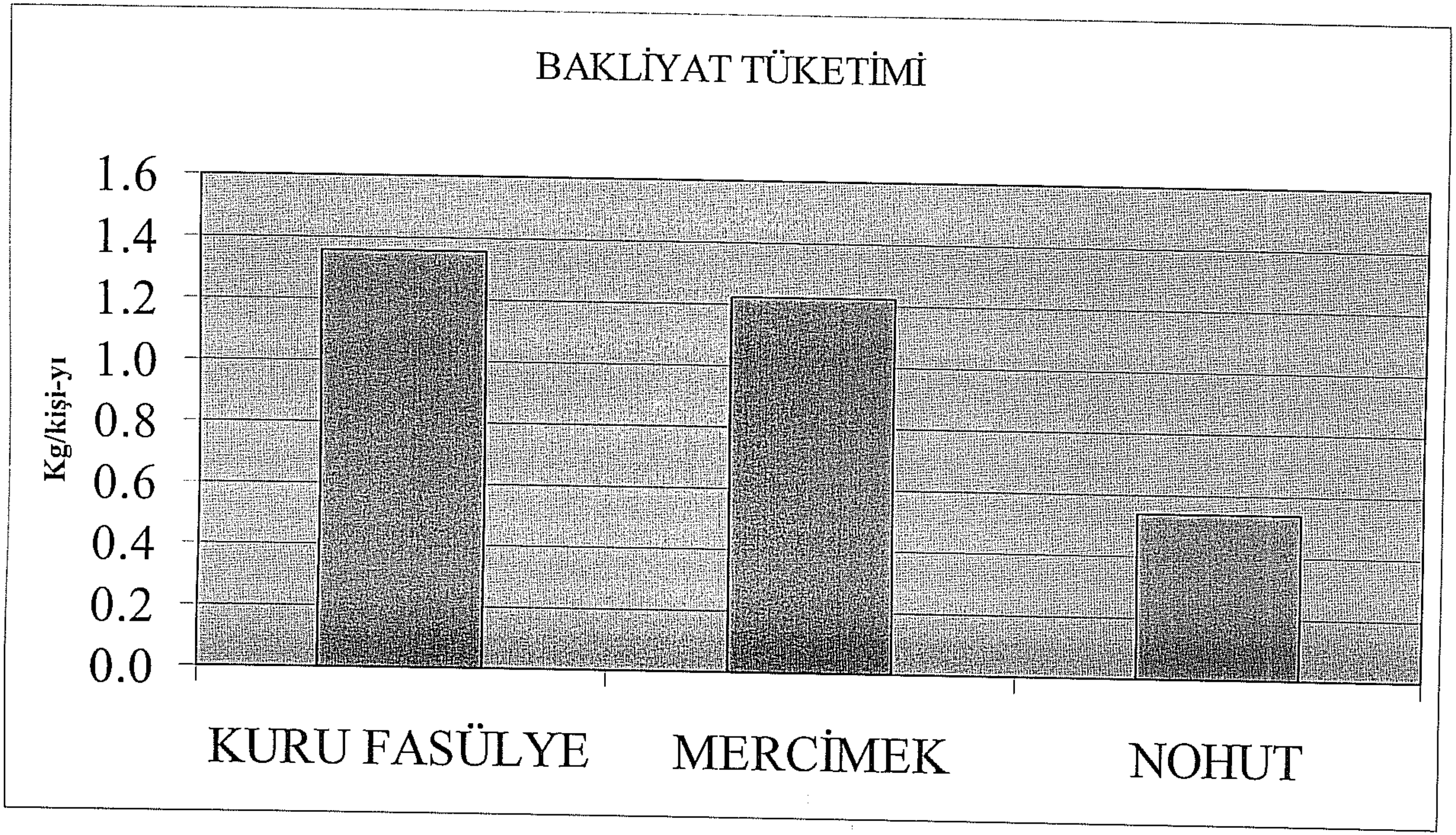


TAZE SEBZE TÜKETİMİ
Kg/kişi-yıl
25
20
15
10
5
0
DOMATES
PATATES
BİBER
SALATALIK
PATLICAN
SOĞAN
FASÜLYE
LAHANA
ISPANAK
HAVUÇ
MARUL
PIRASA
DİĞER

ŞEKİL 7


TAZE MEYVE TÜKETİMİ
Kg/kişi-yıl
20
18
16
14
12
10
8
6
4
2
0
KARPUZ
ELMA
PORTAKAL
LİMON
KAVUN
ÜZÜM
MANDALİNA
ŞEFTALİ
ERİK
ARMUT
DİĞER

ŞEKİL 8


BAKLİYAT TÜKETİMİ
Kg/kişi-yı
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
KURU FASÜLYE
MERCİMEK
NOHUT

III- MALİ ETKİNLİKLER

Seyahat Harcamaları:

1995 YILI

i. Prof.Dr.Suat Ungan'ın Belçika Seyahati:	34,818,246 TL
ii. Prof.Dr.Faruk Bozoğlu'nun Çek Cum. Seyahati:	41,213,684 TL
iii. Prof.Dr.Faruk Bozoğlu'nun Finlandiya Seyahati:	105,362,676 TL

1996 YILI

Prof.Dr.Faruk Bozoğlu'nun Almanya Seyahati:	77,561,288 TL

1997 YILI

Prof. Dr. Suat Ungan ve Prof. Dr. Faruk Bozoğlu'nun Polonya Seyahatleri:	219,287,708 TL

1998 YILI

Prof.Dr.Suat Ungan'ın Hollanda Seyahati:	267,165,872 TL

1999 YILI

Prof.Dr.Suat Ungan'ın İtalya Seyahati:	452,665,017 TL
TOPLAM	1,198,074,491 TL

IV- BİLİMSEL ETKİNLİKLER

IV.1- 123-25 Kasım 1998, DİE Araştırma Sempozyumu '98, Ankara

Proje kapsamında yapılan çalışmalar DİE tarafından düzenlemen Araştırma Sempozyumu'nda sunulmuştur.

IV.2- Tez Çalışmaları

Reyhan Ünsalan ve Kılıçhan Kaynak yüksek lisans derecelerini almışlardır **(EK 1 ve EK 2)**.

IV.3- Bildiri Sunumu

5-7 Temmuz 1999 tarihleri arasında FAO tarafından Roma'da düzenlenen III. International Food Data Conference, Back to Basics toplantısında iki adet bildiri poster olarak sunulmuştur.

IV.4- Bildiri Sunumu

12-15 Nisan 2000 tarihleri arasında Hacettepe Üniversitesi, Beslenme ve Diyetetik bölümünce düzenlenen III. Uluslararası Beslenme ve Diyetetik Kongresinde "Türkiye'de Hane Halkı Tüketim Harcamaları Anketinin (DİE) analizi: Günlük Gıda Alımı" konulu bir tebliğ verilmiştir.

V- SONUÇ

Hane Halkı Tüketim Harcamaları anketleri diğer ülkelerde olduğu gibi, bu çalışma sonucunda, ülkemizde de halkımızın besin ögeleri alımı ve gıda tüketim alışkanlığını tespit etmek amacıyla kullanılmıştır. Beslenme konusunda ülkemizin tümünü ve coğrafik bölgelerinin tümünü kapsayan ilk ve tek araştırma olmuştur. Sonuçlar DİE'nden alınacak izin neticesinde COST 99 projesinin ilgili birimine aktarılacaktır.

Genelde projeye katılımımız diğer ülkelerin bu alanda yapmış ve yapacakları projeleri tanımak bakımından da çok faydalı olmuştur. Esasında COST 99 projesinin on yıl önce başlamış olan ilk kısmına ülkemizden katılım olmamıştır. Bu nedenle gıda konusunda önemi diğerlerince de bilinen ülkemizin bu defa, ikinci kısmına katılmış olması ilgi ile karşılanmıştır. COST 99 projesinin gıda konusunda Avrupa'nın tüm ülkelerinin ilgili kuruluşlarını bir araya toplanması ile çok başarılı olduğu ifade edilmiştir. Tüm proje üyesi ülkeler toplantı ve çalıştaylara en az üç kişi ile katılmışlardır. Maalesef bu ve benzer projelerin anlamı ülkemizde hiç anlaşılamadığı için veya mali zorluklar karşısında önemsenememediği için ülkemiz genellikle toplantılara bir kişi ile katılmış veya katılamamıştır. Diğer üyelerce anlaşılması mümkün olmayan bu durum tüm çabalara rağmen ülkemizin ilgisizliği olarak algılanmıştır. Bu gibi projelerin en önemli amacı bilindiği gibi ilgili kuruluş elemanlarının bir araya gelip sorunları tartışabilme ortamını sağlamaktır. Ülkemizde halen dış seyahat tutkusu gibi algılanan bu temaslara yakın zamanda ilgililerce gereken önem verilmelidir. Bu husus Avrupa Birliği'ne katılım ve içinde yaşayabilmek için önemli bir hedeftir.

COST 99 projesinin Hane Halkı Tüketim Harcamaları anketlerinin değerlendirilmesi ile ilgili kısmı DAFNE adı altında bir Avrupa Birliği projesi olarak desteklenmeye devam edilmektedir. Bu projenin başkanı ülkemizin de katılımını beklemektedir. Bu amaçla gerekli girişimlerin yapılmış olmasına rağmen, bu projelere katılımın nasıl olacağı bugüne TÜBİTAK tarafından açıklığa kavuşturulamamıştır.

Araştırmalarımızın bundan sonraki kısmında 1994 Hane Halkı Tüketim Harcamaları Anketi verilerinin gelir grupları bazında incelenmesine başlanmıştır. Gelir grupları arasındaki beslenme paternindeki farklılıkların tespiti, beslenme uzmanlarımız ve diğer ilgililer için çok değerli bir kaynak olacaktır. Ayrıca, anketin DİE tarafından 2000 yılında tekrarlanması söz konu olduğundan çalışmanın gelir grupları düzeyindeki kısmının da en kısa zamanda tamamlanması gerekmektedir.

BİBLİYOGRAFİK BİLGİ FORMU

1- Proje No: COST 99 **2-Rapor Tarihi:** 28 Nisan 2000

3- Projenin Başlangıç ve Bitiş Tarihleri: 1.1.1995 – 31.12.1999

4- Proje Adı:

AVRUPA'DA GIDA TÜKETİMİ VE KOMPOZİSYONU VERİLERİNİN KALİTE VE UYGUNLUĞUNUN GELİŞTİRİLMESİ

5- Projenin Yürütücüsü ve Yardımcı Araştırıcılar:

Prof. Dr. Suat Ungan - Yürütücü
Prof. Dr. Faruk Bozoğlu - Yürütücü Yd. 1997'ye kadar
Prof. Dr. Perihan Aslan - Yürütücü Yd. 1997'den sonra
Reyhan Ünsalan - Araştırıcı
Kılıçhan Kaynak - Araştırıcı
Nuray Gürtekin - Araştırıcı
Elif Özsoy - Araştırıcı
Asuman Uğrasız -Araştırıcı
Nuray Akıncıoğlu - Araştırıcı

6- Projenin Yürütüldüğü Kuruluş ve Adresi:

ODTÜ, Gıda Mühendisliği Bölümü

7- Destekleyen Kuruluş(ların) Adı ve Adresi:

Tüm Avrupa Birliği Ülkelerinin ilgili kuruluşları

8- Öz (Abstract):

Bu projede, Devlet İstatistik Enstitüsü'nce 1994 yılında yapılan Hane Halkı Tüketim Harcamaları Anketi verileri kullanılarak, Türkiye'de günlük kişi başına ortalama protein, yağ, karbonhidrat, enerji, posa, yağ asitleri, kolesterol, vitamin ve mineral alımları hesaplanmış ve değerler Tavsiye Edilen Günlük Alım ve Günlük Referans Değerleri ile karşılaştırılmıştır.

Gıdalar tahıl ve tahıl ürünleri, et ve et ürünleri, balık, süt ve süt ürünleri, yumurta, meyveler, sebzeler, şeker ve şekerlemeler, tuz, baharatlar, hazır yemekler ile diğer gıdalar ve içecekler olarak gruplandırılmıştır. Gıdaların nem, enerji, protein, yağ, karbonhidrat, posa, yağ asitleri, kolesterol, vitamin - mineral içeriklerine göre kompozisyon tabloları oluşturulmuş ve her besin ögesinin hangi gıda grubundan ne oranda alındığı incelenmiştir.

Ortalama enerji ve protein alımı tavsiye edilen miktar düzeyindedir. Karbonhidrat - yağ alımlarının ise tavsiye edilen günlük miktarın üzerinde olduğu tespit edilmiştir. Sadece Güneydoğu Anadolu ve Doğu Anadolu bölgelerinde protein alımı tavsiye edilen en düşük günlük alım miktarının altında bulunmuştur.

Bütün bölgelerde en çok tüketilen gruplar sırasıyla tahıl ve tahıl ürünleri ile sebzelerdir. Et fiyatlarının diğer besin gruplarına nazaran daha pahalı oluşu, et tüketimini etkilediği gözlenmiştir. Buna bağlı olarak günlük hayvansal protein alımının tavsiye edilen değerlerin altında olduğu tespit edilmiştir.

Ortalama günlük alım değerlerine incelendiğinde demir ve kalsiyum alımının önerilene yakın, çinko alımının ise önerilenin çok altında olduğu görülmektedir. Diğer mineral alımlarının yeterli olduğu gözlenmiştir. Düşük demir ve çinko alım değerleri bu besin maddelerini en çok içeren hayvansal gıdaların az tüketilmesinden kaynaklanmaktadır.

Anahtar Kelimeler: Hane Halkı Tüketim Harcamaları Anketi, Beslenme, Gıda Kompozisyonları, Günlük Gıda Alımı, Tavsiye Edilen Günlük Alım, Günlük Referans Değerleri

9-Proje ile ilgili Yayın/Tebliğlerle ilgili Bilgiler

2 adet yüksek lisans tezi
2 adet yurt içi tebliğ
2 adet yurt dışı tebliğ

10- Bilim Dalı:

Doçentlik B.Dalı Kodu:614.02.00 ISIC Kodu:
Uzmanlık Alanı Kodu:614.02.02-06

11- Dağıtım (*) : ☐ Sınırlı ☐ Sınırsız

12- Raporun Gizlilik Durumu: ☑ Gizli ☐ Gizli Değil

(*) Projenizin Sonuç Raporunun ulaştırılmasını istediğiniz kurum ve kuruluşları ayrıca belirtiniz.

EK 1

FOOD CONSUMPTION EXPENDITURES AND COMPOSITION DATA ANALYSIS IN TURKEY
ENERGY, PROTEIN, FAT AND CARBOHYDRATE

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

REYHAN ÜNSALAN

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF
MASTER OF SCIENCE
IN
THE DEPARTMENT OF FOOD ENGINEERING

SEPTEMBER, 1998

Approval of the Graduate School of Natural and Applied Science

Prof. Dr. Tayfur Öztürk
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

Prof. Dr. Faruk Bozoğlu
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Prof. Dr. Suat Ungan
Supervisor

Examining Committee

Prof. Dr. Ali Esin (chairman)

Prof. Dr. Suat Ungan

Prof. Dr. Perihan Arslan

Prof. Dr. Gülden Pekcan

Assoc.Prof. Dr. Levent Bayındırlı

ABSTRACT

FOOD CONSUMPTION EXPENDITURES AND COMPOSITION DATA ANALYSIS IN TURKEY ENERGY, PROTEIN, FAT AND CARBOHYDRATE

Ünsalan, Reyhan

M.S., Department of Food Engineering

Supervisor: Prof. Dr. Suat Ungan

September 1998, 150 pages

According to the classification by the State Institute of Statistics (SIS), food items were grouped under cereal and cereal products, meat and meat products, fish, milk and dairy products and eggs, fruits, vegetables, sugar and confectionaries, salt and spices, ready meals and other foods, beverages. The composition tables were formed according to the moisture, energy, protein, fat and carbohydrate content of foods. By using the SIS 1994 survey data the consumption of these food groups were found in order to find the dietary pattern in Turkey. Daily intake of protein, fat carbohydrate and energy per capita values were calculated for Turkey as a whole as well as her seven regions. The results were further analized to make the comparison with the recommended daily allowance values of the nutrients which are used for evaluating nutritional status

ÖZ

TÜRKİYE'DEKİ GIDA TÜKETİM HARCAMALARI VE KOMPOZİSYON VERİLERİ ANALİZİ ENERJİ, PROTEİN, YAĞ VE KARBONHİDRAT

Ünsalan, Reyhan

Yüksek Lisans, Gıda Mühendisliği
Tez Danışmanı: Prof. Dr. Suat Ungan
Eylül 1998, 150 sayfa

Devlet İstatistik Enstitüsü'nün (DİE) yapmış olduğu sınıflandırmaya göre tüketilen gıdalar tahıl ve tahıl ürünleri, et ve et ürünleri, balık, süt - süt ürünleri ve yumurta, meyveler, sebzeler, şeker ve şekerlemeler, tuz ve baharatlar, hazır yemekler ve diğer gıdalar, içecekler başlıkları altında gruplandırılmıştır. Gıdaların nem, enerji, protein, yağ ve karbonhidrat içeriklerine göre kompozisyon tabloları oluşturulmuştur. DİE 1994 tüketim harcamaları araştırmasından elde edilen datalar kullanılarak Türkiye'deki beslenme örtüsünü oluşturmak amacıyla gıda gruplarının tüketim miktarları bulunmuştur. Kişi başına düşen günlük protein, yağ, karbonhidrat ve enerji alımları hesaplanmış ve daha sonra bu değerler tavsiye edilen günlük alım miktarları ile beslenme durumunu gösterebilmek amacıyla kıyaslandırılmıştır.

ACKNOWLEDGMENTS

First of all, I express sincere appreciation to Prof. Dr. Suat Ungan for insigth throughout the research and unlimited patience. Thanks go to Prof. Dr. Perihan Arslan and Prof. Dr. Gülden Pekcan for their valuable contribution. I also would like to offer my special thanks to Özlem Çavaç, Deputy Manager of Income and Consumption Expenditures Statistics Department of State Institute of Statistics. I offer sincere thanks to my father and mother for their support throughout the research and I thank to my friends for their encouragement.

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

SUMMARY

The purpose of this study was to identify the differences in dietary pattern in Turkey and to find Turkish people's daily protein, fat, carbohydrate and energy intake. Moreover their daily intakes were further analysed to compare with the recommended daily allowance (RDA) values of these nutrients.

Household Budget Survey (HBS) is one of the main sources of data from which these kind of results can be drawn. In this study the source of data taken from State Institute of Statistics (SIS) was HBS. It is a combination of income/expenditures/budget and multi subject survey. Food consumption and nutrient intakes are then calculated by incorporating the relevant food composition tables.

In the study, the food items were categorised according to the SIS classification. After conversion of all units of the food items into the kilogram, total consumption of food groups were found. Amount of waste or loss, gifts into and out of households, food given to pets were not taken into the consideration. Cereal and cereal products were found as the main food group consumed whereas the meat and meat products consumption was relatively low in all regions in Turkey. By using both consumption and relevant food composition values, per capita daily protein, fat, carbohydrate and energy intakes were found. In the Eastern and South Eastern Anatolia regions energy deficiency was observed as compared with the Turkish average energy RDA. The undernutrition or malnutrition was observed in these regions, since daily energy intakes were found below the Turkish energy RDA.

CHAPTER 1

INTRODUCTION

It is generally recognised that insufficient and unbalanced nutrition will adversely affect the health status of community and retard social and economic development. People who do not consume a balanced and adequate diet have less resistance to diseases and lower productivity. The most vulnerable groups of the population (infants, pre-school children, pregnant and lactating mothers) are even more susceptible to the ill effects of malnutrition (Köksal, 1977).

Many nations around the world are carrying out research to find ways to solve their respective nutrition problems. Before any national plan or policy can be formulated to ensure proper nutrition for the country basic data must be available. First, current nutritional status of the people must be determined in order to know the type, magnitude and location of malnutrition. Secondly, the food consumption habits of the people must be learned so that the causes of malnutrition and the food consumption pattern can be identified. The data from the surveys on the problem will serve as the basis for a multi- disciplinary policy aimed at solving nutritional problems and meeting future needs (Köksal, 1977).

The main problems being faced result from unbalanced per capita income, the lack of quality and quantity in food production, regional imbalance in food distribution, marketing of food from the producer to consumer, lack of cultural and educational facilities and lack of nutritional knowledge.

In most developing countries food production politics have only one target that is to meet national demands. Turkey, due to its agricultural production potential and development level, should also take into consideration the necessity of using its export opportunities and national sources rationally. Planning the agricultural production will improve the nourishment which will increase and strengthen the development level. Development plans can project the agricultural production at a level that will satisfy the increasing national demands and will meet part of the foreign exchange needs of a country (Türkiye Gelişme ve Araştırmaları Vakfı, 1980).

The term, "increasing food demands" covers not only the adequate food intake level of people but also the amount that provide the balanced diet. In that case, agricultural sector takes on three different duties, these are:

- to increase the agricultural production to satisfactory level,
- to reach the production structure that should allow the balanced diet, and
- to define the food price base indicators.

1.1 SOURCES OF FOOD CONSUMPTION DATA

There are two major sources of food consumption data. These are the food balance sheets and national household surveys. National household surveys will be used to complement the information obtained from food balance sheets since they are the only source of data on the distribution of food consumption and its relationship with other socio-economic and anthropometric variables. But there is a difference between these data sources due to the differences in concepts and definitions used, so that the data from these sources are expected to be neither similar nor directly comparable (FAO a, 1983).

1.1.1 Food Balance Sheets

They show a picture of a country's food supply during the specific reference periods and also sources of supply and uses of each food item. Supply available during that period is equal to sum of the total quantity of foodstuffs produced in a country and total quantity imported and adjusted for any change in stocks that may occurred within the reference period. The quantities that are exported, fed to livestock, used for seed, used for industrial and other non-food purposes, wasted during storage and transportation are examined on the utilisation side distinctions.

The total food supplies for domestic utilisation are the total food supplies available for human consumption in the household and non-household sectors. The non-household sector covers catering establishments, boarding schools, hospitals, prisons, armed forces bases and other communities. Wastage on the farm and during distribution and processing is taken into account in the food balance sheets. However, the amount of food actually consumed may be lower than the quantity shown in the food balance sheets since the losses of edible food and nutrients in the household and non-household sectors (FAO a, 1983).

The per capita food supply of each food item available for human consumption is obtained by dividing the total food supplies available for human consumption by the total population during the reference period. Then the per capita supply of each food item is converted into nutritional units; calories, fat, and protein by applying nutritional conversion factors.

1.1.2 National Household Surveys

The household surveys provide the information on food consumption at the household level in the country. They collect information from different sections of the population. Thus, they are able to provide indications of the diet obtained by people living in different parts of a country, or by people of different socio-economic groups. If the surveys are carried on through the year, they give information about seasonal variation, and if they are carried on at regular intervals they can show longer-term trends to be analysed. If household surveys do not collect data for the whole year, the data obtained will not represent the daily average of the food consumed during the whole year, because no adjustment can be made for seasonal variation (FAO a, 1983)

For the more comparative study, food items classified into 15 major food groups. These are cereals and cereal products, roots and tubers, sugar and honey, pulses, nuts and oilseeds, vegetables, fruits, meat and offal, eggs, fish and seafood, milk and milk products, oils and fats, spices, stimulants, and other food items. Since the majority of the household surveys do not show the quantities of alcoholic beverages consumed, they were excluded from the database.

Although Food and Agriculture Organisation (FAO) offered such 15 major food groups, food groups classification used in this study was done according to Turkish State Institute of Statistics (SIS) classification (Appendix, A6).

There are three types of national household surveys that are the second major source of food consumption data.

i.Income/ expenditure/ budget surveys: In order to investigate the economic behaviour of consumers these surveys are primarily concerned with household income and expenditures data. Besides, food quantities are also obtained in the case where home-produced food is an important part of food consumption. However, the majority of such surveys do not process and tabulate the quantity data obtained but only provide the amount of money spent on food or the value of food consumed (FAO a, 1983).

The value and quantity of food items consumed in the household are noted by interviewing or the recording method, and may include food purchased, food obtained as a gift or pay, home produce, food gathered wild during the reference period. In the case of home produce, the weighing method is also applied. The food consumption data obtained represent the total quantity of food acquired by or available to household during the reference period. In other words, they refer to the flow of food into households independently of its consumptive use and without taking into account wastage or losses of edible food. Per capita food availability is then obtained by dividing the total food available to the household during the reference period by the number of partakers.

ii.The Specialised Food Consumption Surveys: These surveys focused on food consumption include not only food consumed in the household but also food consumed away from home by the household members. The household food consumption data are obtained by weighing and measuring food items to be used, before the preparation of each meal, while the food consumed away from home are obtained by interviewing each member of the household. The food consumption data obtained from this type of survey represent an estimate of the quantity of food intakes. Due to its costly and complicated procedures, few countries have conducted such surveys in recent years (FAO a, 1983).

iii.Multi - Subject Surveys: They combine two or more major topics, such as family characteristics, income, employment, education, housing, nutrition and health. Such multi-subject surveys have the advantage that different aspects of living conditions can be seen in relation to each other (FAO a, 1983).

After these definitions, it can be said that 1994 Household Consumption Expenditures Survey done by SIS is a combination of income/ expenditure/ budget survey and multi subject survey, since the procedures applied covers this combination. But there was only one difference in 1994 survey that it did not include the home produced food items.

1.2 HOUSEHOLD BUDGET SURVEYS (HBS)

The HBS represent a combination of income/ expenditure/ budget and multi-subject surveys. They are designed mainly to analyse the economic trends in food consumption. HBS may be a source of information on food availability, and indirectly on food consumption and nutrient intakes after using conversion factors. These are based on food composition tables. HBS do not record availability of food items by individuals but it is possible to obtain information on household composition (Zintzaras *et al.*, 1997).

Perhaps more important for a changing world that is being rapidly dominated by similar commercial, economic, regulatory and communication forces, a nutritional database would be useful only if it could be or become:

- truly international, with built-in feedback mechanisms to improve comparability,
- representative and linked to explanatory demographic and socio-economic factors that are themselves subject to rapid changes,
- very large, in order to generate precise estimates for inherently complex patterns, regularly updated,
- not least, affordable (Trichopoulou *et al.*, 1996).

They are conducted regularly because of their importance for governments in order to define price indices and to analyse implications of trends in food consumption.

HBS collect substantial information on food consumption and record the socio-demographic data of the households. Different countries collect data on food items at different detail, and comparisons between countries are not straightforward because information on food consumed and about losses and waste are usually not concerned. However by using mathematical modelling, availability for household members, who may be at different types, can be estimated (Trichopoulou *et al.*, 1996). The information on household composition provided by HBS can be used to estimate the availability of food groups to a household member belonging to a specific age group.

HBS have important potential for assessing nutrient intake levels besides food consumption analyses. These should reflect nutrients as eaten rather than as purchased and will depend on appropriate food composition data that allow for changes in nutrient availability relating to food preparation and cooking.

HBS data may help to identify;

- differences in dietary patterns,
- high-risk population groups due to their nutritional habits,
- relation between diet and mortality,
- additives and contaminants intake.

However, HBS have several limitations. From one country to another the nutrition data are different, not only in relation to the number of food items recorded but also the type of information provided. Consumption of food commodities and beverages outside the household create a problem in household budget survey. In most countries no information is collected concerning losses and waste of food. In addition, estimation of nutrient intakes from HBS food availability data requires that a series of assumptions and approximations be made, because most countries collect data only for large groups. Also, there is no uniform coding system, and rules must be developed and agreed upon for the aggregation of food items appearing in the HBS (Trichopoulou *et al.*, 1996).

1.3 HOUSEHOLD CONSUMPTION EXPENDITURES SURVEY 1994, TURKISH STATE INSTITUTE OF STATISTICS (SIS)

Turkey being a developing country changes its socio-economic state. The consumption patterns and income levels of the individuals and households are determined by " Household Income and Consumption Expenditures Surveys" for each socio-economic sector, population stratum and region (SIS, 1994).

The Household Income and Consumption Expenditure survey is one of the most important sources which gives information on socio-economic structures, living conditions and consumption patterns of households in a given country and used to identify the targets of development plans and to test the validity of economic policies. In these surveys, information is collected as the household sizes, employment conditions and statues of household members, total household income, sources of revenue, consumption habituation, consumption and expenditure types and varieties of goods and services.

Turkish State Institute of Statistics applies household income and consumption expenditures survey at determined intervals in order to reach survey's targets in periods and to reflect them to price indexes.

1994 survey was conducted as two separate studies:

i. **Household Consumption Expenditures Survey:** It was carried out from 1 January to 31 December 1994 at 236 urban and rural settlements and applied to 2,188 sample households changing every month. As a result at the end of the year 26,256 (2,188 households /month*12 month/year) households were selected on a sampling basis to cover all household and settlements.

ii. **Household Income Distribution Survey:** It was carried out from 8 February to 1 May 1995 and applied to 26256 sample households examined in Household Consumption Expenditures Survey in order to show the expendable yearly income of the households.

1.3.1 Preparatory Work

The preparatory work of the survey started with analysing the results of the 1987 Household Income and Consumption Expenditures Survey. After publication of the results of the 1987 survey, it was discussed with the experts who contributed to the stages of the preparatory work, fieldwork, data processing and publication of the study.

During the preparatory work the documents (publications, questionnaires, etc.) used in the previous studies of State Institute of Statistics on income and expenditures and publications of other agencies about this field were examined. Also the studies conducted by the international statistical agencies were also taken into consideration.

A draft questionnaire was applied to 100 households in ten provinces, two districts and seven towns. Then discussing with persons from public or private institutes and professors from the universities developed new draft questionnaires. These questionnaires are tested in Ankara, Istanbul, Adana, Konya, Trabzon, Erzurum and Diyarbakir for probable errors.

Finally two separate questionnaires were developed for consumption expenditures and household income: 1994 Household Consumption Expenditures Survey Questionnaire and 1994 Household Income Distribution Survey Questionnaire. The " Diary of Household Expenditures " was prepared for every household to gather complete information on monthly household expenditures. The "The Coding Book " which covers all expenditures items based on 10 digit level and their detailed definitions was prepared. The coding book was also used as a reminding guide for consumption expenditures to the households.

1.3.2 Implementation

In this study all data were collected from Household Consumption Expenditures Survey 1994 so that the more detailed explanations about this survey were given in the following paragraphs.

In order to select the sample households, at 62 urban and 174 rural areas household listing surveys were conducted according to household's address, educational status, employment status and occupation of household head, form of possession, heating system, number of household members, number of 12 years of age, agricultural information as land size, number of livestock etc (State Institute of Statistics, 1994). These informations were gathered by interviewing about 285400 households. By the multi stage cluster sampling methods 2188 sample size were chosen and at the end of the year 26256 households were studied (to be fortuitously) among these 285400 households.

At the implementation, 2188 households were interviewed each month, alternatingly. For example, 2188 sample households were interviewed in January to get data on their consumption expenditures, employment status etc., in February another 2188 households representing the households examined in January were interviewed. This alternate process was continued until December 1994. As a result every month 1522 households in urban and 666 households in rural areas were traced.

Interview plant followed by SIS at the regional level is given in Table 1.1 Number of household members interviewed in each region was used in the per capita food consumption calculations. In this case alternate process was taken into the consideration. For example: the Marmara region 16,665 of household members were interviewed during the survey period, however, 16,665/12 =1,389 household members represented the Marmara region. For example 1389 household members were interviewed, in February another 1,389 household members representing the household's members examined in January were interviewed.

Table 1.1: Number of Households and Household Members Interviewed During the Survey Period

Region	Number of Household (households / year)	Number of Household Members (persons / year)	Number of Household Members-after the alternate process (persons / month)
Marmara	3961	16665	1389
Agean	3216	12306	1026
Mediterranean Sea	3907	17554	1463
Central Anatolia	4491	19194	1600
Black-Sea	4072	17981	1498
East Anatolia	3418	17966	1497
South East Anatolia	3121	18027	1502
Total	*26186	119693	9974

* 70 questionnaire forms were cancelled during the evaluation period, therefore the number of total number of households is not equal to 26256. (SIS, 1994)

Interviewers visited about 6 households once every 3 days, each month ie. totally ten times a month, to get the consumption expenditures data. Interviewing, observation and recording were done together during the survey.

Also diaries for recording consumption expenditures of households and household members were distributed to the households at the beginning of the survey. Members who purchase goods and services during the survey month recorded these expenditures to the household diary (SIS, 1994).

From the questionnaire variables listed below were obtained under three main groups (SIS, 1994):

i House and socio economic state

- house type,
- possession situation,
- building construction type,
- number of rooms and area for living,
- furniture, vehicles and immovables possessed,
- consumption habits.

ii Consumption expenditures

- brands and categories of goods and services and their full explanations,
- the way they are obtained,
- amounts,
- total values, prices,
- the way they were bought; cash or credit,
- where they were bought; city centre or village centre, grocer or market place, butcher etc.

iii Household composition, employment and income state, household members;

- number,
- sex,
- age,
- educational status,
- employment status,
- job,
- income earned in that month,
- total income earned in one last year.

1.3.3 Sampling Plan

There is more than one factor, which determine the sample size on the survey. Sampling size is determined by taking into consideration some restrictions such as cost, field organisation and data quality.

In the 1994 survey, literature survey about household income and expenditures survey was done first. In this study, changes in sample sizes according to social, economical, geographical status and population of the countries are determined. Then sampling methods and sample sizes used in developed and developing countries were examined.

In countries where register system does not exist, the multi- stage sampling methods are usually used. In Turkey this method is preferred because there is no register system, no current addresses and work places of households. In 1994 survey the strafied multi- stage systematic cluster sampling method was used.

The 1990 Census Enumeration Sheets constituted the frame for the first stage sample selection in settlements with a population over 2000.

Seven geographical regions stratification was used. Using the latest definition of the State Planning Organisation, the settlements with a population of 20,001 and more are taken as urban, 20 000 and less were taken as rural in every region. The survey covers all household and household members of Turkish nationality living in the territory of the Republic of Turkey with the exclusion of those living in schools, dormitories, hostels, hotels, nursery homes, homes for elderly hospitals, penitentiaries, caserns and officer's clubs. This population which is not included in the survey was added to the estimates in an indirect manner.

1.3.4 Definitions Used in the Survey

The followings are the basic concepts and definitions used in the 1994 Survey:

Household: The household is a group of persons, irrespective of the existence of a family tie among them, who live in the same house and eating from the same kitchen, pooling their incomes and expenditures and participating in the household services and management.

Household head: The household head is the person managing the household incomes and expenditures, briefly manager of the household.

Household member: The member of group that constitutes the household during the survey month. Guests and members, who are in the army, prison, abroad or left the household for a long time, were excluded.

Household consumption expenditures: Money spent to cover the purchases for goods and services on food, restaurant, clothing, house furnishings, health, transportation, education, cultural activities, entertainment, housing and other needs including the purchase of materials for self production and used stock value during the survey month.

1.4 PREVIOUS WORKS ON FOOD CONSUMPTION

In Turkey the first food consumption survey was done in 1974 by Köksal and published under the name of "Nutrition in Turkey, Health and Food Consumption Survey" in 1977. Before 1974, similar surveys done in this field are listed below:

- at 5 different regions of Turkey by Palmer E.Z., 1966,
- at urban rural areas of Ankara city, 1965 -1966,

- in South East Anatolia region at urban and rural areas of Diyarbakır, Mardin and Urfa cities, 1969,
- in east part of Black-Sea region at urban and rural areas of Rize, Trabzon and Giresun cities, 1970,
- at villages of Kayseri city by Baysal Uzel, 1968,
- at urban and rural areas of Edirne city by Baysal and friends, 1971,
- at villages of Etimesgut region of Ankara city by Baysal and friends, 1972,
- in summer and winter season at villages of Etimesgut region of Ankara city and at Bağcılar slum quarters of Ankara city by Baysal, 1974,
- food consumption survey, 1984.

It is important to note that the results of all these surveys are very similar. (Türkiye Gelişme ve Araştırmaları Vakfı, 1980)

1.5 COST 99 ACTION

COST is an acronym for European Cooperation in the field of Scientific and Technical research. In January 1995, a new action has started in the field of food science and nutrition: COST 99, research action on Food Consumption and Composition Data / EUROFOODS. Now, more than 20 European countries have joined this research cooperation. Turkey is one of the parties, and this study will constitute part of the requirements of this research action on Turkey's side. COST 99 action is a continuation of Eurofoods (established 1982) and the Eurofoods-ENFANT Project (1990-1994) of the FLAIR-Programme of the European Union.

The main objective of the COST 99 Food Consumption and Composition data in Europe is to improve the quality and compatibility of food consumption data in Europe. In order to reach this aim, a network of compatible food consumption and composition databases will be established by the way of providing the quality for interpretation, description and exchange of these data. One of the general objectives is to ensure the continuity of collection and improve the quality and harmonisation of food consumption and availability data as available from food balance sheets and household budget surveys.

Also it was aimed that the existing food coding systems should be maintained and than improved in order to exchange food consumption and composition data efficiently.

In this action, before a network constructed on data exchange between the institutes, an agreement of understanding about the followings would be reached
- variation of the quality of data,
- food sampling procedures,
- analytical methods,
- conversion factors,
- ways of expressing constituents,
- minimum requirements for data exchange.

1.5.1 What are the Benefits of Turkey by Participating the COST 99 Action?

Inclusion of Turkey to the information network will lead to have a chance to follow the changes in nutritional habits and the food demands of the European countries. Data bank that will be formed at level of action will enable to plan their export and imports, and make more realistic forecasts for the future. Network will provide better presentation of Turkish food products in the European market.

Moreover, this data obtained from household budget surveys will be the most valid and unique data for creation of Turkish nutritional policies and realisation of national food consumption pattern.

In addition, food poverty caused from inadequately income distribution food intake by geographic regions or similar problems caused by other socio-economic factors and their relations with to each other can be predicted.

1.6 HUMAN NUTRITIONAL REQUIREMENTS

Foods supply the body with energy in the form of carbohydrate, fat and protein. Foods also provide the materials such as vitamins, minerals, water, all of which are needed for growth and for the maintenance of cells and tissue.

The recommended intakes of nutrients can be converted into recommendations for average intakes of foods according to age, sex, and physiological status. Then, the total population figure of a country, together with the distribution of the population by age groups and sex, can be used to make estimates of the total national food requirements. The figures for recommended intakes may be compared with actual consumption figures determined by food-consumption surveys. Such comparisons, though always useful, cannot in themselves justify statements that undernutrition, malnutrition, or overnutrition is present in a community or group, as such conclusions must always be supported by clinical, anthropometric or biochemical evidence

The recommended intakes are not an adequate yardstick for assessing health because each figure represents an average requirement increased by a factor that takes into account inter-individual variability. The recommended intakes are therefore the amounts considered sufficient for the maintenance of health in nearly a people.

It must be understood that recommendations apply to amounts of nutrients required by people in their stomachs. For many food-stuffs the journey from the fields where they are grown to the homes where they are eaten is a long one, and nutrient losses may occur on the farm, in barns and warehouses, in food factories, and in wholesale and retail distribution. Estimates of such losses can be made at a national level.

Food losses also inevitably occur in the home due to spoilage, methods of cooking and preparing meals, or plate waste. In homes with poor cooking equipment and storage facilities such losses are often unavoidable. The extent of these losses is hard to measure or estimate. Ten percent is probably the representative figure for wastage in homes where reasonable care is taken.

Man has evolved with reserves and adaptive mechanisms that help him to survive in periods of famine. His reserves of energy in the form of carbohydrate are small and may be exhausted by two days of starvation, but if he has been previously well fed, the reserves of fat supply sufficient energy to prevent death from starvation for two months or longer. If the period of food deprivation is prolonged, the need for energy is reduced by curtailment of all unnecessary physical activity. Moreover, as starvation proceeds, the tissues waste and the body becomes smaller, thus needing less energy to maintain itself.

The body has no real store of protein. The proteins are broken down and the constituent amino acids become available to maintain the protein in other and more essential tissues and cells. Because excess dietary protein is readily converted into amino acids and subsequently used as energy, it does not accumulate in the body. Furthermore, the cells, especially those of the liver, adapt so that the amino acids from a limited supply of protein can be utilised more readily for the function of maintenance and less as a source of energy. In a normal adult the protein losses from the body are not likely to become critical until the body weight has fallen by at least 25 percent, which usually does not occur before about two months of total starvation (Passmore *et al.*, 1974).

1.6.1 Energy

The human body is an engine that can set free the chemical energy bound in fuels present in foods. These are carbohydrates, fats, proteins, and alcohol. Since the body continually converts and replaces its component parts, energy is needed for the synthesis of maintenance. The synthetic reactions which produce the chemical components of the new cells and tissues during growth the greater the need for fuel.

The body also has to have energy for internal work, such as the action of heart in circulating the blood and the movements of the diaphragm in breathing. The difference in the ionic composition of the fluids inside and outside the cells is essential to their normal functioning and can only be maintained by chemical reactions utilising energy. All these processes constitute the resting energy exchanges, also known as basal metabolism, which is equal to the energy expenditure when the body is at complete rest.

Additional fuel is needed for external work performed by the muscles, such as moving the body about, maintaining its posture, lifting and carrying loads, and varied physical activities of everyday life.

The energy content of foods and the energy requirements of man are expressed in terms of the thermochemical kilocalorie. The thermochemical calorie was originally defined as the quantity of heat required to raise the temperature 1 g of water from 14.5^{o} C to 15.5^{o} C at sea level. The approximate energy values of the body fuels are the following: for carbohydrate, 4 kcal per gram; for fat, 9 kcal; for protein, 4 kcal. These are net values, allowing for small losses of energy in the faeces and also for the energy lost in the urine in the form of urea and other nitrogenous end products of protein metabolism which cannot be completely broken up in the body. The energy content of a foodstuff is obtained by applying the above factors to its carbohydrate, fat, protein and alcohol content as determined by chemical analysis (Passmore *et al.*, 1974).

Food composition tables including such analysis are available for many countries and regions of the world. In this study, United States Department of Agriculture (USDA) food composition tables that the most recent one were used in the calculation of amount of protein, fat, carbohydrate and energy intake. In these tables the energy values of foods represent the energy available after deductions have been made for losses in digestion and metabolism. The system for determining these energy values was developed through the classic investigations of W. O. Atwater and his associates at the Storrs Agricultural Experiment Station (Watt and Merril, 1975).

The Atwater procedure is to adjust the heats of combustion of the fat, protein, and carbohydrate in food to allow for the losses in digestion and metabolism found for human subjects, and to apply the adjusted calorie factors to the amounts of protein, fat, and carbohydrate in the food. The contents of protein, fat and ash are determined by chemical analysis, and the percentage of carbohydrate is obtained by difference. This so-called total carbohydrate, therefore, includes fiber as well as any noncarbohydrate residue present (Watt and Merril, 1975).

Briefly, due to Atwater procedure, all energy values used in the study were not found by taking the approximate energy values of protein, fat, and carbohydrate. However for each food groups that were categorised by Atwater different calorie factors were found and the examples are the following:

Table 1.2: Examples of Calorie Factors

	Protein			Fat			Carbohydrate		
Food or Food Group	Coeffi-cient of digesti-bility	Heat of Combus-tion less 1.25*	Factor to be applied to in-gested nutrients	Coeffi-cient of digesti-bility	Heat of combus-tion less 1.25*	Factor to be applied to in-gested nutrients	Coeffi-cient of digesti-bility	Heat of combus-tion less 1.25*	Factor to be applied to in-gested nutrients
Eggs, Meat , Milk Products:	%	cal / g	cal / g	%	cal / g	cal / g	%	Cal / g	cal / g
Eggs	97	4.50	4.36	95	9.50	9.02	98	3.75	3.38
Meat, fish	97	4.40	4.27	95	9.50	9.02	98	4.19	4.11
Milk, milk products	97	4.40	4.27	95	9.25	8.79	98	3.95	3.87

* The correction, 1.25 Calories, has been substracted from the heat of combustion. This gives values applicable to grams of digested protein and identical with Atwater's factors per gram of available protein.(Watt and Merril, 1975).

While at rest in bed the energy expended approximates the basal metabolic rate, for the man a little over 1 kcal/ min and for woman a little under 1 kcal/ min. This rate is increased by about one-half when sitting and using the arms for light work. It is doubled when standing and moving about slowly, and quadrupled when walking. In addition to physical activity and to type of nonocupational activities, the energy requirements of individuals depend on body size and composition; age; climate and other ecological factors.

When the body composition is normal, the énergy requirement of adults per unit of body weight is the same: for moderately active men 46 kcal/ kg of body weight, for moderately active women 40 kcal/ kg of body weight. Because women have a larger proportion of fat, their energy requirement is less than that of men.

The expenditure of adults may alter with age because of

- changes in body weight or body composition,
- a decrease in the basal metabolic rate,
- a decline in physical activity,
- an increasing prevalence of disease and disabilities.

In many populations the amounts of body fat and total body weight tend to increase with age, this may affect the basal metabolism and hence, the total energy requirements (Passmore *et al.*, 1974).

1.6.2 Proteins

No living matter is devoid of protein. After water, protein is the major component of body tissue. Proteins supply raw materials for the formation of hormones, plasma proteins, haemoglobin, vitamins, and enzymes. The body is constantly undergoing wear and tear that is repaired by proteins.

Proteins are large molecules made up nitrogen-containing amino acids that are linked by peptide bonds. Amino acids are the building stones for tissue synthesis. 22 amino acids are known to be physiologically important. The body is capable of synthesising some under proper conditions and if a supply of nitrogen is made available, these amino acids are known nonessential amino acids.

Others cannot be synthesised by the body and must therefore be supplied by diet, these are essential amino acids which are leucine, isoleucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. Histidine is essential to the growth of infants (Passmore *et al.*, 1974).

Proteins can be classified as either animal proteins or vegetable proteins. Animal proteins contain more of the essential amino acids than vegetable proteins and, in general, have a higher nutritive value. A biologically complete protein is one which contains all of the essential amino acids in adequate amounts to meet human requirements. A biologically incomplete protein is deficient in one or more of the essential amino acids.

Most of the vegetable proteins lack one or more of the essential amino acids, therefore they are biologically incomplete proteins, although mixtures of vegetable proteins may present all of the amino acids in adequate quantities. Therefore, the various proteins may complement one another as long as they are not lacking in the same amino acids (Passmore *et al.*, 1974).

An essential amino acid supplied in less than the amount needed to support protein synthesis is called a limiting amino acid. Food proteins that offer the body an unbalanced assortment of amino acids, so that the body can not make full use of them, are said to be proteins of poor quality. Similarly, diets that supply such imbalances are diets of poor protein quality. In countries where food is scarce, or where the people receive marginal or inadequate amounts of protein, the quality of the dietary protein determines how well the children grow and how well the adults maintain their health. For this reason, scientists use tests of protein quality to determine the adequacy of food proteins. (Whitney, 1993)

Complete Protein: A complete protein contains all of the essential amino acids in relatively the same amounts as human beings require; it may or may not contain all of the nonessential amino acids. Generally, the proteins in foods from animals (meats, fish, poultry, cheese, eggs, and milk) are complete. Proteins from plants (vegetables, legumes and grains) have more diverse in amino acid contents, and some tend to be limiting in one or more essential amino acids. Some plant proteins (for example, corn protein) are notoriously incomplete, while others (for example, soy protein) are complete.

Digestibility: To be deemed high in quality, a protein must be not only complete but also digestible. The most complete protein is worthless to the body if it can not be digested and absorbed to yield amino acids for protein synthesis. A protein's digestibility depends on its configuration, on other factors in foods eaten with it, and on reactions that influence the release of amino acids.

Since there is a cessation of growth in adults, they require protein only for maintenance purposes. The body of an adult contains 18-19 percent protein. The proteins are continuously broken down and replaced in the tissues, but this occurs at very different rates in the various organs. The total turnover of proteins in a human adult amounts to about 400 g per day. The proteins released in this turn over are broken down into their constituent amino acids, most of which can be used again in the formation of new protein molecules; however, a fraction is further broken down, and the nitrogen present is converted into urea and other products which are lost in urine.

It is well recognised that proteins from different sources mutually supplement each other, as a result of which blends of two or more proteins may possess a higher biological value than the individual proteins. The diets of low-income groups are based mainly on cereals. The proteins of cereals are often low in biological value. Maize is low in tryptophan and lysine, rice in lysine and threonine, and wheat in lysine. In most of the parts of the world cereal-based diets traditionally include small amounts of legumes. Legumes contain as much as 25 percent protein that is rich in lysine, thus supplementing the lysine-deficient cereal proteins. Diets based on a mixture of cereals and legumes therefore posses a protein nutritive value that is significantly higher than those based on cereals or legumes alone.

Higher consumption of animal protein foods (meat, milk, eggs, and fish) and of fats and oils increases the energy level of the diet and thus further protein utilisation. Animal proteins could be used to effectively supplement poor diets based on vegetable origin foods.

It should be recognised that persons consuming diets based mainly on animal protein foods or a mixture of animal and vegetable protein foods require lesser amounts of dietary protein for maintenance as compared to those whose diets are based solely on vegetable protein foods.

Protein requirements during infancy, childhood and adolescence are greater than those of adults owing to the necessity of maintaining healthy growth rates. The nutrition of pregnant woman has an important influence on the course of pregnancy and the health of infant. The average birth weight is relatively low in many poor countries, while birth weight in upper socio-economic groups of these countries are similar to the average birth weights that are characteristic of rich countries. Low birth weights are thus related to conditions of poverty, including poor nutrient intakes during pregnancy. The additional protein needed by the lactating woman can be estimated from the volume and composition of the milk secreted.

The diet of growing children and of pregnant and lactating mothers should contain adequate amounts of milk to meet their protein demands. It is well known that the milk is providing good nutrition to the vulnerable groups of the population. A great problem of this time is that in many countries the human population has outgrown the population of dairy cattle. Alternatives became available with the discovery of the possibility of making milk substitutes from mixtures of vegetable proteins (soya, peanut, etc.). Many of these preparations are suitable for supplemental feeding of children.

Also, there are now available protein foods based on blends of cereal flours, oil-seed meals, legume flours, and skim-milk powder, adequately fortified with vitamins and minerals, which can be used as effective supplements to diets of preschool children and pregnant and lactating mothers.

In many of the developing countries the lack of sufficient quantities of nutrious foods, coupled with the prevalence of infections and other diseases, has lead to a incidence of protein-calorie malnutrition. There is a satisfactory result in the case of six months of age children in developing countries, because the protein and other nutrient requirements of these infants are met from breast milk. After the age of six months the infant's overall need for protein increases due to the demands of growth and the development of muscular tissue. Furthermore, if the protein deficiency of the diet is acute, symptoms of protein- calorie malnutrition will set in. Planning should be based upon an examination of the nutrient intake of the population, particularly that of vulnerable groups, and this information should be incorporated into the planning process for economic and social development (Passmore *et al.*, 1974).

1.7 RECOMMENDED DAILY ALLOWANCES (RDA)

The RDA serve as estimates of adequate energy and nutrient intakes for healthy people. They do not apply to people with health problems who may require supplemented or restricted intakes. RDA are safe and adequate recommendations that include a generous margin of safety. They are not minimum requirements, nor are they necessarily optimal levels of intake for all individuals. RDA are intended to be met through diets composed of variety of foods. They are daily intakes. (Whitney, 1993)

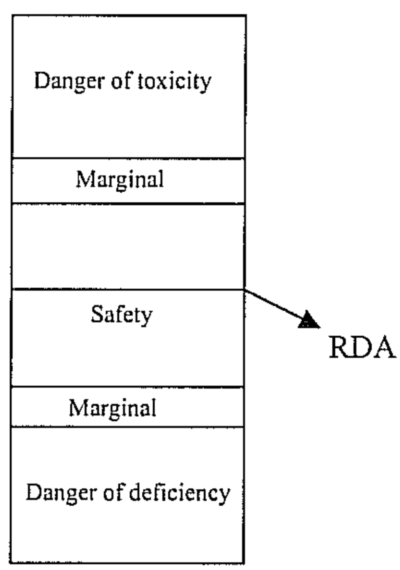
To try to meet the RDA for every nutrient every day is difficult and unnecessary. The length of time over which a person's intake can deviate from the average without risk of deficiency or overdose varies; for most nutrients, it is best to try to achieve the average intakes recommended by the RDA within three days or so.

RDA are most appropriately used to plan and evaluate diets for populations such as school children or military personnel. RDA can be used to estimate the probable risk of deficiencies for an individual only if the person's intakes are determined and averaged over a sufficient length of time.

Researchers use the RDA as a yardstick to assess the adequacy of diets-for example, in nutrition surveys. Diet planners use them as guidelines to aid in planning and evaluating diets for groups of people. Dietitians working in social service programs use the RDA to establish criteria for foods delivered by food assistance programs. The Food and Drug Administration (FDA) uses the RDA as guidelines for nutrition labelling of foods and the food industry uses them to develop new products.

Some nutrients can be toxic at intakes above the RDA, but people's tolerances for high doses vary. A more accurate view is to see a person's nutrient needs as falling within a range, with marginal and danger zones both below and above it. It can be seen from Figure 1.1 the RDA reflects recommended intakes in terms of "safe and adequate" ranges, safe meaning "not too high" and adequate meaning "not too low." Clearly, the safety margins used in setting the nutrient RDA cover " practically all" people.

Figure 1.1 : Accurate View of Nutrient Needs



Protein intakes can be stated in three ways; as a percentage of total energy, as an amount proportional to body weight (grams per kilogram per day) or as an absolute number (grams per day). When expressed as a percentage of energy intake, the protein requirement represents about 10-15 percent of the energy RDA. The Diet and Health report recommends that people's fat intake should contribute 15-30 percent of total food energy, and carbohydrate, 55-75 percent.

Expressed in proportion to body weight, protein RDA for healthy adults is 0.8 grams per kilogram of appropriate body weight per day. For infants and children, it is higher, but when compared to total energy intake, however, it is similar to that of adults. The RDA generously covers the needs for replacing worn-out tissue, so it increases for larger people; and it also covers the needs for building new tissue during growth, so it increases for children and pregnant women.

In setting the RDA, the committee assumes that people are healthy and do not have unusual metabolic needs for protein; that the protein eaten will be of mixed quality; and that the body will use the protein about as efficiently as it will uses reference proteins. In addition, the committee assumes that the protein is consumed along with sufficient carbohydrate and fat to provide adequate energy and that other nutrients in the diet are adequate.

The RDA tables recommend 50 g of protein per day for 64 kg person. An intake of 50 g of protein, equal to 200 kcal, provides about 10 percent of the total energy from protein, if the person receives 2000 kcal a day or more. But if the person cuts energy intake for example 800 kcal a day, then an intake of 200 kcal from protein is suddenly 25 percent of the total, yet it is still the same absolute number of grams. This is still a reasonable protein intake, but the energy intake is not reasonable; low energy intake will force the body to use the protein to meet energy needs rather than to replace lost body protein.

A recommendation of a protein stated as a percentage of energy intake is useful only if the energy intake is within reason. Otherwise the comparison of number of grams of protein with the RDA should be ascertained to make more accurate conclusion about the deficiency. (Whitney, 1983)

Because the body can convert all monosaccharides and disaccharides, most protein fragments, and even a small portion of fat to glucose, the Committee on Dietary Allowances has not established a specific RDA for carbohydrates, but it does suggest that carbohydrates provide more than half the energy requirement. 55-75 percent of total energy should be from carbohydrate to support long-term health. Some of that 55-75 percent includes concentrated sweets, but these by themselves should occupy only 10 percent or less of total calories. A person consuming 2000 kcal a day should therefore have 1100 to 1200 kcal of carbohydrate, or about 275 to 300 g, with only 200 of day's kcal or less (that is 50 g or less) from concentrated sugars. These guidelines signify that for most people, total carbohydrate intake should increase, and sugar intake should decline. The major additions to the diet should be foods containing starch and fiber- vegetables, grains, legumes and fruits.

According to Food and Drug Administration in USA, for an adult female between the 25-50 age the energy RDA is 2200 kcal and protein RDA is 50 g per day. For an adult male the energy RDA is 2900 kcal and protein RDA is 63 g per day.

For a daily 2000 kcal energy intake, total fat intake should less than 65 grams and the total carbohydrate should be 300 grams. These are not RDA, but they are daily reference values (DRV). DRV are the food labelling values for nutrients and food compositions such as fat and fiber, fat do not have RDA but do have important relationship with health.

1.8 NUTRITIONAL DEFICIENCIES

A balanced diet is taken as a norm, and actual diet is explained by divergence from that norm whether due to physical, psychological or social factors. There might be insufficient income or inadequate knowledge of a healthy diet or information concerning foods. While incomes were low, the gap between actual and recommended food intake could be readily explained by factors beyond the control of the individual consumer. A deficient diet was the consequence of lack of capacity or deviancy in habit or knowledge (Austin, 1980).

It is apparent that dietary norms defined by nutritional standards only play a limited role appropriately understood by reference to what we ought to eat. There is a role for nutritional standards and advice in explaining diet, but it is only a small part of a complex system of what constitutes food knowledge and the translation of that knowledge into food choice.

1.8.1 Types of Nutritional Deficiency

In physiological terms, malnutrition is a pathological state deriving from a relative or absolute deficiency or excess of one or more nutrients. Clinical, anthropometric and physiological tests discriminate three main forms of malnutrition in developing countries (Austin, 1980):

i. Undernutrition: the pathological state resulting from long term consumption of an inadequate quantity of food

ii. Specific deficiency: the pathological state resulting from a relative or absolute lack of particular nutrient.

iii. Imbalance: the pathological state resulting from a disproportionate amount of any nutrient with or without a deficiency of any other nutrient.

Malnutrition: If the deficiency or excess is significant over time, the person exhibits signs of malnutrition. With a deficiency of energy, the person may display the symptoms of undernutrition by becoming extremely thin, loosing muscle tissue, and losing resistance to infections and disease. With the deficiency of a nutrient, the person may experience skin rashes, depression, hair loss, bleeding gums, muscle spasms, or night blindness.

Protein-energy malnutrition (PEM) the most widespread form of malnutrition in the world today, affects over 500 million children. Most often, PEM strikes early in childhood, but it touches many adults' lives as well. Inadequate food intake leads to poor growth in children and to weight loss and wasting in adults.

PEM is prevalent in Africa, Central America, South America, the Near East, and the Far East.

Early descriptions of PEM split the condition into two: marasmus was due to energy deficiency and kwashiorkor to protein deficiency. In reality, marasmus reflects in adequate food intake and therefore inadequate energy, protein, vitamins and minerals as well. Acute PEM is the protein-energy malnutrition and it is caused by recent severe food restriction and characterised in children by short stature. Chronic PEM is caused by long term food deprivation and characterised in children by stunding stature for age.

1.9 AIM OF THIS STUDY

The aim of this study was to find the food intake and consumption pattern in seven regions of Turkey and Turkey as a whole. Also expenditures for each food item are found and their relative costs are compared.

CHAPTER 2

MATERIALS AND METHODS

2.1 HOUSEHOLD BUDGET SURVEY (HBS) 1994 DATA (SIS)

HBS 1994 data was obtained from the SIS according to the according to the protocol signed between the State Institute of Statistics and Middle East Technical University, Food Engineering Department (Appendix, A7). Data was categorized in thesis according to Marmara, Agean, Mediterranean Sea, Central Anatolia, Black Sea, Eastern Anatolia and South Eastern Anatolia regions. Data contained the annual consumption expenditures and amounts in approximately 5200 rows in Excel (Microsoft Excel) format.

The data includes the following information:

- Food code (ten digits)
- Name of the food items
- Units (kg, package etc…)
- Quantity (Unit / y)
- Total Price (TL/ y)
- Price/ Quantity (TL/unit)

The food items were listed in the Code Book (State Institute of Statistics) and categorised according to the group that they are included. According to this categorization, food groups data were created for each region. These are:

- Cereal and Cereal Products
- Meat and Meat Products
- Fish
- Milk and Dairy Products and Egg
- Fats and Oils
- Fruits
- Vegetables
- Sugar and Confectioneries
- Salt and Spices
- Ready Meals and Other Foods
- Beverages (including moisture)

Food items listed under these groups are given in Appendix, A6.

2.2 UNITS AND DEFINITIONS FOR FOOD ITEMS

During the survey, consumption of the amounts of food items were recorded in kilogram, number, liter, pack, bunch, bottle, and serving units as specified in the Code Book.

In this study, all units different from kilogram were converted into the kilogram which was taken as the base unit, because the aim of this study necessitates attaining the gram of protein, fat and carbohydrate intakes at the regional base.

If the food item was defined with shell, skin or peel, the shell, amounts of these were subtracted from the total amount. For example, walnut was coded as shelled or unshelled.

All other fruits and vegetables with shell, skin, peel or seed were assumed that only the edible portion of them was mentioned. When orange or lemon consumption for example, was being studied, the peel portion was not taken into consideration, because there was not any information that specifies whether it was orange with peel or not.

All composition values (moisture, protein, fat and carbohydrate and, energy) of food items were taken as gram per 100 grams of edible portion of food in the calculations.

However, some foods defined as its seed in Code Book were examined by subtracting its seed content from the quantity expected to be consumed. Dried apricot is an example of this case. It is coded as dried with seeds and without seed. Seed content is calculated and reduced to find the net amount consumed. Similarly bone content of different meat cuts are subtracted.

2.2.1 Number

During the survey, some foods were recorded in number unit. For example, the amount of bread was recorded in kilograms and the loaves of bread. In this study, the average weight of a bread was assumed to be the same at all regions and it was found to be 0.260 kg. Also kiwi was recorded in number unit and average weight of a kiwi was found to be 0.075 kg/unit.

2.2.2 Liter

Some of the food items are recorded in liter during the survey. When the liter unit was converted into the kilogram the following formulas given in Table 2.1 were used. For example, the amount of tomato juice was recorded in liter therefore in order to find the amount of tomato juice into kilogram u~it, standard density calculation for liquid foods was applied. (Heldman, 1992).

Table 2.1: Standard Density Calculation of Liquid Foods

ρ I at T = 20 °C	Formula	Value (kg/m³)
Density of protein (ρ prot)	(1.3299*Power(10;3))-(5.184*Power (10;-1)*20)	1319.53
Density of fat (ρ fat)	(9.2559*Power(10;2))-(4.157*Power(10;-1)*20)	917.28
Density of carbohydrate (ρ cho)	(1.5991*Power(10;3))-(3.1046*Power(10;-1)*20)	1592.89
Density of ash (ρ ash)	(2.4238*Power(10;3))-(2.8063*Power(10;-1))*20)	2418.19
Density of moisture (ρ moisture)		998.23
Percentage of protein, fat, carbohydrates, ash	Xi	
ρ food	1 / sum (Xi / ρi)	

(Heldman, Choi and Okos eqn for liquid food density equation,1992)

2.2.3 Pack

There were some food items which were recorded in more than one unit. Rusk toast is an example. Amount of rusk toast was recorded in kilograms and in pack units. In such cases the price per unit pack was used to convert the contents of the pack unit into kilograms. Packed and unpacked prices were assumed to be equal and cost of packaging was not taken into consideration. From the ratio of price per pack to price per kilogram, the equivalent of one pack in terms of kilograms was found.

2.2.4 Bunch

If the data was recorded in bunch, like in the case of parsley, an average weight is assumed. This assumption was based on a survey made in open markets in Ankara. For example, a bunch of parsley is assumed to be 0.2 kg throughout Turkey.

2.2.5 Bottle

Liquid foods were recorded in bottle units during the survey. For example amount of carbonated beverages was recorded in liters and also in number of bottle units. In the Code Book, the size of the container was also specified. By using this information and the density calculated for liquid food item, the units were converted into kilograms.

2.2.6 Serving

Generally when ready meals were recorded, serving unit was used. Kilogram value of one serving of ready meal was assumed according to its recepie. On the other hand, if the quantity of ready meal was recorded in kilograms and also in serving units, the price per serving ratio was again used to make conversion.

2.3 DATA PROCESSING

After converting all units into kilograms and categorizing the food items into groups, the food composition tables were found matched by the food items consumed (Appendix, A3). Food composition tables of United States Department of Agriculture (USDA) database was downloaded. In case of traditional foods, compositions were taken from Besin Bileşimleri (Baysal, *et. al.*). For these food items where there were no data available in literature, stoichiometric calculations according to their recipes were done. A few food items, without any known recipes and with negligible amounts of consumption, were omitted. Calculations of food compositions and recipes are given in Appendix A4 and A5.

After matching the food items with the compositions, the amount of moisture, protein, fat carbohydrate and energy intake for each region was calculated. Also the expenditures for each food group were calculated by using the price of food items.

Total quantities of each constituent and the expenditure for moisture, protein, fat and carbohydrate , and total energy intake for each food group were calculated for all regions. At the end overall results for Turkey were found by summing the data for all these regions.

By using the data that represents the total number of people in each region interviewed (Table 1.1), per capita intakes of nutrients and relevant expenditures were found for the seven regions and Turkey (Appendix, A2). These results were then compared with the RDA values.

In all regions and in Turkey, the data was further analysed to find the consumptional habits and nutrient intake from different sources of food as listed below:

- Consumption distribution among the food groups.
- Protein, fat and carbohydrate intake from different food groups.
- Composition of daily energy intake by the main food components.
- Sources of protein, carbohydrate and fat.
- Price of food groups.
- Price of energy, protein, fat and carbohydrate obtained from different food groups.
- Consumption of :
    - cereal and cereal products
    - meat, meat products and fish
    - milk and dairy products
    - sugar and confectionaries
    - beverages

CHAPTER 3

RESULTS AND DISCUSSIONS

Household budget survey, which is conducted in 1994, is a combination of income-expenditure-budget and multi-subject surveys. Data from the income-expenditure-budget surveys refer to the flow of food into households independent of consumptive use and does not take into account the losses.

Although the data was related to the consumption expenditures, it was assumed that the amount of food items purchased by the households was consumed.

3.1. TURKEY IN GENERAL

3.1.1 Food Consumptions and Expenditures

As it is seen from Table 3.3, the cereal and cereal products and vegetables are the main food groups that are consumed, in which cereal and cereal products have the largest consumption, because bread and wheat products are the staple foods in Turkey. Whereas the consumption of meat and meat products, along with fish, though they are very important as a source of protein, have very low consumption level. From Table 3.3 it is observed that while the meat and meat products consumption is very low, milk and dairy products constitute a considerable proportion.

From Fig 8 and Fig 1, it can be seen that the price of the meat and meat products are relatively high which results in their low consumption. On the other hand, cheapness of the cereals, fruits and vegetables results in consumption of high amount of these food groups. High cost of fats and oils does not directly affect the amount of their consumption, since they can not be consumed as a dish alone. Turkish people generally prefer to cook at home therefore the consumption of ready meals are low as expected. Also salt and spices are the supplementary food groups used in only cooking. Therefore consumption of these food groups are relatively very low (Table 3.3). Sugar, on the other hand, is consumed widely for different purposes extending from tea to deserts cooked regularly at each Turkish home.

3.1.2 Energy Intake in Turkey

Turkey, being an agricultural country, especially the Central Anatolia region, where cereals are cheap, therefore consumed the most, 52 percent of the daily energy intake of the Turkish people come from cereals (Table 3.3).

Second source of daily energy intake comes from fats and oils (Table 3.3). Combustion of 1 gram of fat gives the highest amount of energy when it is compared to the energy relased from the combustion of carbohydrates and proteins. Although sugar and confectionaries have high percentage of carbohydrate, due to their relatively low consumption, they contribute only to 4 percent of the daily energy intake (Table 2, Appendix A2).

Meat and meat products, milk and dairy products and eggs are the protein sources other than cereals. In general only 10 to 15 percent of the daily energy intake is derived from the proteins (Whitney, 1973). Primarily protein is utilized for maintaining purposes in the body. For this reason the energy intake from these food groups are low. In the case of fruits and vegetables although there is a high consumption, the energy intakes from these food are low, because the main component is water (Figure 2, Table 1).

Carbohydrates supply the 58 percent of daily energy intake in Turkey. From Figure 6 it can be seen that 30 percent of daily energy intake is derived from the fat content of the foods and only 12 percent of energy is obtained from the protein.

3.1.3 Protein Intake in Turkey

Due to the cereal oriented based consumption, daily protein intake is supplied by the cereal and cereal products (Table 3.3). Protein from meat and its products can only make up the 10 percent of daily intake. Moreover fish proteins supply 3 percent, milk and dairy products and eggs supply 15 percent of daily protein per capita intake (Table 3.3). In the case of vegetable, the inclusion of the dry pulses into this food group affects the percentage of protein taken from the vegetables (Appendix, A6).

As a result, 72 percent of daily protein intake is vegetable origin while only 28 percent is animal origin (Table 3.4). It has been generally accepted that for adequate and palatable nutrition 33 percent of the total protein consumed should be animal origin (Köksal, 1977). The main reason of the low animal protein consumption can be explained by the high cost of meat and meat products. It results in low consumption so does in low level of animal protein intake (Fig 9, Fig 10, Fig7).

Animal proteins contain one or more of the essential amino acids than vegetable proteins, by this way they have a higher nutritive value. Vegetable proteins are the biologically incomplete, due to lack of one or more of the essential amino acids. Especially maize is low in tryptophan and lysine, rice in lysine and threonine and wheat in lysine. In Turkey the consumption of cereals and their products, vegetables and fruits make up the 72 percent of total protein intake.

If the diets based on the adequate mixture of animal and vegetable protein, the lesser amount of dietary protein for maintainance is required compared to diets which are based solely on vegetable protein foods. Besides, higher consumption of animal protein foods (meat, milk, eggs and fish) and of fats and oils increases energy level of the diet and thus further protein utilization. By this way, the higher percentage of protein intake is not utilized in order to complete daily energy requirement.

3.1.4 Fat & Carbohydrate Intake in Turkey

The main sources of fat consumption are the fats and oils. The other sources are cereals and cereal products, milk and dairy products and also eggs in Turkey. Although the fat content is high in meat, due to low consumption, the fat intake from the meat and meat products is very low. (Table 3.3). Also, high price of meat affects the purchase rate, finally resulting in high price of fat drived from meat (Fig 11). Inclusion of nuts into the fruits affects the percentage of fat taken from this food group (Appendix, A6).

Because of high consumption, cereal and their products are the major sources of carbohydrates. Despite the relatively low consumption of sugar, 13 percent of carbohydrate is taken from these foods due to their high carbohydrate composition (Table 3.3).

When the value, in TL, of the food components are calculated from total intake, fat is found to have the highest value (Fig 13). Fats and oils contribute 55 percent of the daily fat intake (Fig 4). Therefore the value of fat component mostly depends on the price of fat and oils sold in Turkey. This figure is important to observe values of the changes in the relative values of the food components when a similar survey is repeated.

3.2. FOOD CONSUMPTION AND NUTRIENT INTAKES IN THE SEVEN REGIONS OF TURKEY

Insignificant differences are observed when food consumption in the seven regions of Turkey is compared with the total consumption of Turkey in general, except the South Eastern and Eastern Anatolia. In the South Eastern region 40 percent of the consumption are cereals and cereal products (Table 3.5). It is about 38 percent higher than cereal consumption level in Turkey. With 34 percent cereal consumption Eastern Anatolia also shows the second highest deviation from Turkish average (Table 3.5 and Table 3.3). In both regions bread is the main food consumed and it is approximately the 69 percent and 76 percent of the total cereal consumption in the Eastern and South Eastern Anatolia, respectively (Table 3.6).

In all regions rice and rice flour is much more consumed than macaroni and semolina. The second major cereal products consumed for all regions are flour, starch and tarhana. The highest consumption of corn and its products is observed in the Black Sea region (Table 3.6).

Only in the Agean region, vegetable consumption exceeds cereal consumption. Vegetable consumption is 26 percent while fruits and cereals and cereal products are 22 and 25 percent, respectively (Table 3.5). Due to the high consumption of watermelons, melons, orange and apple, the fruit consumption in this region has the highest percentage among others regions. This also it exceeds the Turkish average in fruit consumption (Table 3.5 and Table 3.3).

The lowest level of sugar and confectionary consumption is observed in the South Eastern Anatolia. In this food group, sugar is the main item consumed in all regions, but in the South Eastern Anatolia tahini and grape molasses have also a significant portion (Table 3.6).

The share of milk and dairy products consumption is approximately same in all regions (Table 3.5). The lowest share of milk and dairy products and eggs consumption was observed in the Central Anatolia region. Only in the South Eastern Anatolia yoghurt consumption is more than milk consumption (Table 3.6). Also in the Eastern Anatolia 41 percent of the consumption of this food group is yoghurt (Table 3.6). This is the result of difficulties encountered in keeping the fresh milk. Traditional way of keeping the milk is in the form of yoghurt.

Fish consumption is the lowest among other groups in all regions. When fish is compared with the items of the meat and meat products group , the differences in fish consumption can easily be detected for all regions. (Table 3.6). By this way the highest share of fish is found in the Black Sea and the lowest in the South Eastern Anatolia among the animal origin foods (Table 3.6).

The high percentage of beef and veal consumption is found in the Marmara, Agean, Central Anatolia, Black Sea and the Eastern Anatolia regions. Lamb and muton is consumed more than all other animal origin foods in the Mediterranean and the South Eastern Anatolia. In the Agean region poultry is consumed more than the lamb and muton (Table 3.6).

In the Central and Eastern Anatolia the consumption of poultry is approximately equal to the fish consumption. In the Marmara and Black Sea regions more fish is consumed than poultry (Table 3.6).

Drinking water is included in the beverages. Therefore drinking water is found to be the highest consumed item of this group in all regions as expected, except the Eastern Anatolia region where the share of the drinking water consumption was found as 0.3 percent (Table 3.6). In the Eastern and South Eastern Anatolia, hot drinks, especially tea, are consumed more than cola. The highest cola consumption is seen in the Mediterranean region. In the case of fruit juice, its consumption is always below the hot drink consumption in all regions (Table 3.6).

The diets are based on the vegetable protein due to the high consumption of cereals and their products in all regions. For the adequate and palatable nutrition 33 percent of total protein should be animal origin protein. In the Marmara region the percent of animal protein taken from foods is 32 and in the Agean region animal protein is taken at 31 percent (Fig 20, Fig 74). By taking these values into consideration, only animal protein intakes of these two regions are close to the accepted value. In the South Eastern Anatolia, the percentage of animal protein intake has the lowest value (20 percent of the total protein intake) (Fig 38).

Finally, people in the South Eastern Anatolia pay much less money for protein and energy intake than people in all other regions due to the huge amount of cereal consumption and bread oriented diet (Fig 31, Fig 49, Fig67, Fig 85, Fig 103, Fig 121 and Fig 139).

It should be also noted that the inclusion of dry pulses in vegatables group affects the protein intake from the vegetable group. The share of the dry pulses consumption in the vegetables consumption was found as 4.15 percent in the Mediterannean, 3.63 percent in the Agean, 4.46 percent in the Marmara, 4.13 in the South Eastern Anatolia, 2.71 percent in the Central Anatolia, 3.57 percent in the Eastern Anatolia and 3.18 percent in the Black Sea region.

Also the inclusion of nuts in fruits group affects the fat intake from fruit group. The share of the nuts consumption in the fruits consumption was found as 0.79 percent in Mediterannean, 0.84 percent in the Agean, 1.14 percent in the Marmara, 0.35 percent in the South Eastern Anatolia, 0.79 percent in the Central Anatolia, 1.52 percent in the Eastern Anatolia and 1.92 percent in the Black Sea region.

3.3. COMPARISON OF THE DAILY INTAKE VALUES WITH THE RECOMMENDED DAILY ALLOWANCE (RDA) AND THE PREVIOUS WORK

Recommended daily intakes are stated in terms of safe and adequate ranges. "Safe" meaning "not too high" and "adequate" meaning "not too low". The nutrient RDA is set well above the mean requirement. It covers about 98.7 of the population. People can not use the RDA as their own individual nutrient requirements, but they can be sure that the RDA probably cover their needs adequately. On the other hand the energy RDA are set at the mean so that half the population's requirements fall below and half above them (Whitney, 1973).

In the 15 – 25 age range, the RDA value of the energy is 2900 kcal per day for males, and 2200 for females. Also RDA value of protein is 63 g per day for males and 50 g for females. Various researchers have used 80, 70, and 66,7 percents of the RDA as levels below which diets may need improvement (Garrison and Somer, 1985). In this work, the 80 percent of RDA is taken as the the lower limit of RDA and the standart deviation is taken as the 20 percent of the RDA value for both energy and protein intake comparisons.

Food intake according age and sex classifications is not covered in the HBS survey used in this study. It can be assumed that approximately male and female population in Turkey is equal then the RDA values for Turkish people was found by taking the simple arithmetic average of lower limit values of RDA for male and female. In this case the Turkish RDA values for energy and protein intake have –1 standart daviation from the RDA average.

All comparisons were done according to Turkish average RDA (the average of the lower limits). The results were tabulated in the Table 3.1.

Table 3.1: Comparison of the Energy and Protein Intakes with RDA.

	Energy (kcal/day-capita)	Protein (g/day-capita)	Standart Deviation (20 % of the **RDA**)	
			Energy	Protein
Recommended Daily Allowance. (in 25-50 age range)	2200 for female	50 for female		
	2900 for male	63 for male		
	2550 average	**56.5 average**		
Lower limits of RDA (80% of RDA) (in 25-50 age range)	1760 for female	40	-1	-1
	2320 for male	50.4	-1	-1
Turkish average RDA calculated by taking the average of the lower limits (50% male and 50% female population in Turkey)	2040	45.2	-1 (20% of **average RDA**)	-1 (20% of **average RDA**)
Turkey	2023	56.73	-1.03	+0.02
Marmara Region	2120	58.69	-0.84	+0.19
Agean Region	2120	59.05	-0.84	+0.23
Mediterranean Region	2103	57.64	-0.88	+0.10
Central Anatolia Region	2123	56.46	-0.84	-0.003
Black Sea Region	2282	62.32	-0.52	+0.51
Eastern Anatolia Region	1822	52.09	-1.43	-0.39
South Eastern Anatolia Region	1728	51.74	-1.61	-0.42

(Table 2, Table 6, Table 10, Table 14, Table 18, Table 22, Table 26, Table 30, Appendix A2) (Garrison,1985) (Whitney,1993)

Daily energy intake of Turkish people is very close to the Turkish RDA value and also has –1.03 standart deviation from the RDA average. Only daily energy intake in the Black Sea region exceeds largely the lower limit of RDA value whereas both in the Eastern and South Eastern Anatolia regions daily energy intake falls below the lower limit, which may cause undernutrition in these regions. People living in the Marmara and Agean regions take the same amount energy daily. Energy intake in the Eastern and South Eastern Anatolia regions has the highest standart deviation from the RDA average, as –1.43 and –1.62 respectively.

In Table 3.2 the values obtained in this work is compared with the similar research done in 1974. Decrease of about 12 percent is observed in the energy intake in 1994 when compared with the figures observed in 1974.

Table 3.2: Comparison of 1994 Turkish Energy and Protein Intakes with 1974.

	1974 daily intake per capita	1994 daily intake per capita
Calorie (kcal)	2291	2023
Protein (g)	68 (18 g animal protein)	56.73 (16g animal protein)
Carbohydrate (g)	369.1	306.9
Fat (g)	62.4	66.71
The percentage of daily calories from total protein	12	11
The percentage of daily calories from total carbohydrate	64	59
The percentage of daily calories from total fat	24	30

(Figure 6) (Table 2) (Koksal, 1977).

Decrease in the daily energy intake results from the decrease in carbohydrate intake. It means that lower rate of cereal and cereal products are consumed in 1994 than in 1974.

When expressed as a percentage of energy intake, the protein requirement represents about 10 – 15 percent of energy RDA. It is recommended that fat intake should contribute 15 – 30 percent of total energy and carbohydrate, 55 – 75 percent (Whitney, 1993). In 1994 survey, percentages of calories from protein, fat and carbohydrate are in the recommended ranges. In only Marmara, Agean and East Anatolia regions, the energy intake from fat exceeds the recommended range. In the Central Anatolia the percentage of daily calories from total carbohydrate is close to the upper range of recommended value. (Fig 9, Fig 73, Fig 109 and Fig 91)

The protein intake values in Table 3.1 exceed largely the lower limit of RDA in all regions. The highest protein intake is found in the Black Sea region where the daily protein intake has the +0.51 standart deviation from the RDA average. Second highest protein intake is observed in the Agean region with the +0.23 standart deviation. People in the South Eastern Anatolia consumed the lowest daily protein among all regions due to lower daily fruit, milk and dairy products consumption (Table 30, Appendix A2). Altough daily protein intakes in the Eastern and South Eastern Anatolia were in the acceptable range when compared with the lower limit, they have –0.39 and –0.42 standart deviation from the RDA average respectively (Table 3.1).

Protein intakes are measured in three ways; as a percentage of total energy, as an amount proportional to body weight (grams per kilogram per day) or as an absolute number (grams per day). For more accurate comparison with the protein RDA number of grams of protein intake per day should be used.

It can be seen from the Table 3.2 that a decrease in the protein intake in 1994 is observed when it is compared to intake in 1974. It originates from low consumption of meat and meat products. In addition, while protein and carbohydrate intakes decreased in 1994, higher amounts of fat is taken daily when it is compared to the 1974 value. This shows the increase in the consumption of fats and oils in spite of the expensiveness of these products (Table 3.2 , Fig 8).

According to the daily reference values (DRV) daily fat intake should be less than 65 g and daily carbohydrate intake 300 g (Whitney, 1993). Daily reference values are the food labelling values for nutrients and the food compositions such as fat and fiber. When such values are compared with the Turkish average values, it is found that total carbohydrate intake which is 306 g is higher than its DRV value. Also daily fat intake, which is 66.7 g, surpasses its DRV value (Table 2, Appendix A2).

A person consuming 2000 kcal a day should have 1100 to 1200 kcal equivalent of carbohydrate which corresponds to 275 to 300 g, and 200 kcal or less (50g or less) of this value should come from sugars. In Turkey the average sugar consumption is about 41.03 g as per capita daily intake which is in the acceptable range (Table 2, Appendix A2).

There may be some erors in the food consumption values, because in the survey wastage or losses of edible food was not taken into account. It was assumed that all food items were consumed totally. Also data was related to food consumption expenditures and not directly give to consumed values. It was assumed that the amount of food items purchased by the households are completely. However, for assessing nutrient intake levels besides food consumption analysis, data should reflect nutrients as consumed rather than as purchased (Whitney, 1993).

In order to reach the more accurate result, data should also consist consumption values of the households and it should not include wastes or losses for purchased or home produced foods. In the case of per capita daily nutrient intake, to make the more accurate comparison with the daily allowance values food consumption data should cover all food consumed at home and away from home. By this way total food consumption of individuals can be found and then the nutrient deficiency can be determined more accurately. As far as the food consumption level of the consumers is concerned, food consumption data obtained through household surveys give a better estimation of the actual level of food consumption only if it provides that the food eaten away from home is included.

Table 3.3 : Daily Intakes from Food Groups in Turkey

Source	Mass Distiribution %	Energy Intake %	Protein Intake %	Fat Intake %	Carbohydrate Intake %
Cereal and Cereal Products	29	52	55	15	66
Vegetables	24	7	12	1	9
Fruits	15	5	4	3	9
Milk and Dairy Products and Eggs	12	7	15	13	2
Meat	3	4	10	8	0
Fats and Oils	3	16	0	55	0
Sugar and Confectionary	4	8	1	1	13
Ready Meals and Others	1	1	1	1	0
Fish	1	0	3	3	0
Beverages	7	0	0	0	1

(Fig1, Fig 2, Fig 3, Fig 4 and Fig 5)

Table 3.4: Sources of Energy and Protein Intake in Turkey

Sources of Energy Intake		Sources of Protein Intake	
Carbohydrate	% 59	Vegetable Origin	%72
Protein	% 11	Animal Origin	%28
Fat	%30	Milk and Egg	%15
		Meat	%10
		Fish	%3

(Fig 6, Fig 7, Fig 3)

Table 3.5: Share of Consumption of Main Food Groups in all Regions

Food Groups	Marmara %	South Eastern Anatolia %	Mediterannean %	Agean %	Central Anatolia %	Eastern Anatolia %	Black Sea %
Cereal and Cereal Products	26	40	29	25	23	34	30
Meat and Meat Products	3	3	3	2	2	4	3
Fish	1	0	0	1	0	0	1
Milk and Dairy Products and Eggs	13	11	13	12	10	12	13
Fat and Oils	4	3	3	3	3	4	4
Fruits	15	13	17	22	15	13	14
Vegetables	21	22	28	26	21	25	26
Sugar and Confectionaries	4	1	4	4	4	3	5
Salt and Spices	1	1	1	1	1	1	1
Ready Meals and Others	1	1	1	1	1	1	1
Beverages	11	5	2	3	20	2	2

(Fig 14, Fig 32, Fig 50, Fig 68, Fig 86, Fig 104, Fig 122)

Table 3.6: Share of Consumption of Main Food Items in all Regions

Food Items	Marmara %	South Eastern Anatolia %	Mediterannean %	Agean %	Central Anatolia %	Eastern Anatolia %	Black Sea %
Cereal and Cereal Products							
Bread	67	76	62	70	66	69	63
Corn	0	0	0	0	0	0	1
Bulgur	2	5	5	1	2	4	2
Rice	6	5	6	5	4	5	6
Macaroni and Semolina	3	2	3	3	3	4	3
Biscuits	2	1	3	3	2	1	2
Flour, Starch And Tarhana	19	11	21	18	23	17	23
Sweets	1	0	0	0	0	0	0
Meat and Meat Products							
Beef and Veel	76	6	15	38	43	44	49
Fish	4	14	12	19	13	9	34
Meet Products	0	1	3	4	5	2	2
Offals	1	3	4	3	3	3	2
Goat	0	2	14	6	2	1	0
Poultry	1	13	18	22	14	10	12
Lamb and Muton	18	61	34	8	20	31	5
Dairy Products							
Milk	62	28	57	59	67	51	58
Chesee	12	5	8	10	10	8	10
Other cheese	3	0	4	4	4	0	3
Yoghurt	23	67	31	27	19	41	29
Other	0	0	0	0	0	0	0
Beverages							
Drinking Water	79	79	5	35	92	0	16
Fruit Juices	4	2	13	9	1	7	15
Cola	10	6	41	28	3	28	35
Other Carbonated Beverages	1	1	6	7	1	5	6
Hot drinks	5	9	31	19	3	31	26
Others	1	3	4	2	0	29	2
Sugar and Confectionaries							
Tahini and Grape Molases	4	20	6	5	6	10	4
Jam	4	10	4	4	4	8	4
Confectionaries	10	24	12	9	11	15	7
Sugar	82	46	78	82	79	67	85

(Fig 21-25, Fig 39-43, Fig 57-61, Fig 75-79, Fig 93-97, Fig 111-115, Fig 129-133,)

CHAPTER 4

CONCLUSION

According to the results it can be conculeded that the average values of daily energy and protein intake in Turkey is sufficient to meet the daily requirements. On the other hand, per capita daily intakes of carbohydrate and fat exceed their daily reference values.

When 1994 and 1974 consumption survey results are compared, it is observed that the energy, protein and carbohydrate intakes are decreased. Although fat is the most expensive food component among others, an increase is observed in per capita fat intake in Turkey. This may show the changes in food preferences of Turkish people, or a shift to fat rich food. Carbohydrate rich foods are still staple since cereal and cereal products, especially bread, are the main food items consumed. Vegetables, in addition, display the second major source of food consumption in Turkey.

High price of meat and meat products results in their low consumption, which causes a decrese in animal protein intake. Thus, animal protein intake is below the adequate level in all regions. An increase in fat intake from meat and meat products can increase the energy intake level and thus further protein utilization. This may not be sufficient alone unless there is also a high consumption of animal protein foods (meat, milk, eggs and fish).

Energy deficiency is only observed in the Eastern and South Eastern Anatolia regions due to the imbalances in intake with regard to the sources of nutrients. Therefore, in these regions it is possible to observe the marasmus due to the energy deficiency. Among the seven regions, Central Anatolia shows the best reflection of Turkish people's daily energy and protein intakes. In only the Black Sea region, protein and energy intakes are higher than the Turkish average. Also protein intakes in all regions were sufficient for daily requirements of the people.

CHAPTER 5

RECOMMENDATIONS

This work shows the necessity to gather the data related with the traditional food components in order to establish unique Turkish food composition tables.

Turkish Recommended Daily Allowances and Daily Reference Values may be revised for Turkish people according to sex, age and socioeconomical groups.

In general, besides the impact of cultural and educational status, regional imbalance in food distribution, unbalanced per capita income, lack of quality and quantity in food production and lack of knowledge strongly affect the nutritional wealth of people in a country. Therefore it is important that the government should conduct surveys to measure these imbalances so that corrective action plans can be made. In addition to agricultural policies, a multi-disciplinary policy aimed at solving nutritional problems to meet the future needs of country has to be set and take place in the Five Year Development Plans. The results from such national surveys can only be made effective if they are processed by national committee including engineers, statisticians, dietitians, medical doctors, sociologists, anthropologists and other professionals.

REFERENCES

Ardakoç, B., Türk Sofrası- Alaturka Alafranga Yemek ve Tatlı Kitabı, Geçit Kitabevi,Istanbul, 1993.

Austin, J.E., Conforting Urban Malnutrition. The Design of Nutrition Programs, World Bank Staff Occasional Papers, Johns Hopkins University Press, Baltimore and London, 1980.

Baysal, A., Keçecioğlu, S., Arslan, P., Yücecan, S., Pekcan, G., Güneyli, U., Birer, S., Sağlam, F., Yurttagül, M., Çehreli, R., Türkiye Diyetisyenler Derneği Yayını, Besin Bileşimleri, Yayın:1, Yeniçağ Basın Yayın, 1991.

Cılızoğlu, E.L., Yemek Pişirme, Doğuş Matbaası, Ankara, 1974.

Consumption Expenditures Code Book (Tüketim Harcamaları Kod Kitabı) State Institute of Satistics, Ankara, 1994.

Desrosier, N. W., Elements of Food Technology, Avi Publishing Company Inc, Conecticut, 608, 1977.

DIE Haber Bülteni, 1994 Anketinin Gecici Sonuclari, Sayi: B. 02.1.DIE. 00.05. / 906-12 27.01.1997.

Food and Agriculture Organisation of the United Nations (a), A Comparative Study of Food Consumption Data from Food Balance Sheets and Household Surveys, 1-31, 1983.

Food and Agriculture Organisation of the United Nations (b), Use of Household Surveys For Collection of Food and Agricultural Statistics,1-41,1983.

Garrison, R.H., Somer, E., The Nutrition Desk Reference, Keats Publishing, Inc. Connecticut, 1985.

Heldman, D.R., Lund. D.B., Hanbook of Food Engineering, Marcel Dekker Inc., New York, 251, 1992.

Köksal,O., Türkiye'de Beslenme, Türkiye 1974 Beslenme-Sağlık ve Gıda Tüketimi Araştırması, Hacettepe Üniversity, Ankara, 60, 1977.

Nieman, D.C., Butterworth, D.E., Nieman, C.N., Nutrition, Wm.C. Brown Pub. Co., 1990.

Passmore, R., Nicol. B.M., Narayana. M., Handbook of Human Nutritional Requirements, World Health Organization , 1974.

State Institute of Statistics Turkey, Household Consumption Expenditures Survey, Devlet İstatistik Enstitüsü Matbası, Ankara, 1994.

Trichopoulou, A., Breslin. L., Network For The Pan European Food Data Bank Based on Household Budget Surveys, Data Food Networking, 1994.

Trichopoulou, A., Zintzaras.E., Kanellou. A., Lagiou. P., Integration of Nutritional Data Based on Household Budget Surveys in European Countries, Proceedings of the Nutrition Society, Iss 55, 699-704, 1996.

Türkiye Gelişme ve Araştırmaları Vakfı, Türkiye'de Beslenme ve Gıda Maddeleri Üretim Politikası, Yayın No:1, 1-5, 1980.

Watt, B.K., Merril. A.L., Composition of Foods Agriculture Handbook No: 8, Agriculture Research Service, United States Department of Agriculture, U.S. Goverment Printing Office, Washington D.C, 1975. (1996 upgrade data from http://www.nal.usda.gov/fnic/foodcomp/Data)

Whitney, E.N., Rolfes, S.R., Understanding Nutrition, West Publishing Company, New York, 1993.

Zintzaras.E., Kanellou. A., Trichopoulou. A. and Nelson. M., The Validity of Household Budget Survey Data. Estimation of Individiual Food Availability in an Epidemiological Contex, Journal of Human Nutrition and Dietetics, Iss 10, 53-62, 1997.

APPENDIX

A1

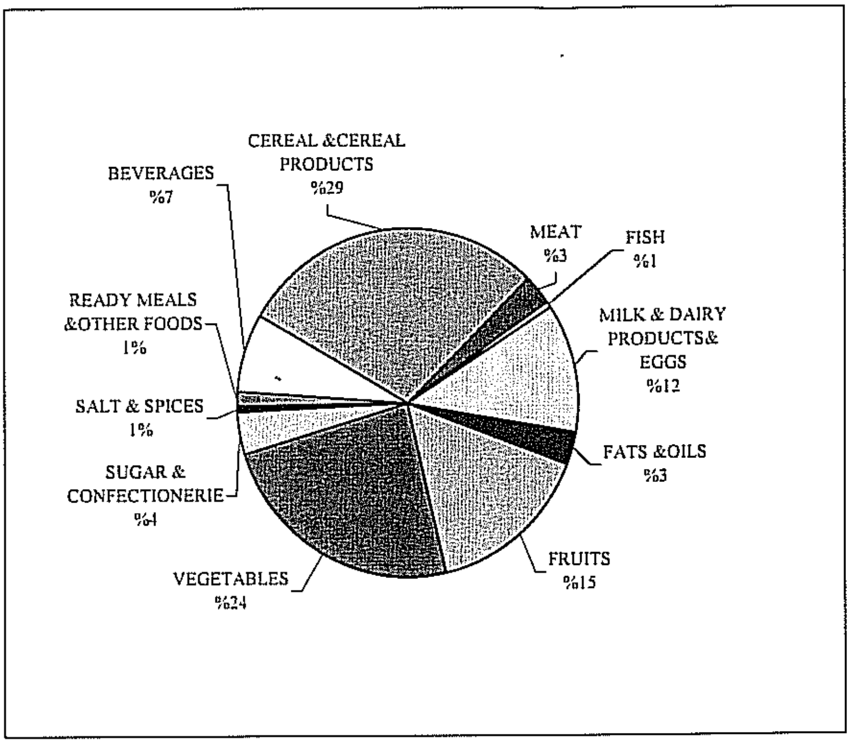


Figure 1 Mass Distribution in Turkey (kg)

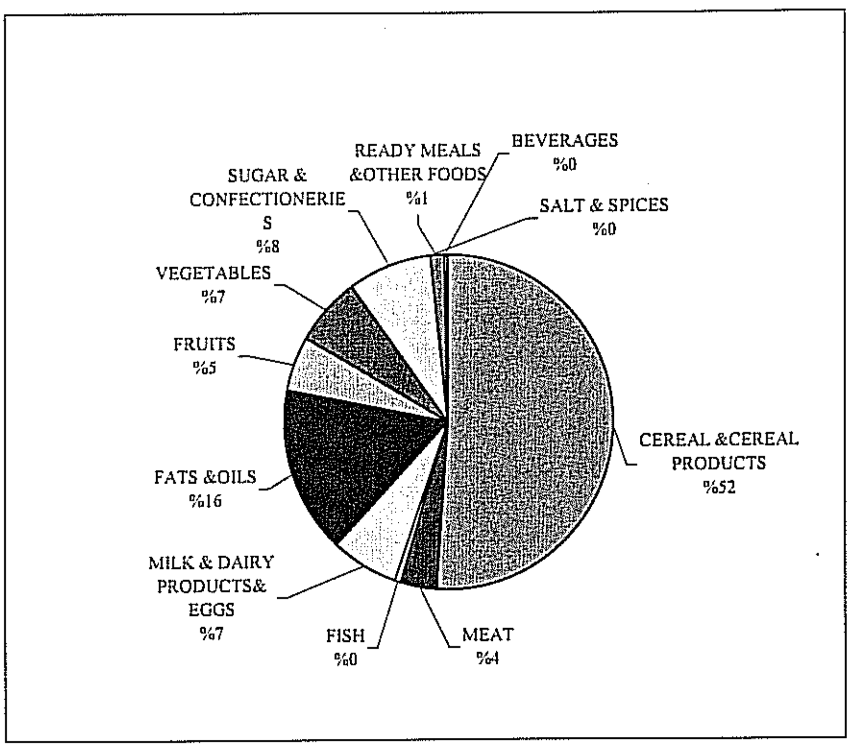


Figure 2 Daily Energy Intake From Different Food Groups in Turkey

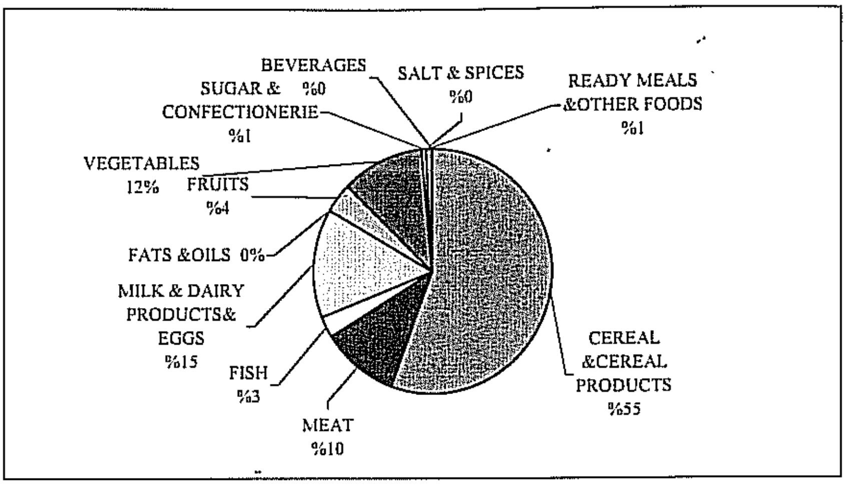


Figure 3 Daily Protein Intake From Different Food Groups in Turkey

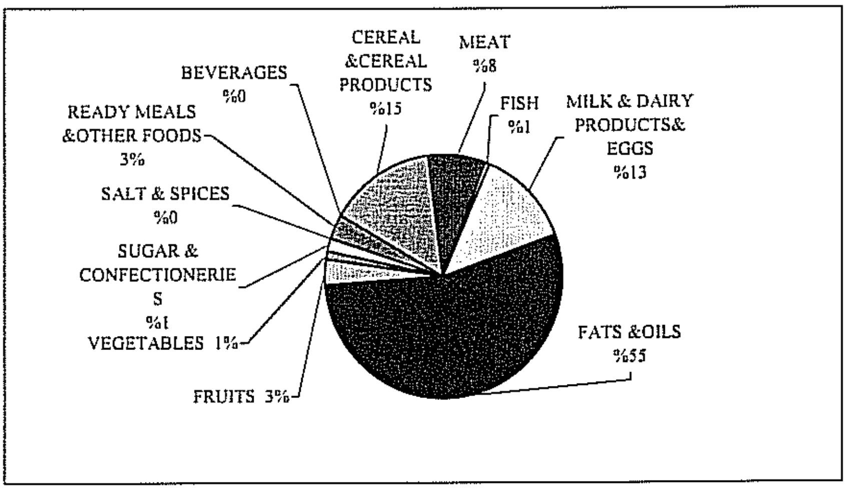


Figure 4 Daily Fat Intake From Different Food Groups in Turkey

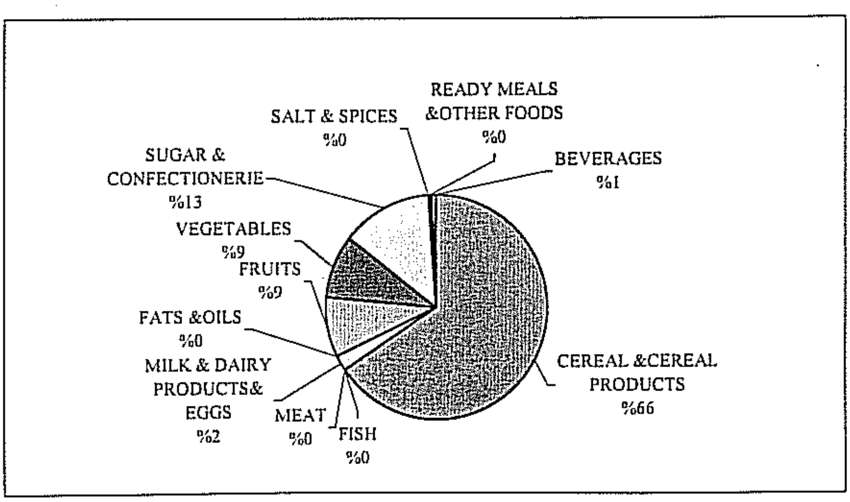


Figure 5 Daily Carbohydrate Intake From Different Food Groups
in Turkey

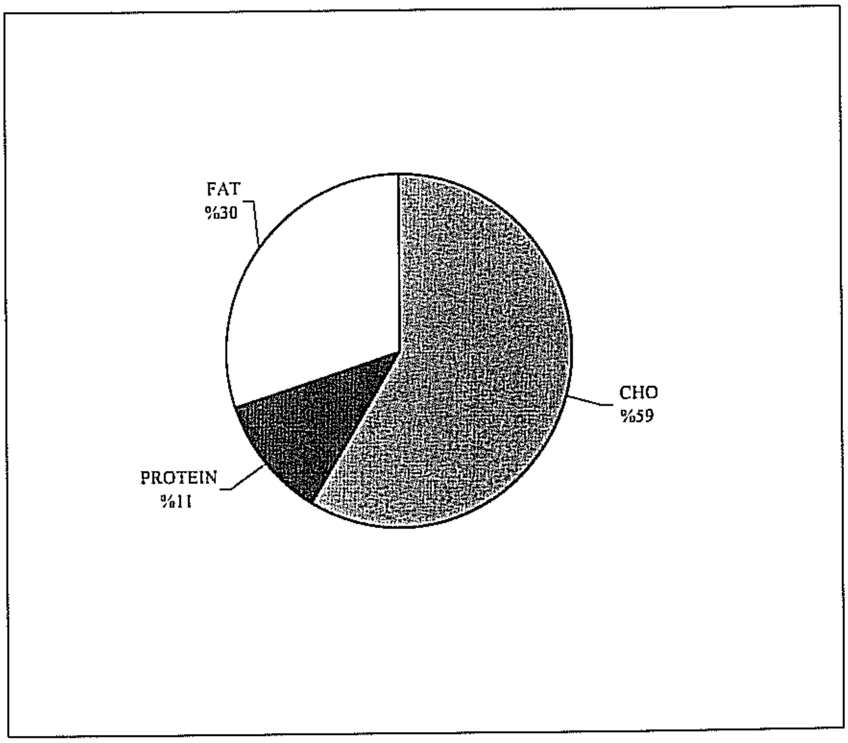


Figure 6 Per Capita Daily Energy Intake From Main Food Components in Turkey

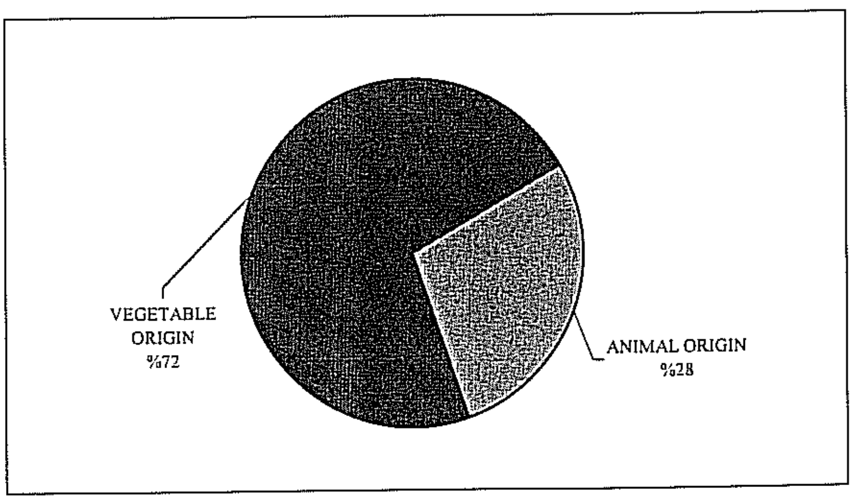


Figure 7 Sources of Protein in Turkey

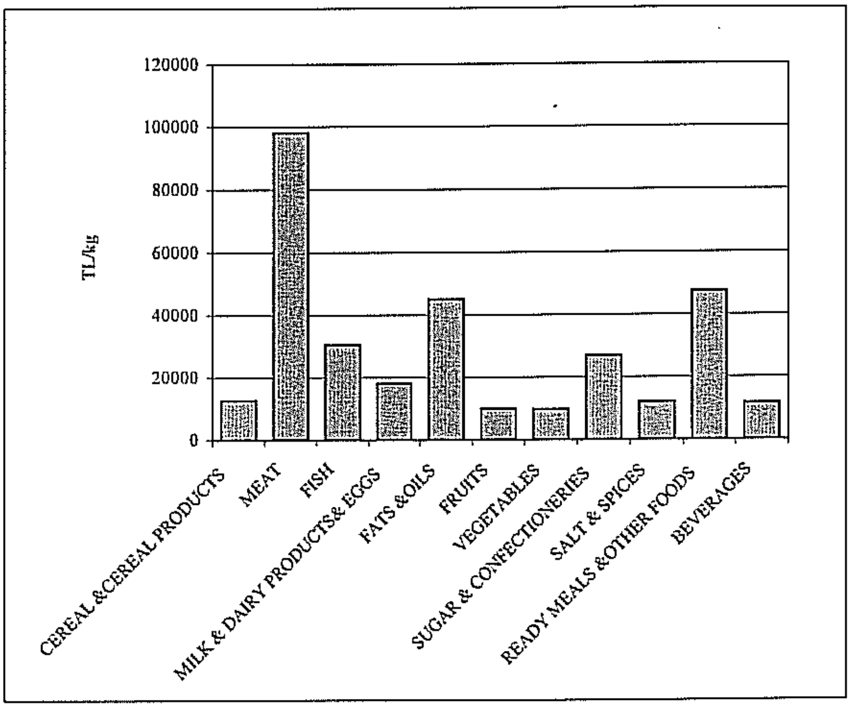


Figure 8 Price of Food Group in Turkey (1994 Price)

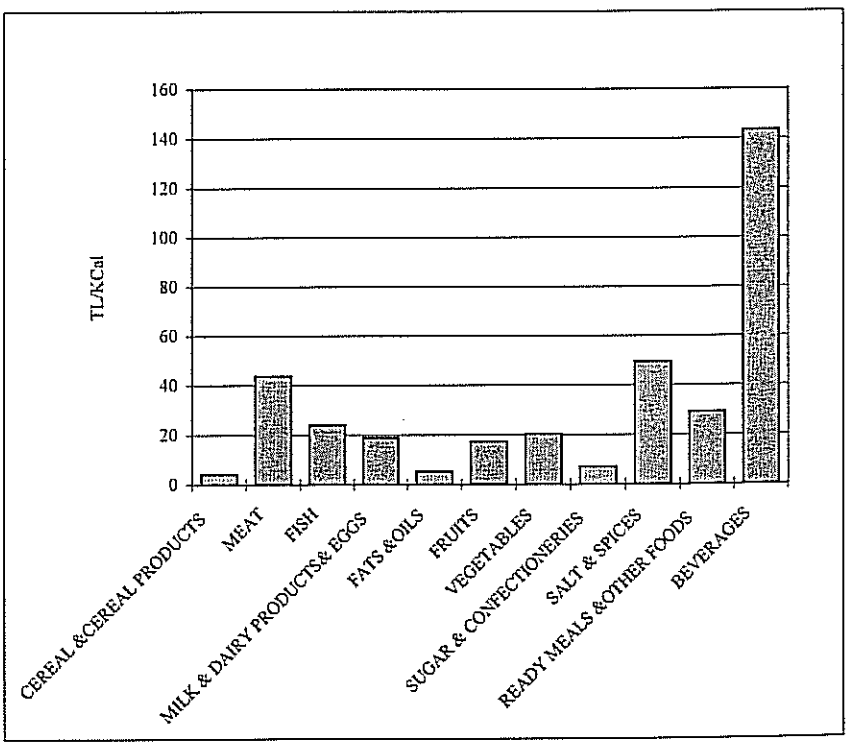


Figure 9 Price of Energy in Turkey

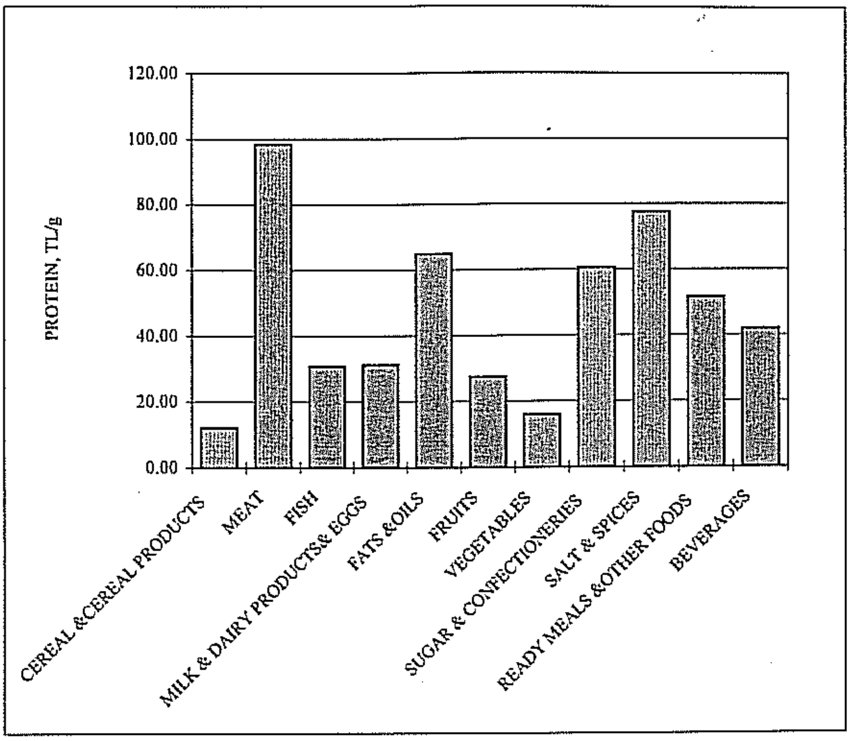


Figure 10 Price of Protein in Turkey

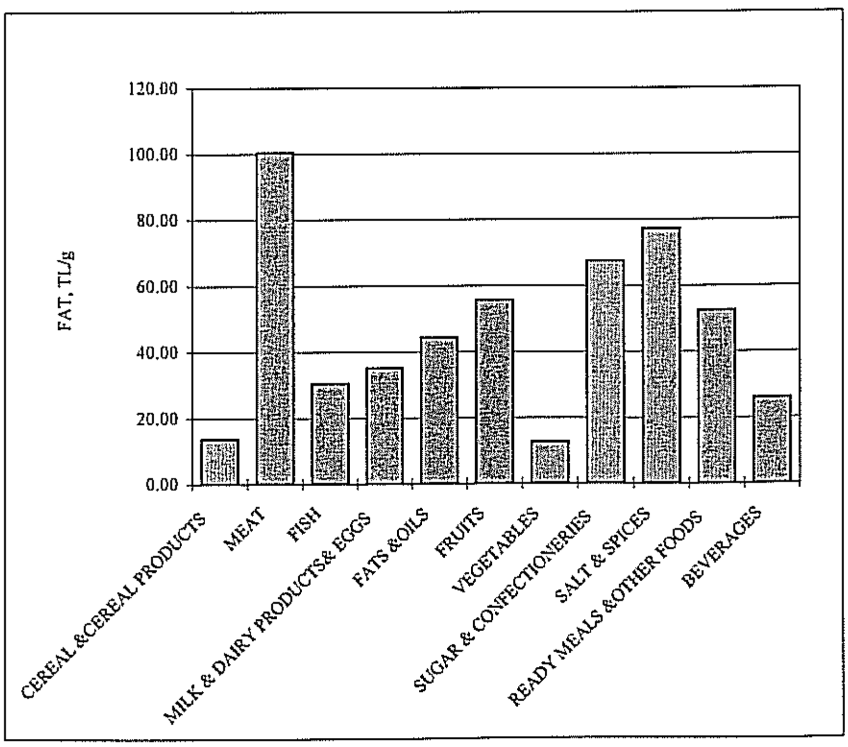


Figure 11 Price of Fat in Turkey

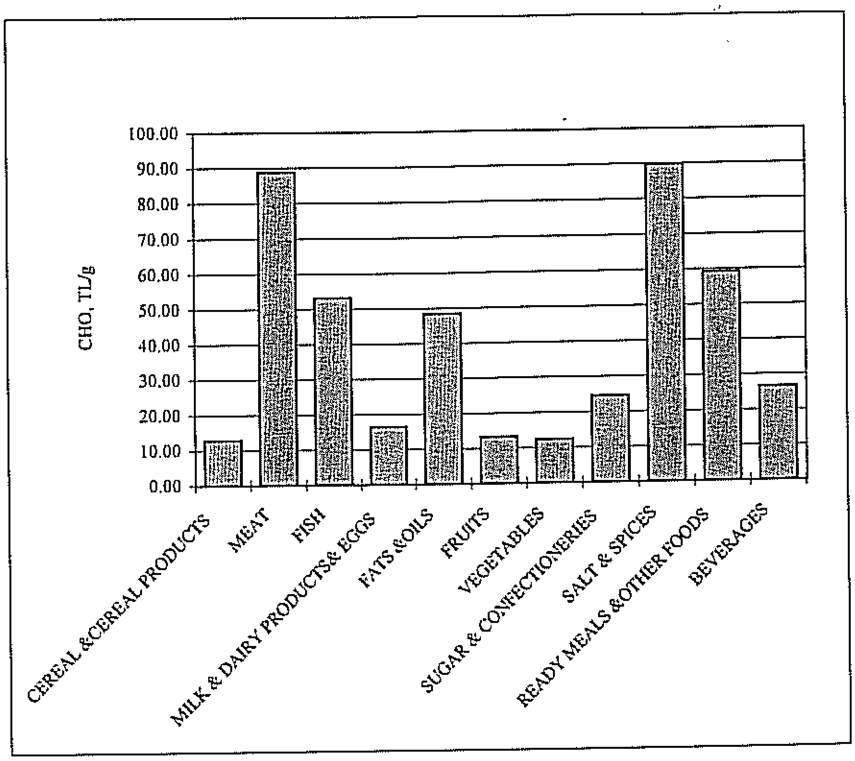


Figure 12 Price of Carbohydrate in Turkey

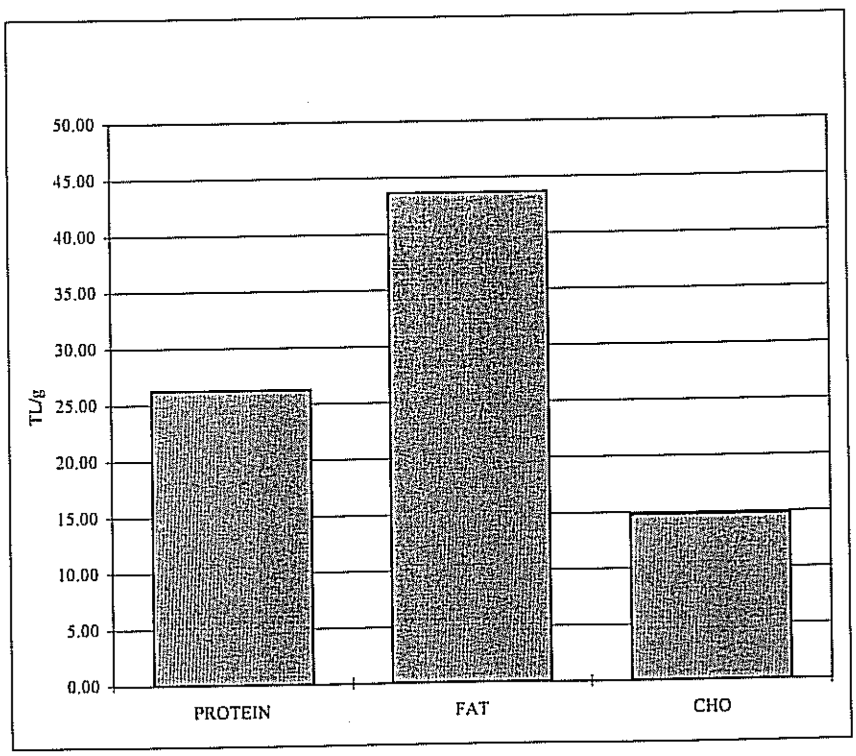


Figure 13 Price of Main Food Components in Turkey

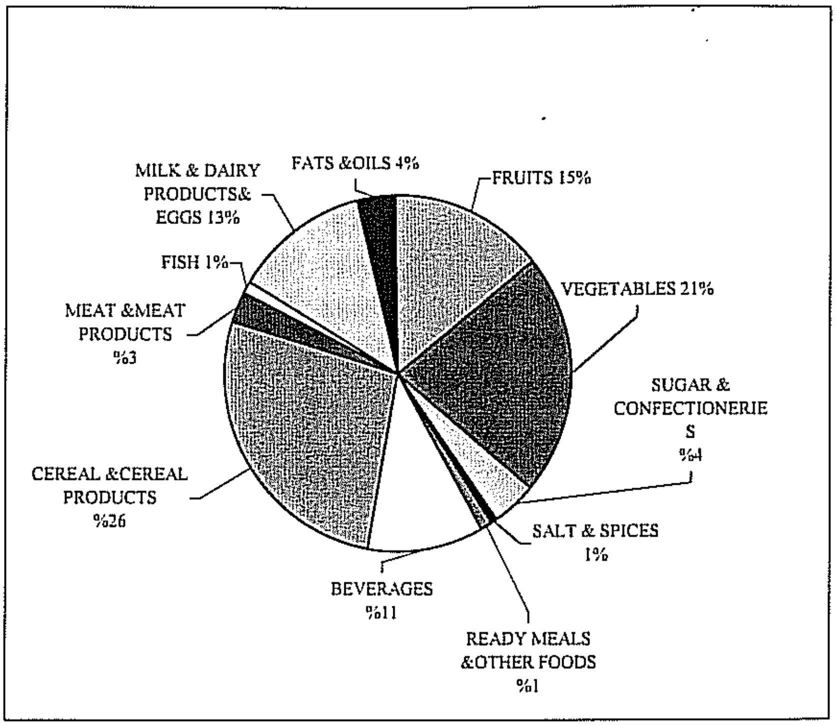


Figure 14 Mass Distribution in the Marmara Region (kg)

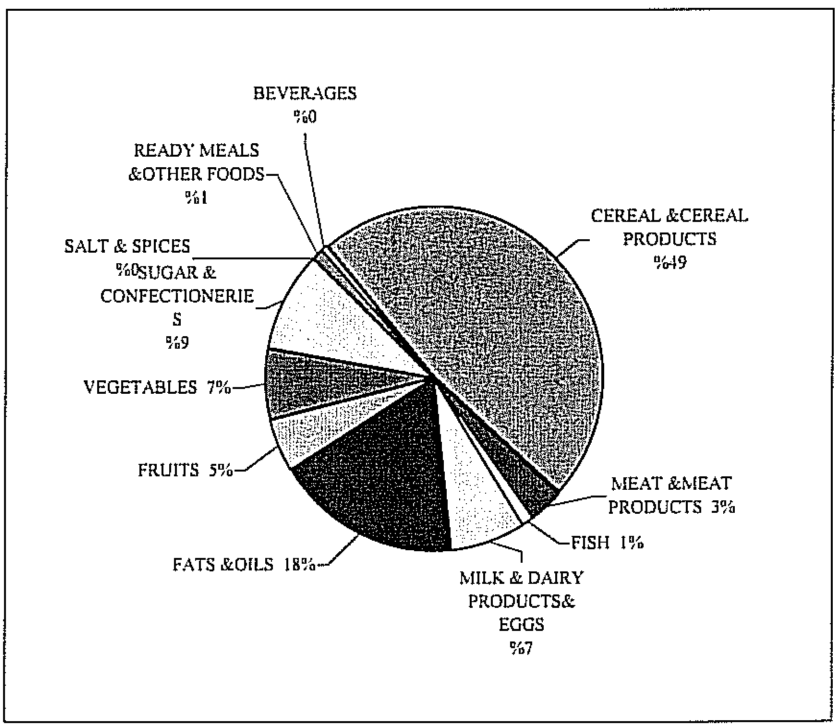


Figure 15 Daily Energy Intake from Different Food Groups in the Marmara Region

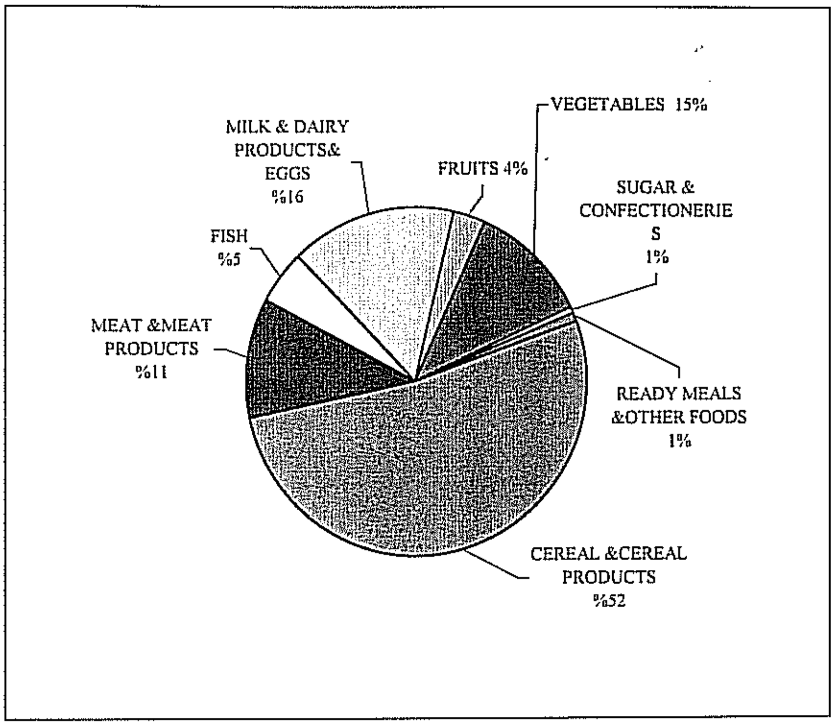


Figure 16 Daily Protein Intake from Different Food Groups in the Marmara Region

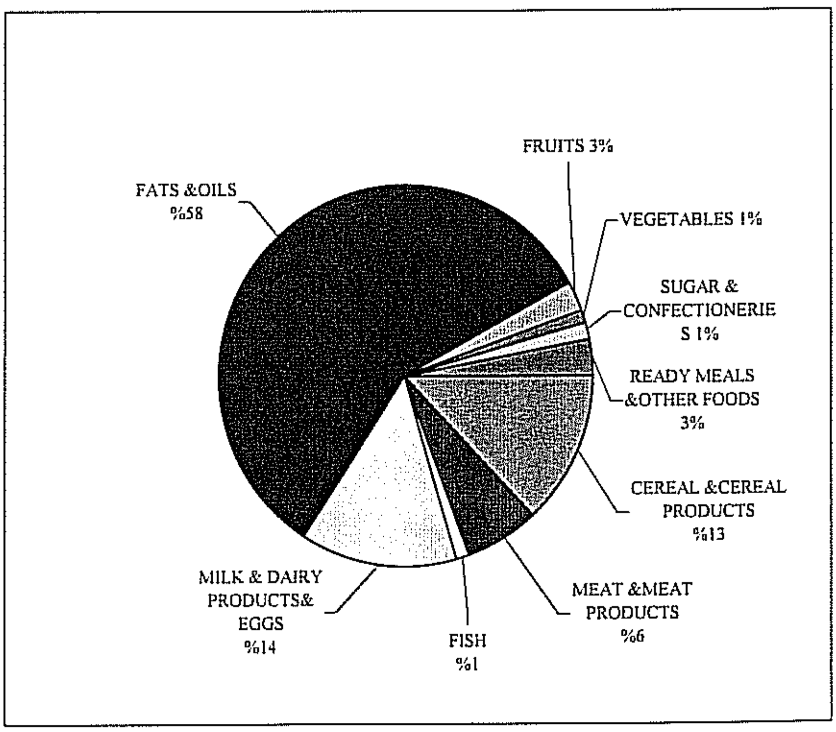


Figure 17 Daily Fat Intake from Different Food Groups in the Marmara Region

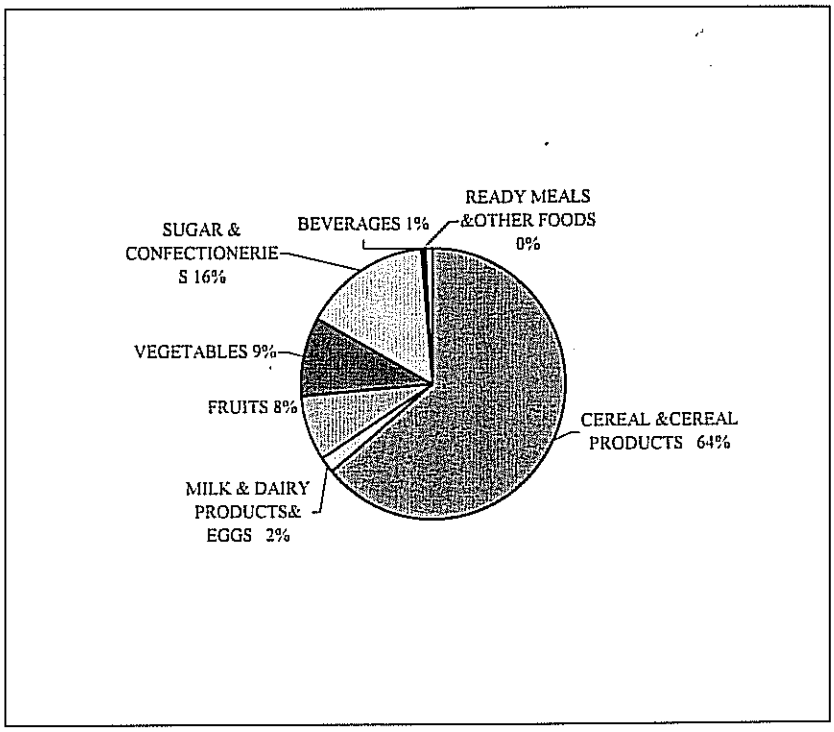


Figure18 Daily Carbohydrate Intake from Different Food Groups in the Marmara Region

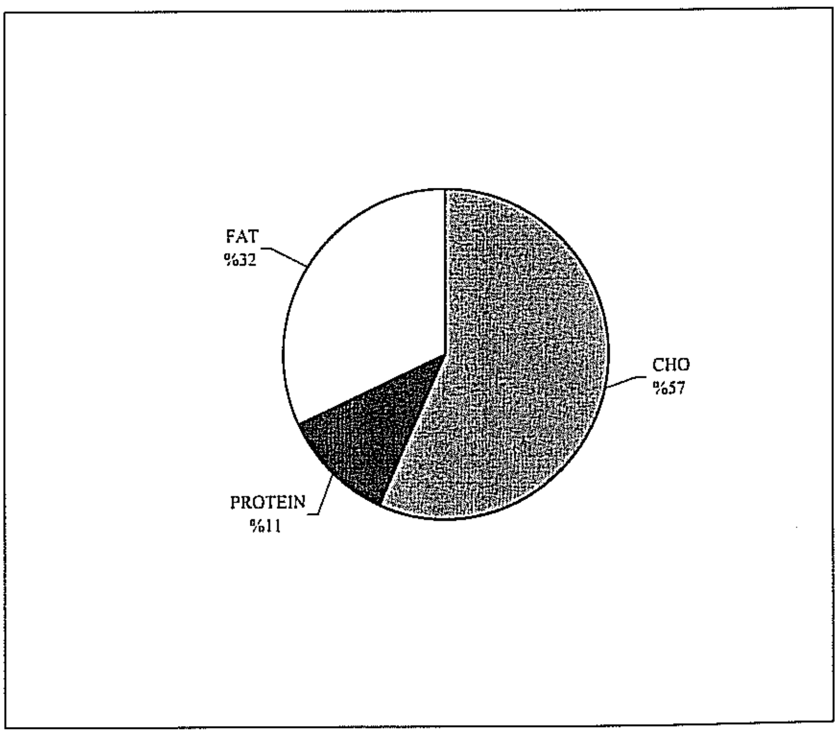


Figure 19 Per Capita Daily Energy Intake from Main Food Components in the Marmara Region

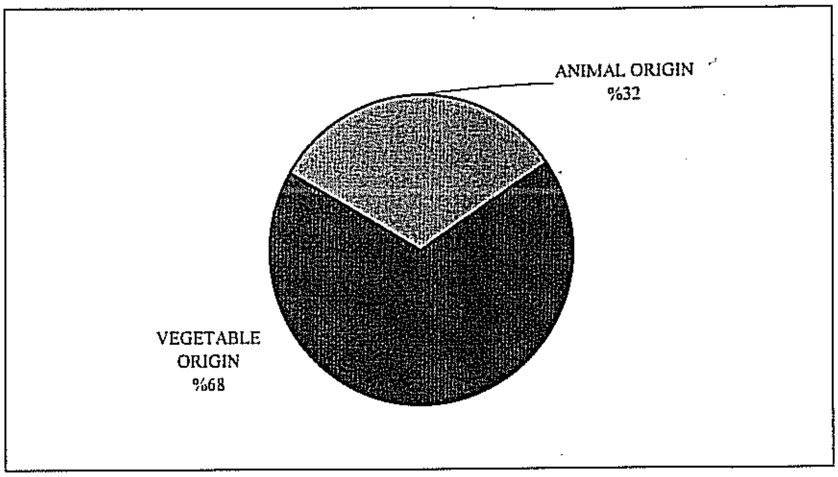


Figure 20 Sources of Protein in the Marmara Region

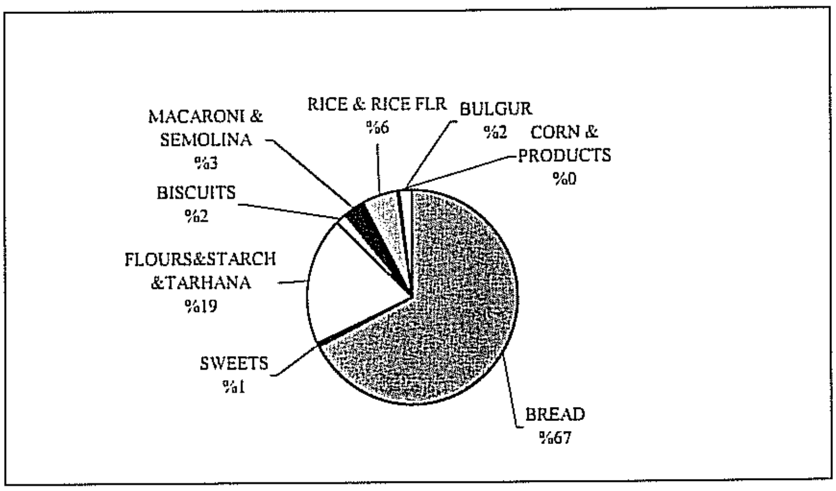


Figure 21 Cereal And Cereal Products Consumption in the Marmara Region

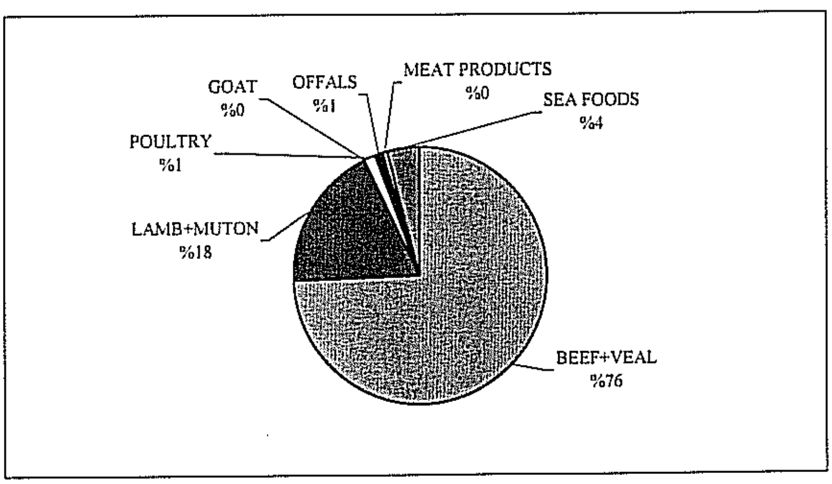


Figure 22 Meat And Meat Products Consumption in the Marmara Region

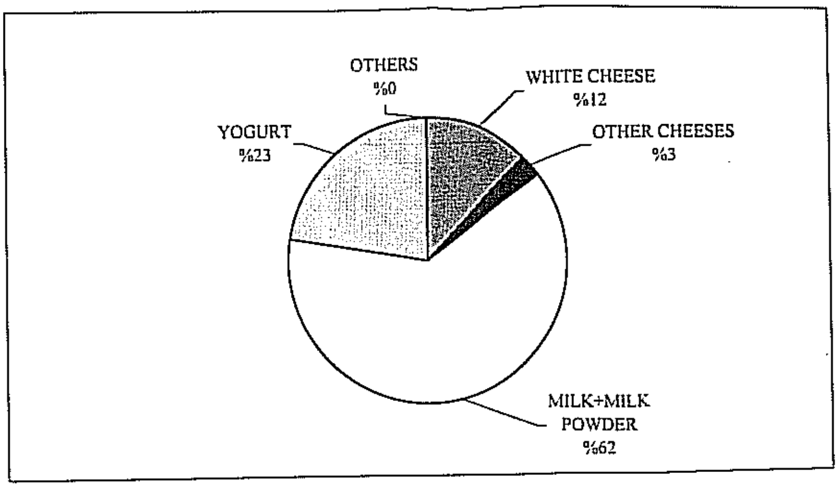


Figure 23 Dairy Consumption in the Marmara Region

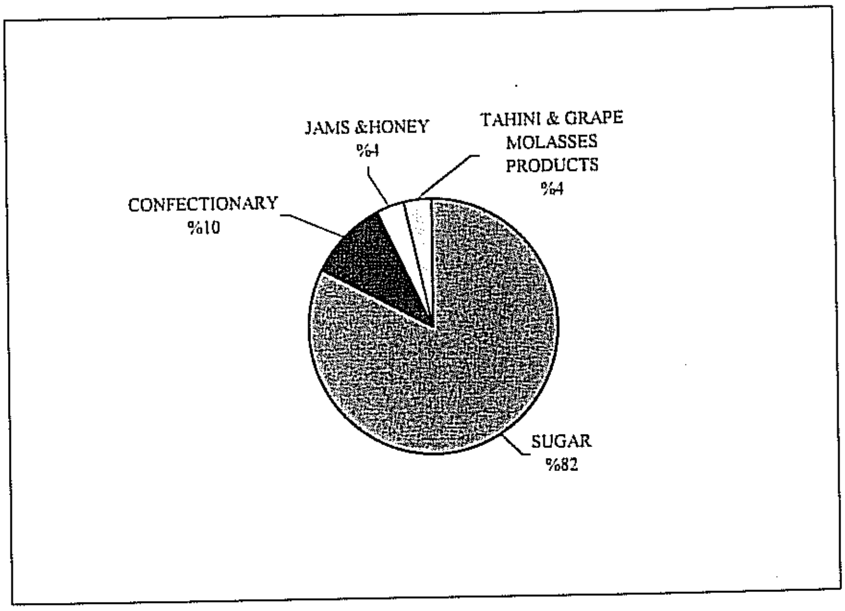


Figure 24 Sugar And Confectionary Consumption in the Marmara Region

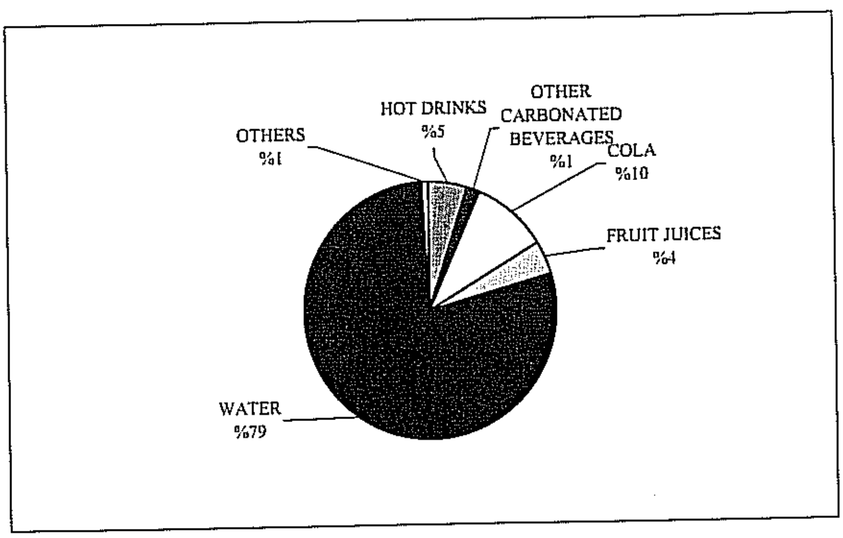


Figure 25 Beverage Consumption in the Marmara Region

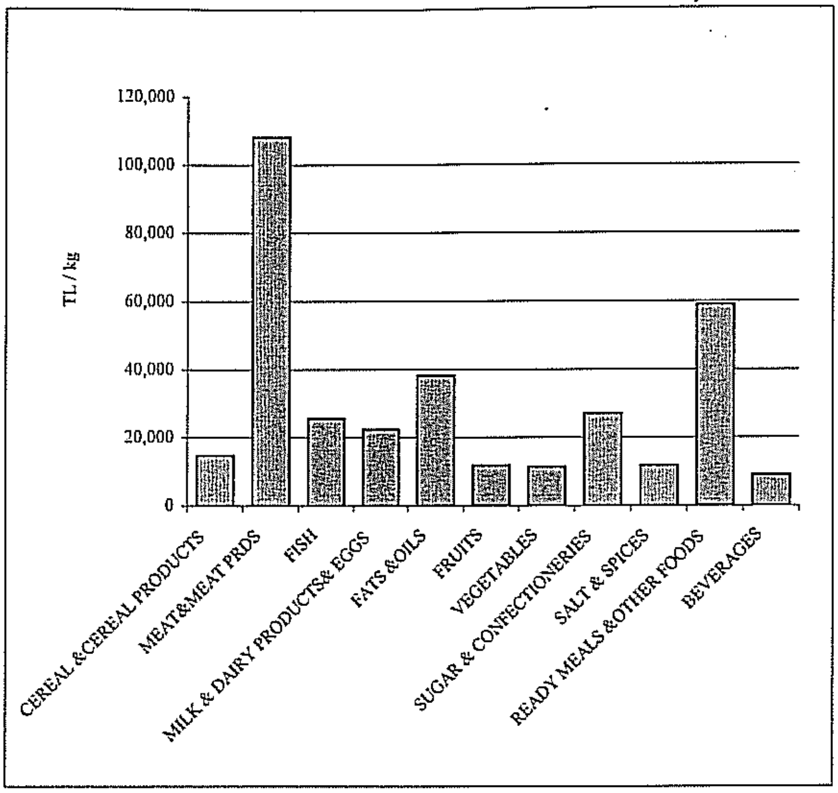


Figure 26 Price of Food Group in the Marmara Region (1994 Price)

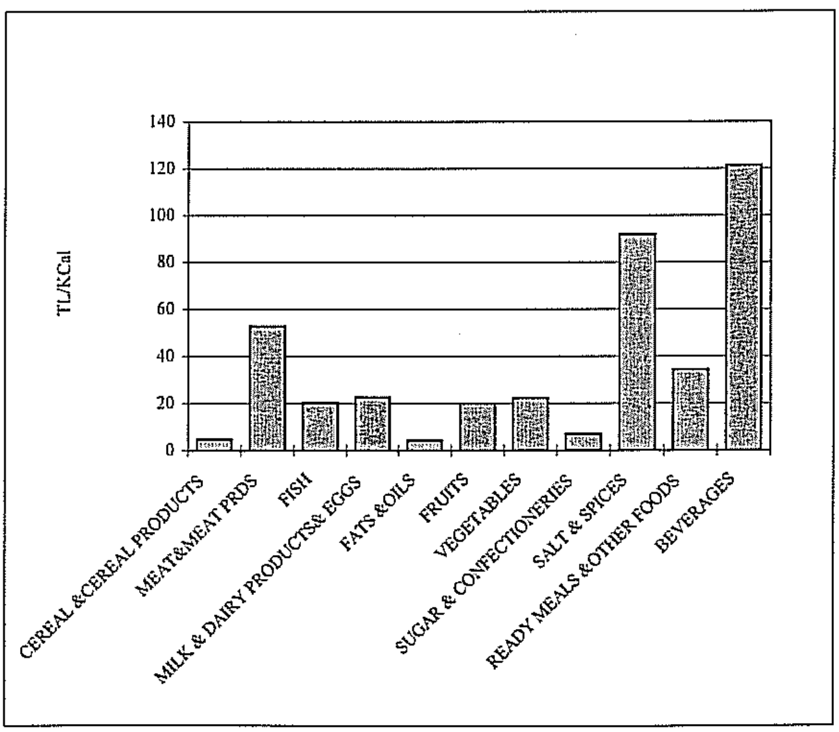


Figure 27 Price of Energy in the Marmara Region

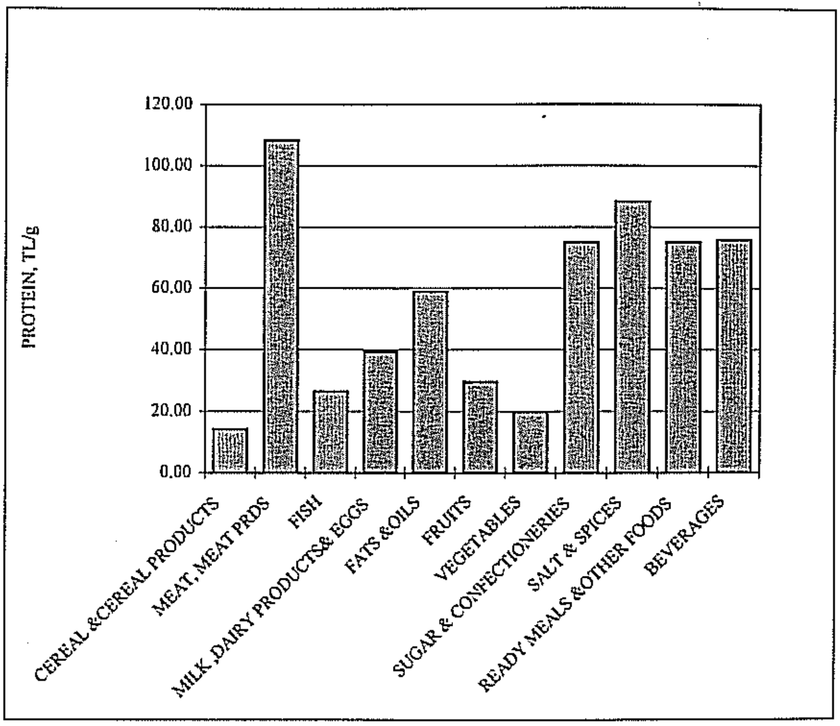


Figure 28 Price of Protein in the Marmara Region

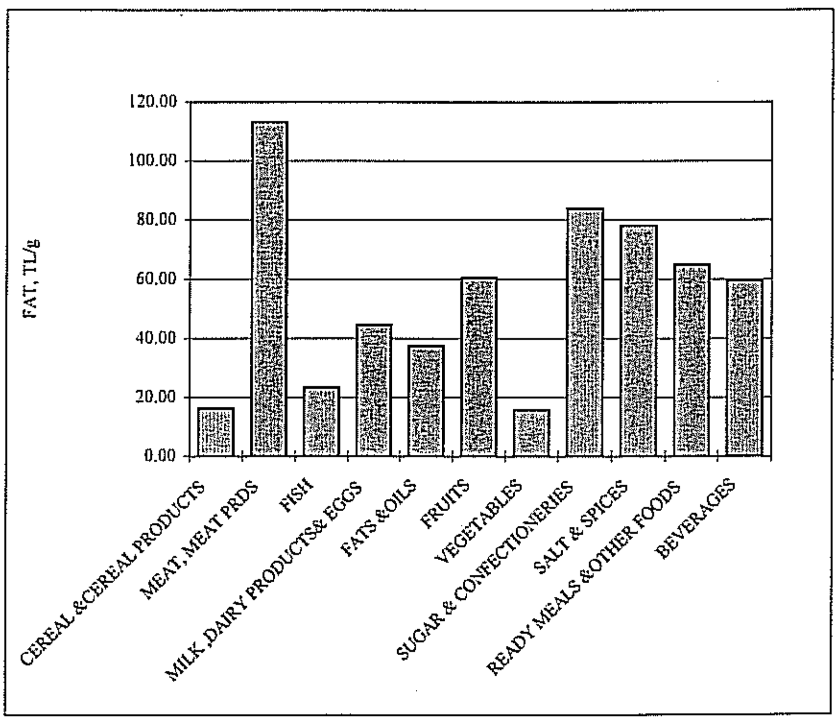


Figure 29 Price of Fat in the Marmara Region

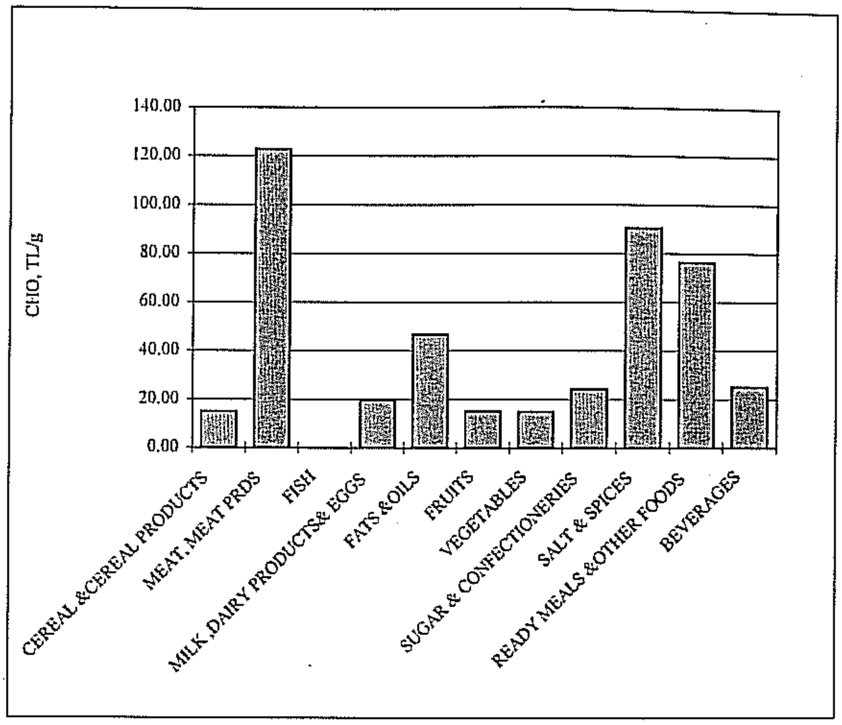


Figure 30 Price of Carbohydrate in the Marmara Region

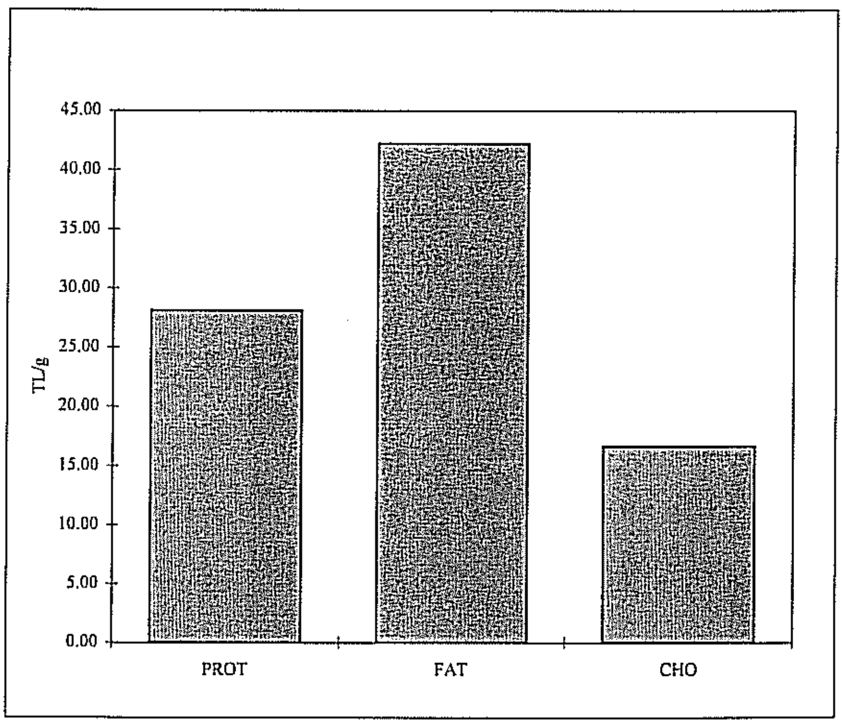


Figure 31 Price of Main Food Components in the Marmara Region

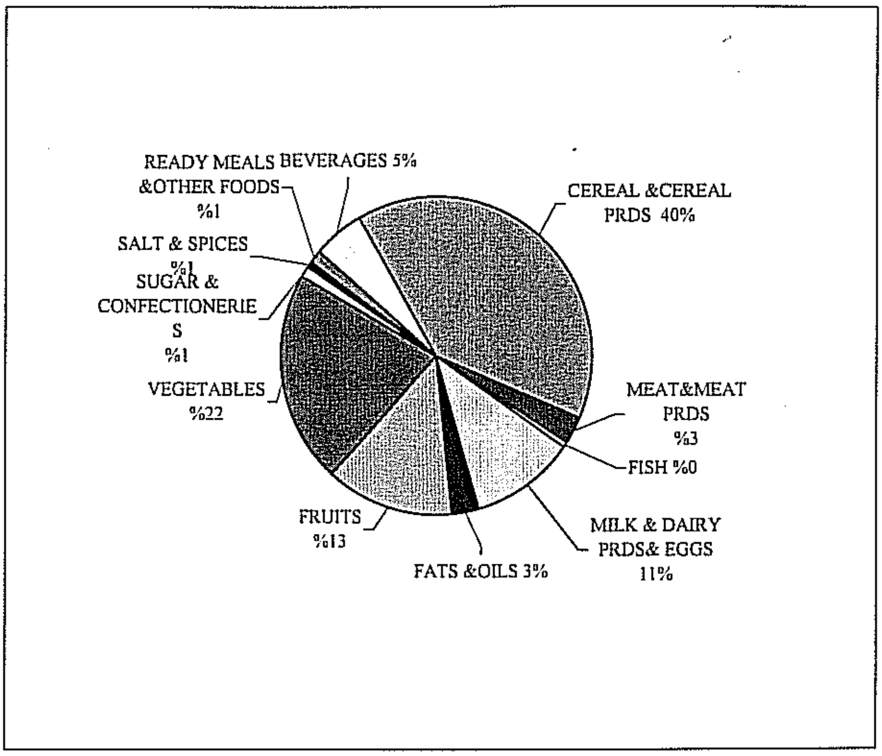


Figure 32 Mass Distribution in the South Eastern Anatolia Region (kg)

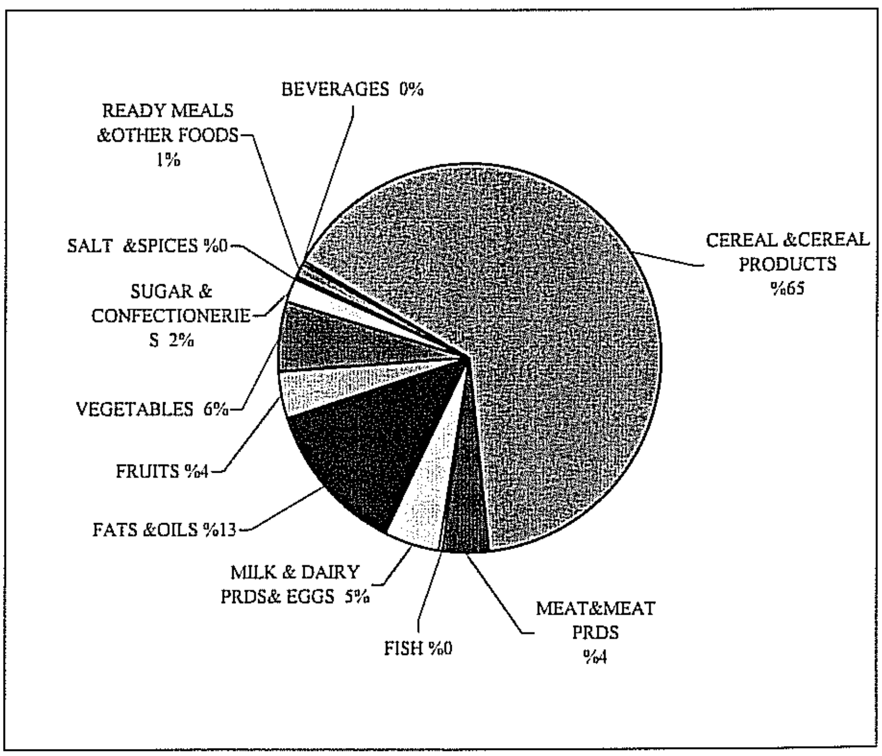


Figure 33 Daily Energy Intake from Different Food Groups in the South Eastern Anatolia

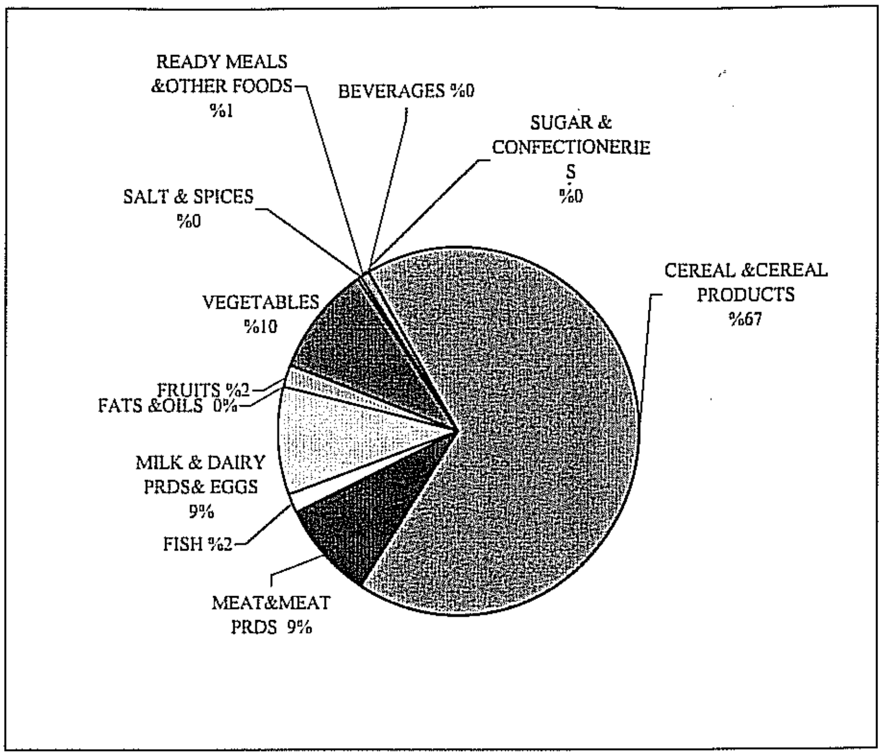


Figure 34 Daily Protein Intake from Different Food Groups in the South Eastern Anatolia

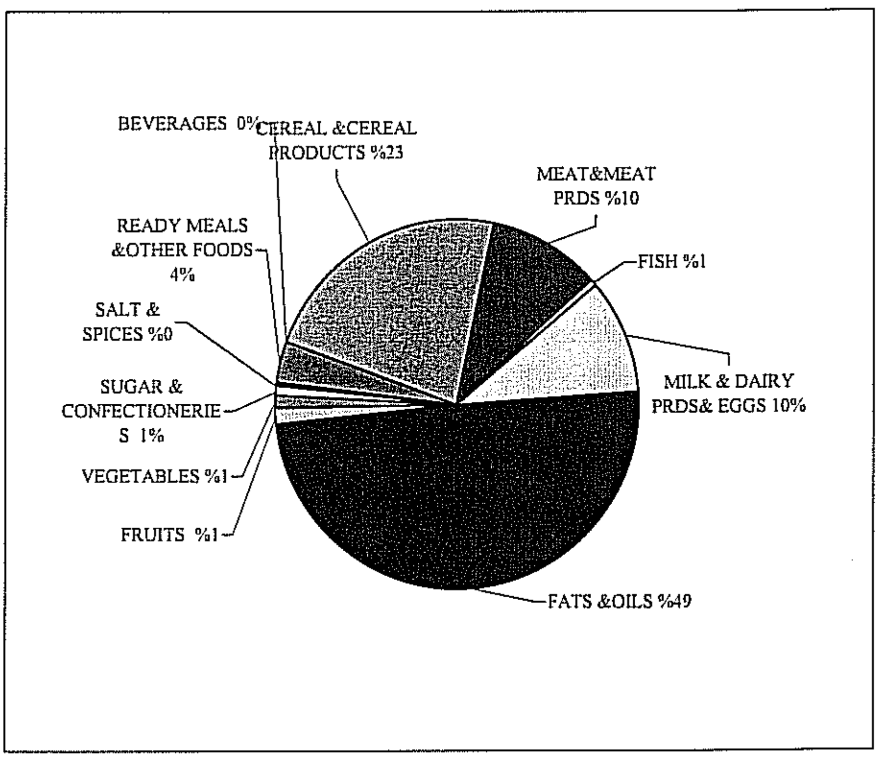


Figure 35 Daily Fat Intake from Different Food Groups in the South Eatern Antolia

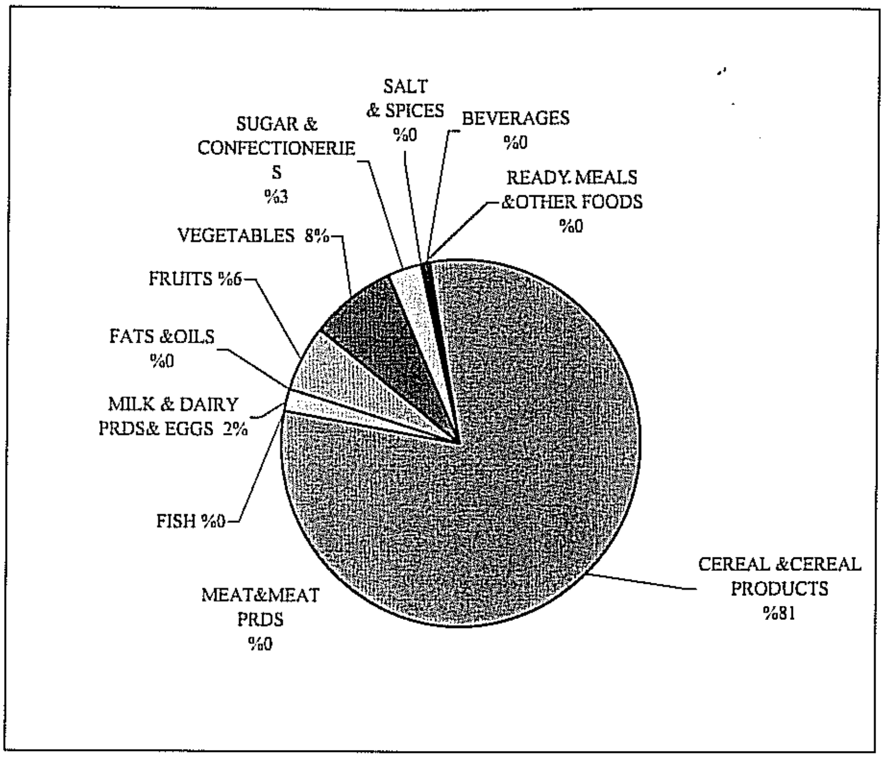


Figure 36 Daily Carbohydrate Intake from Different Food Groups in the South Eastern Anatolia

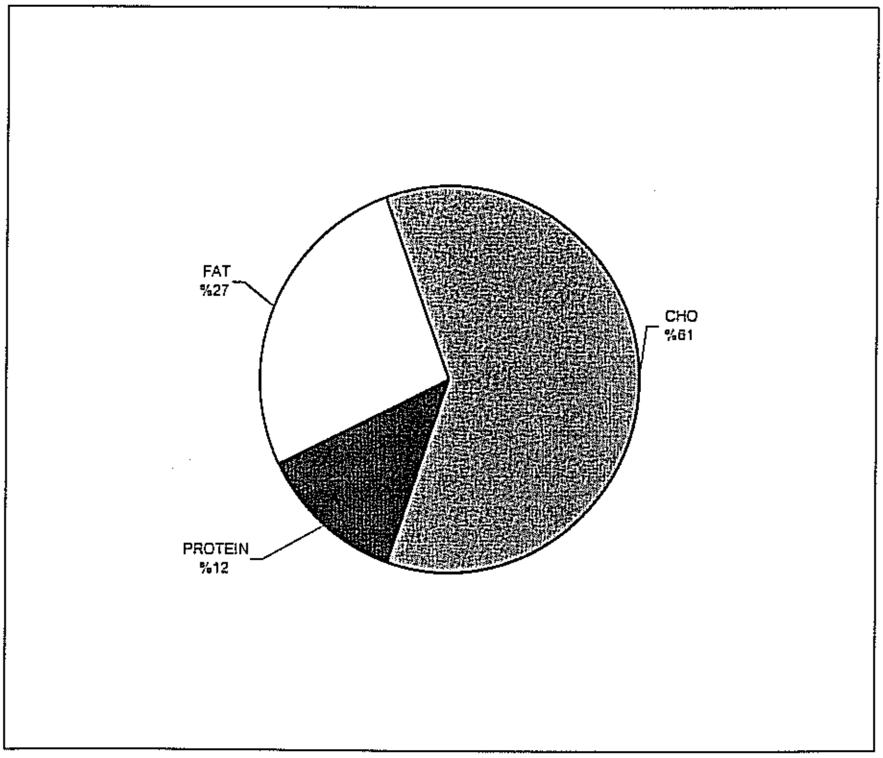


Figure 37 Per Capita Daily Energy Intake from Main Food Components in the South Eastern Anatolia

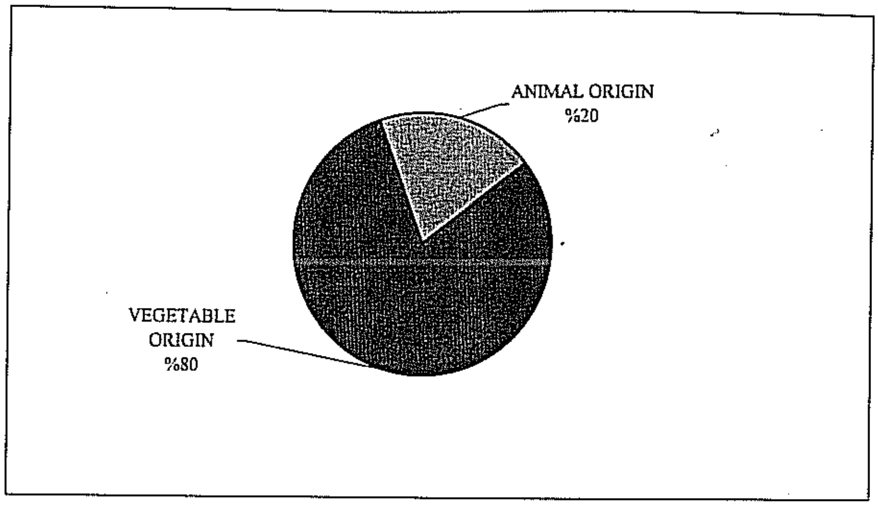


Figure 38 Sources of Protein in the South East Anatolia Region

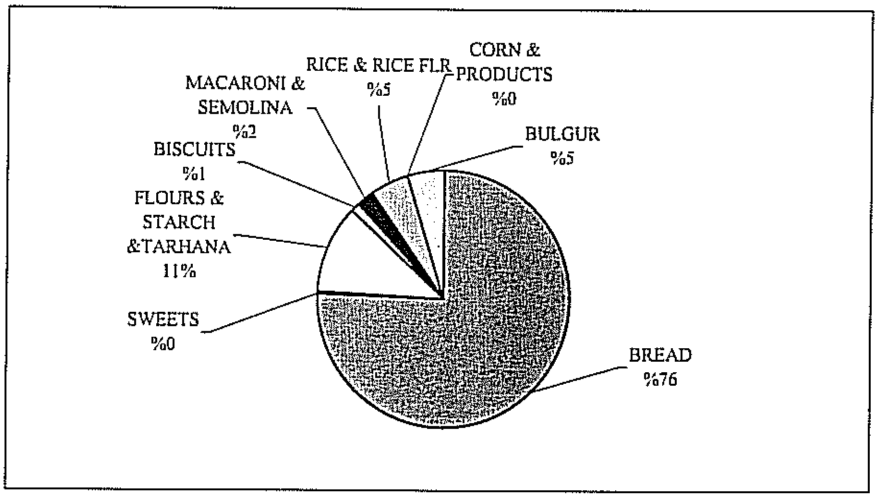


Figure 39 Cereal And Cereal Products Consumption in the South Eastern Anatolia

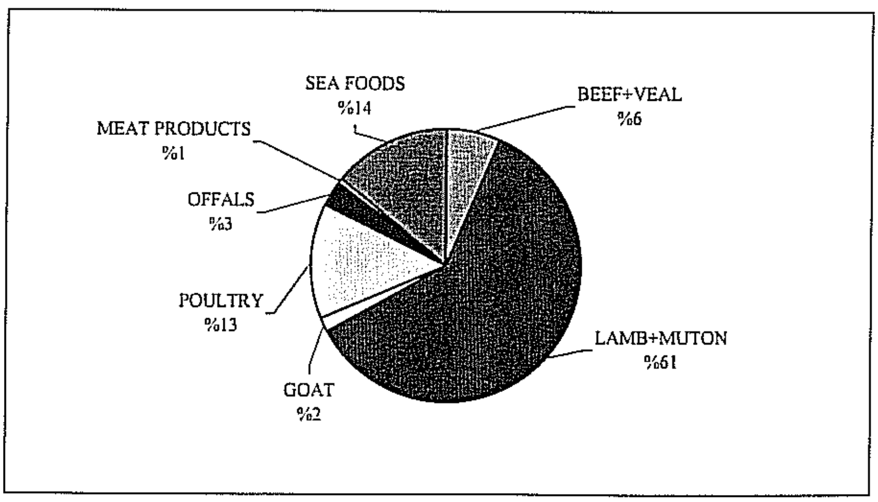


Figure 40 Meat And Meat Products Consumption in the South Eastern Anatolia

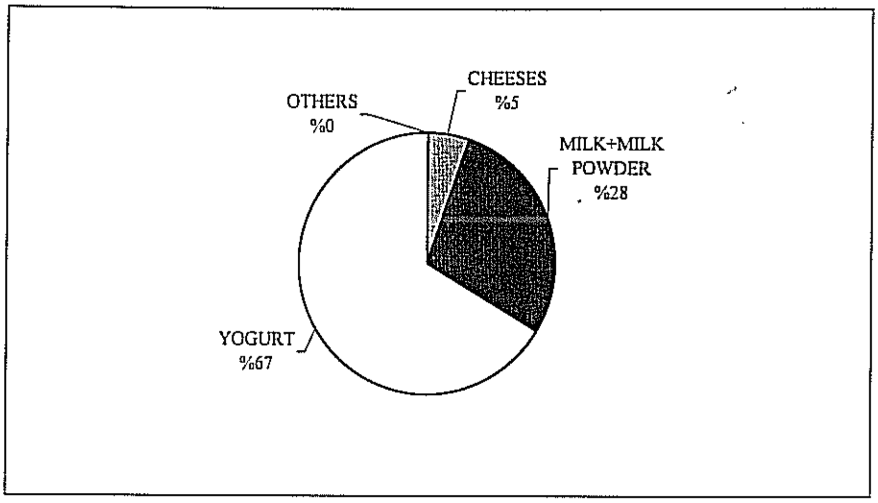


Figure 41 Dairy Consumption in the South Eastern Anatolia

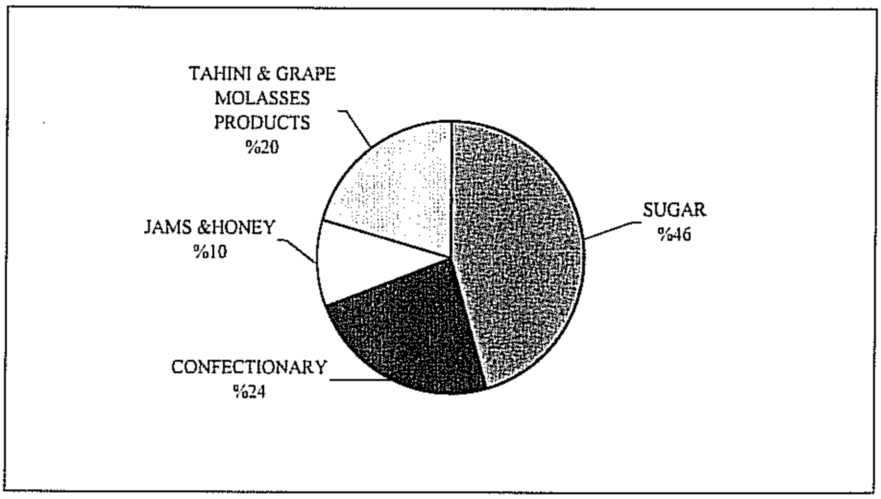


Figure 42 Sugar And Confectionary Consumption in the South Eastern Anatolia

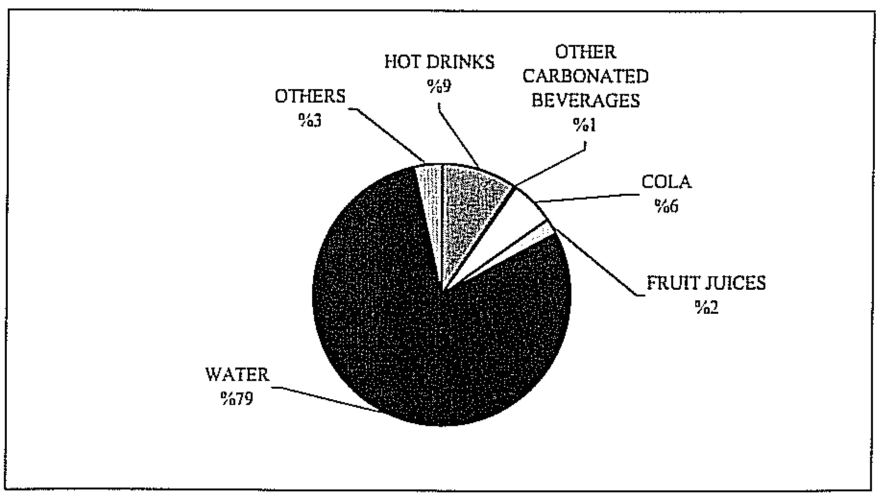


Figure 43 Beverage Consumption in the South Eastern Anatolia

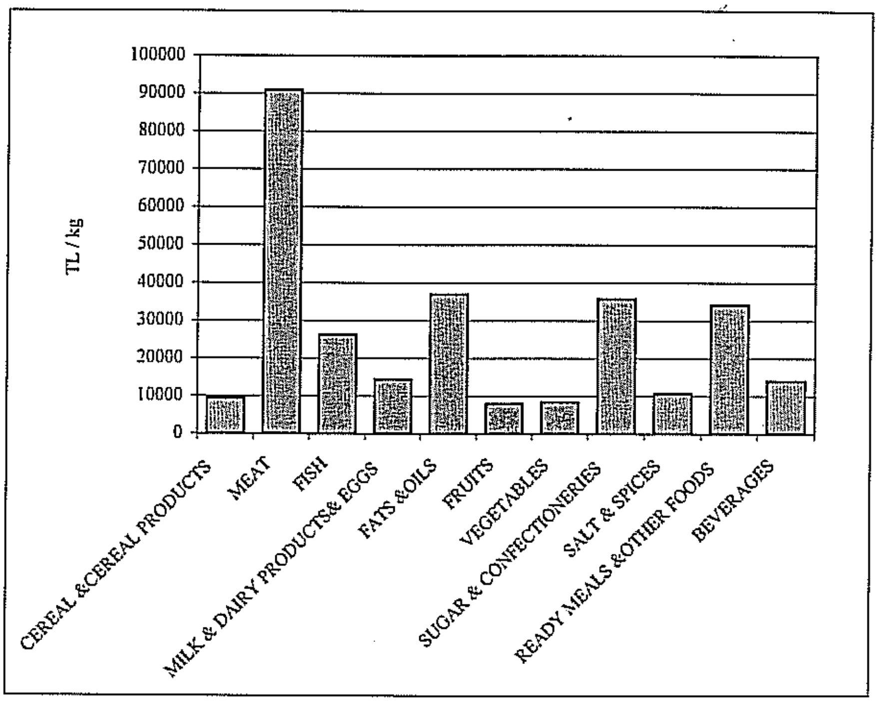


Figure 44 Price of Food Group in the South Eastern Anatolia (1994 Price)

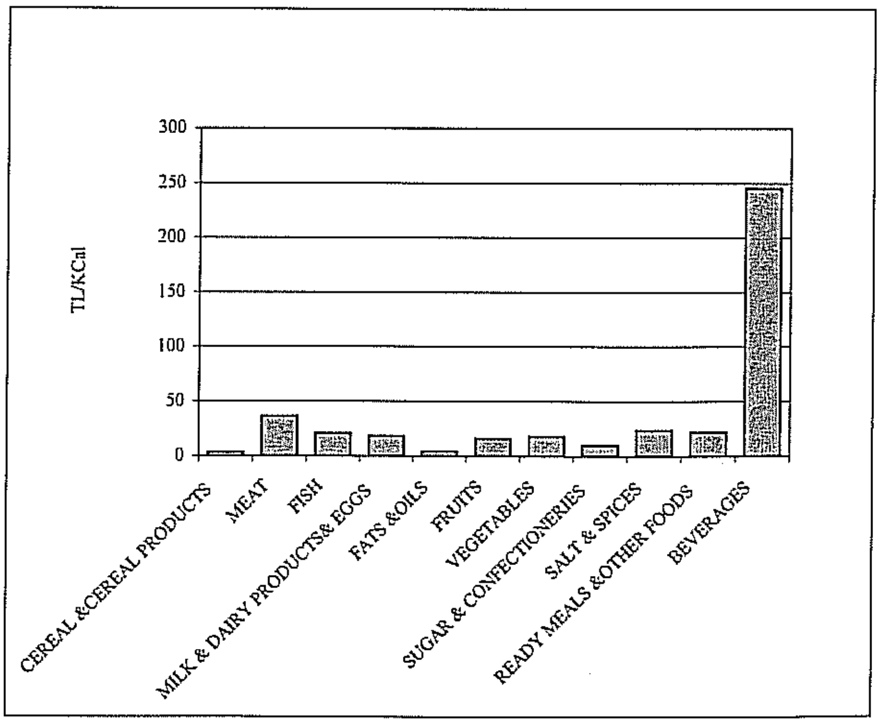


Figure 45 Price of Energy in the South Eastern Anatolia Region

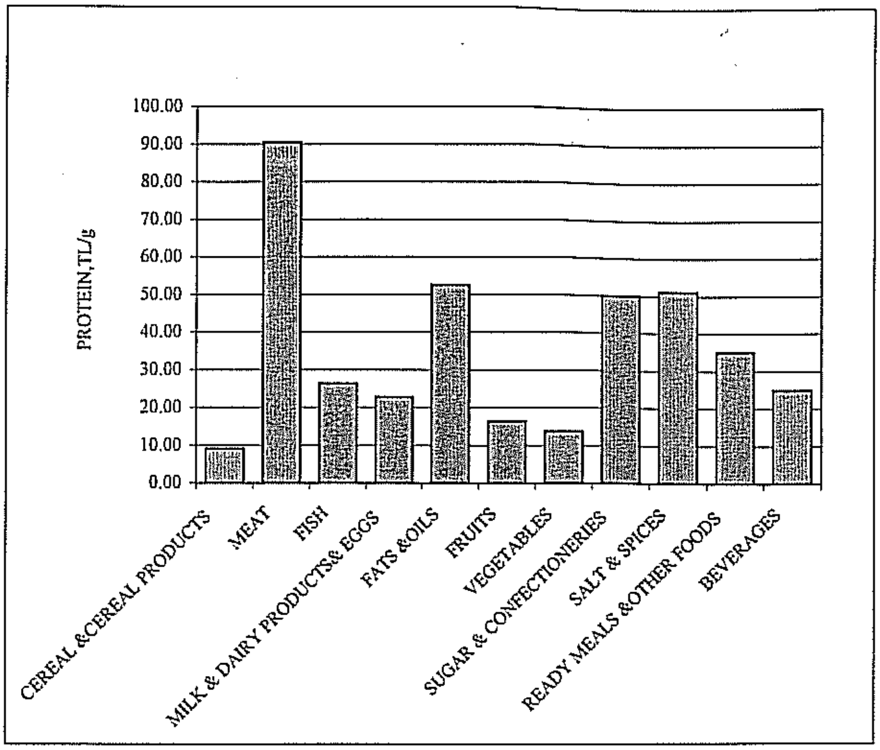


Figure 46 Price of Protein in the South Eastern Anatolia Region

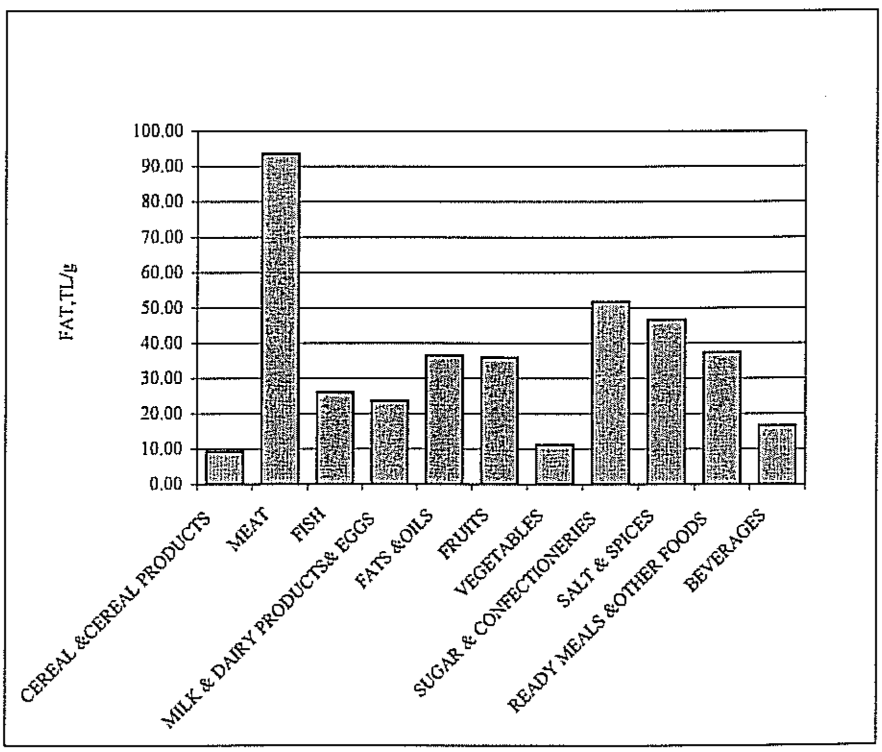


Figure 47 Price of Fat in the South Eastern Anatolia Region

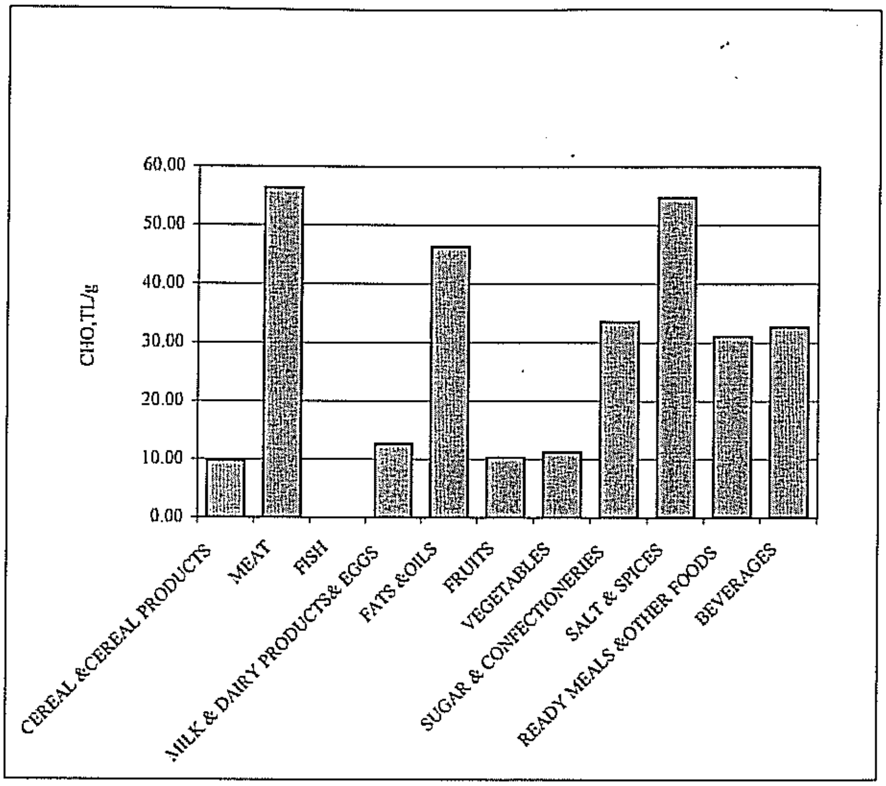


Figure 48 Price of Carbohydrate in the South Eastern Anatolia Region

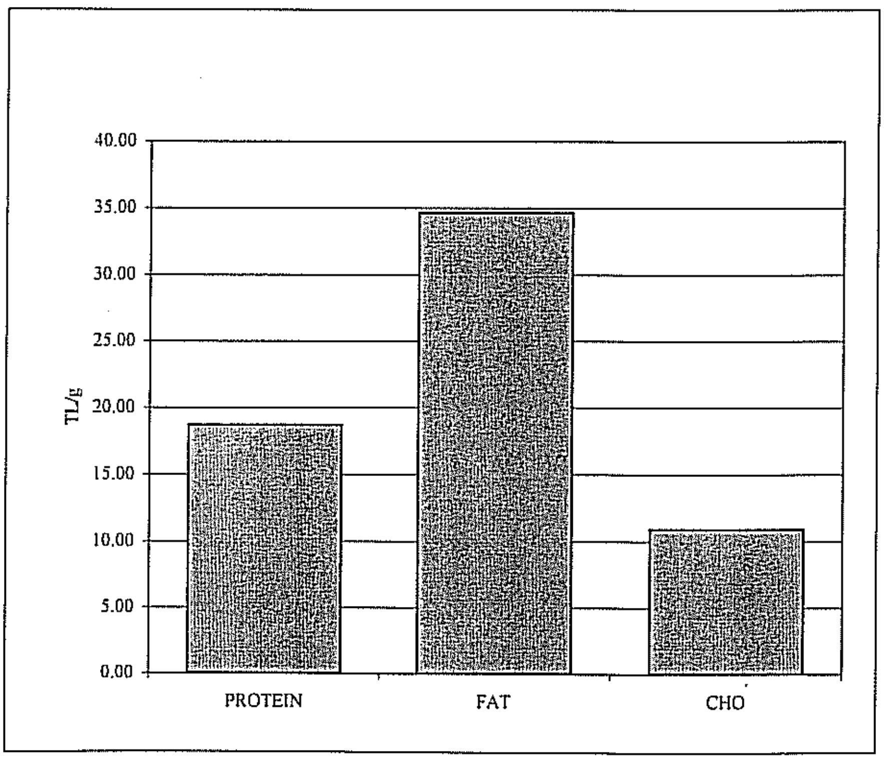


Figure 49 Price of Main Food Components in the South Eastern Anatolia Region

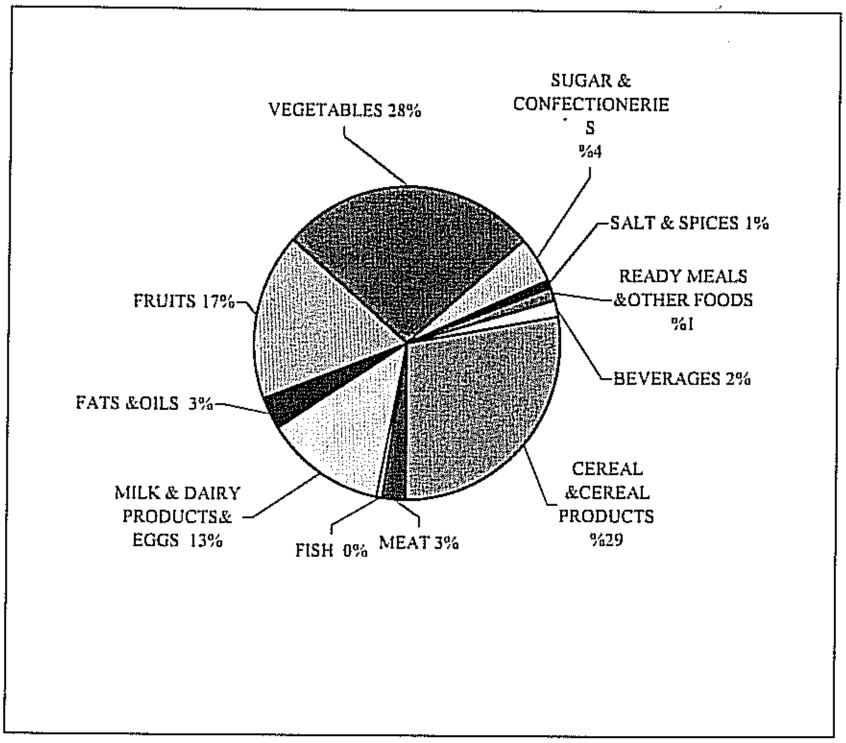


Figure 50 Mass Distribution in the Mediterranean Region (kg)

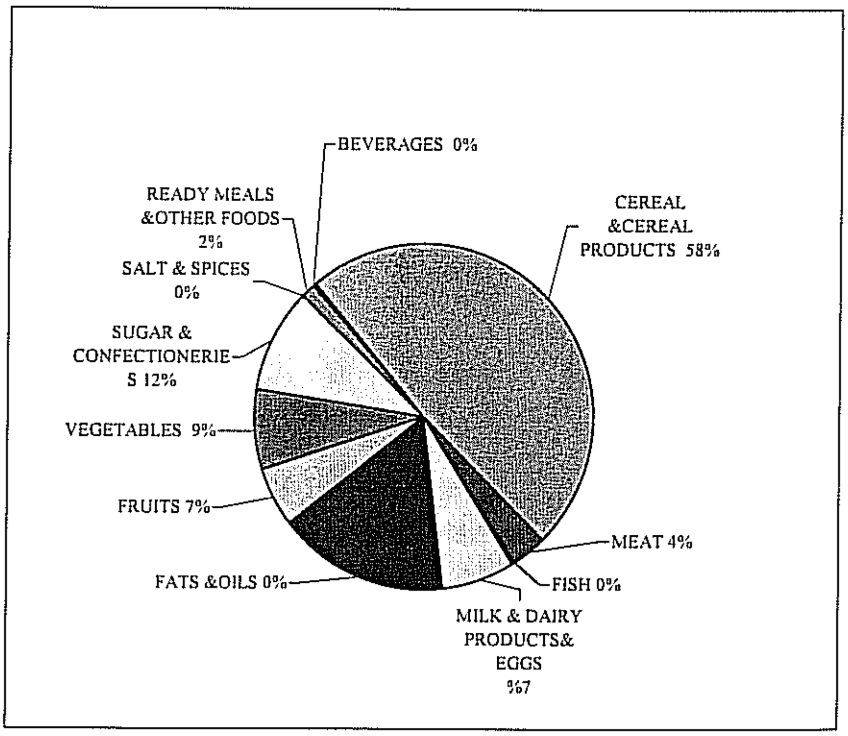


Figure 51 Daily Energy Intake from Different Food Groups in the Mediterranean Region

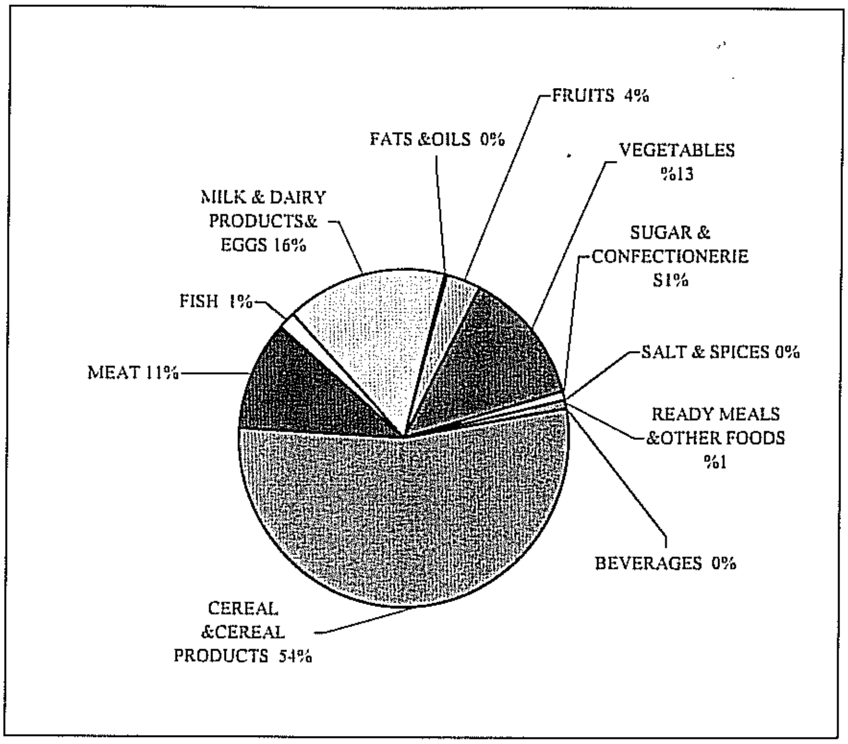


Figure 52 Daily Protein Intake from Different Food Groups in the Mediterranean Region

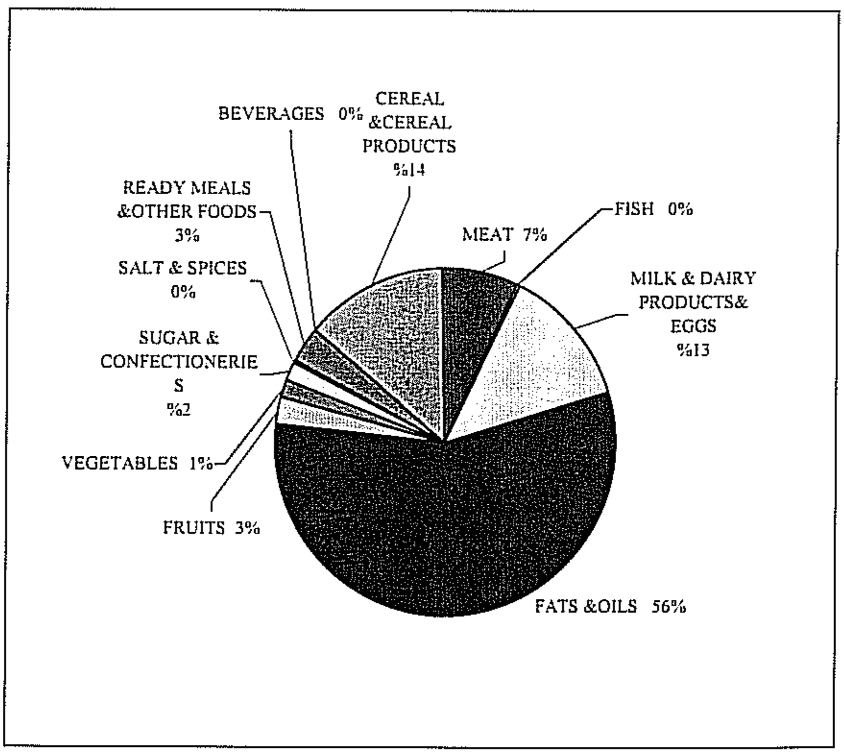


Figure 53 Daily Fat Intake from Different Food Groups in the Mediterranean Region

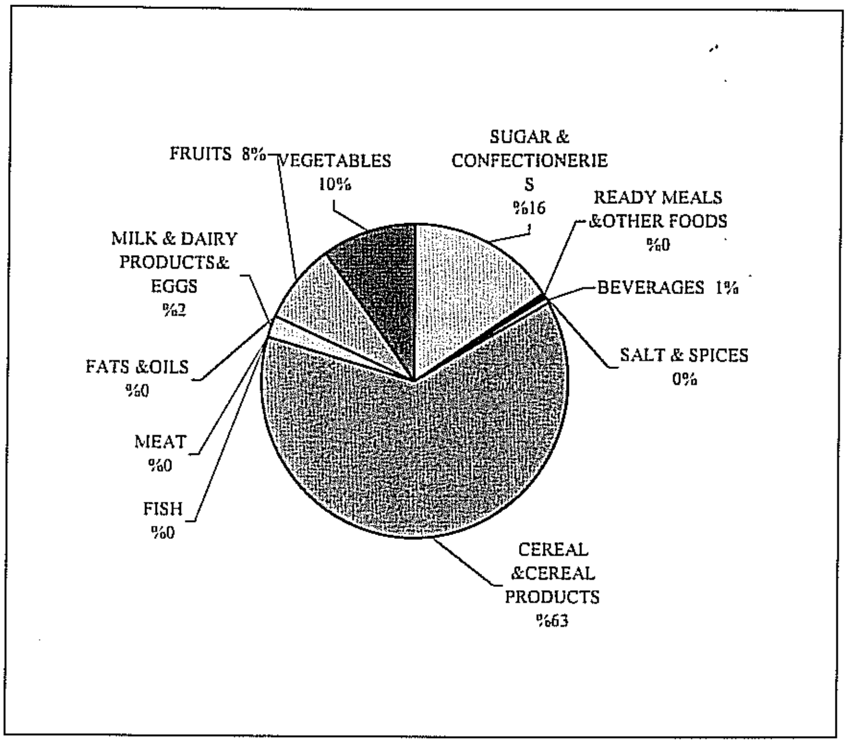


Figure 54 Daily Carbohydrate Intake from Different Food Groups in the Mediterranean Region

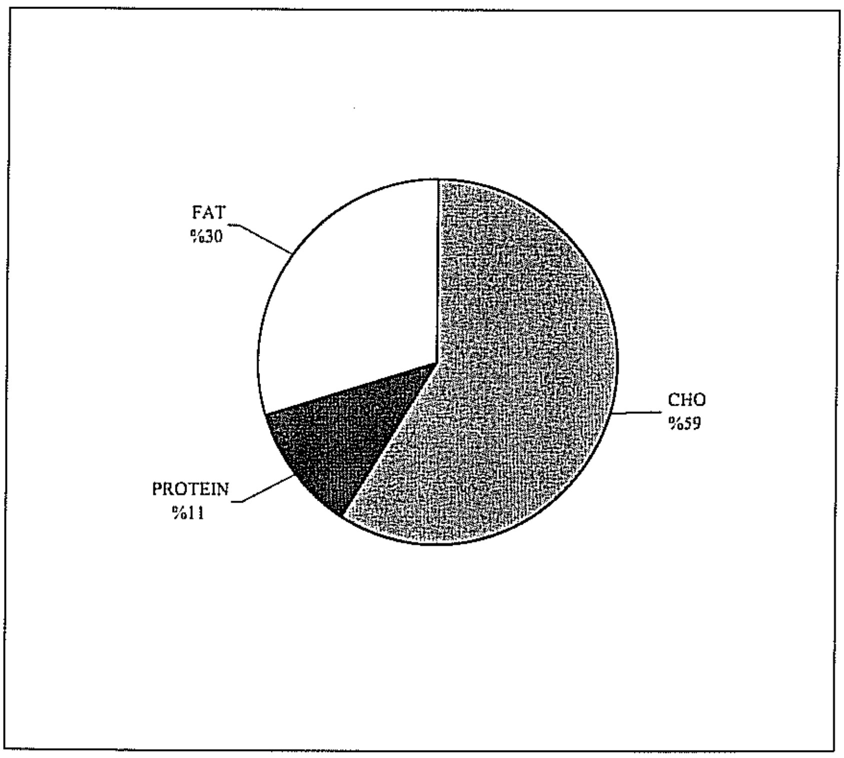


Figure 55 Per Capita Daily Energy Intake from Main Food Components in the Mediterranean Region

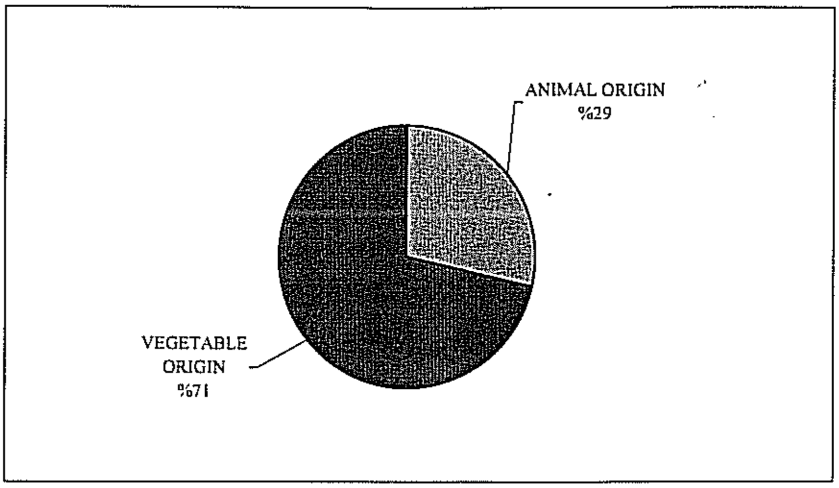


Figure 56 Sources of Protein in the Mediterranean Region

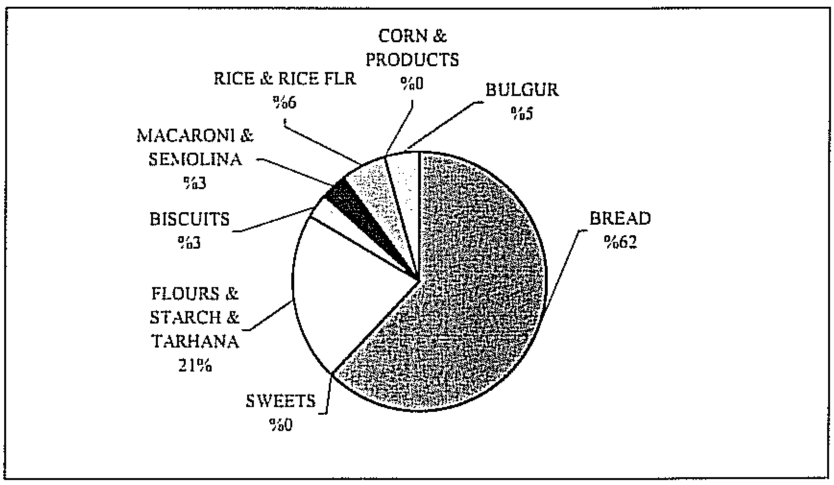


Figure 57 Cereal And Cereal Products Consumption in the Mediterranean Region

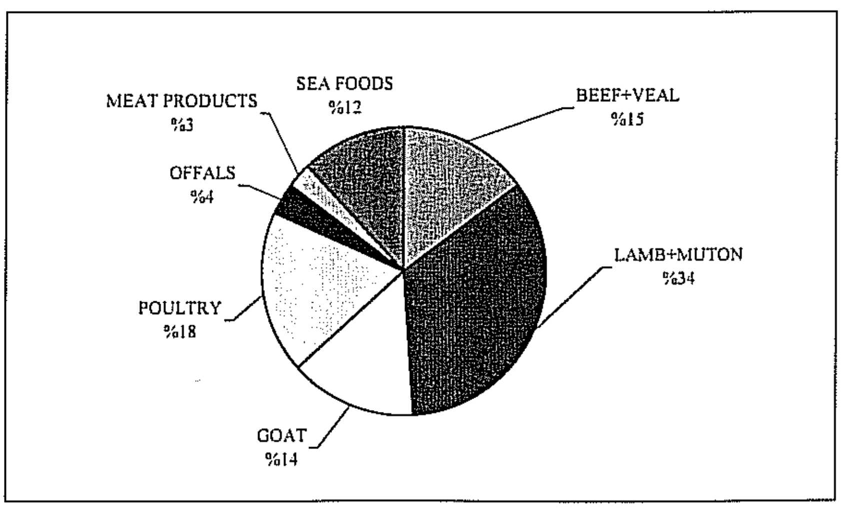


Figure 58 Meat And Meat Products Consumption in the Mediterranean Region

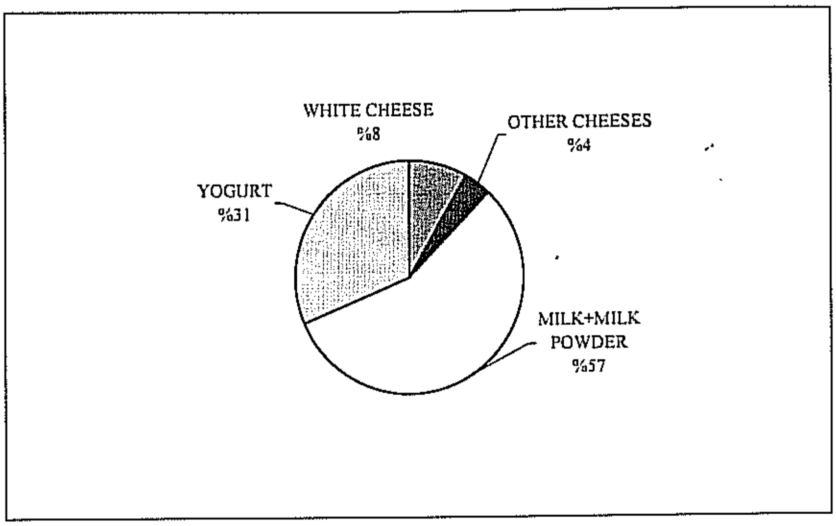


Figure 59 Dairy Consumption in the Mediterranean Region

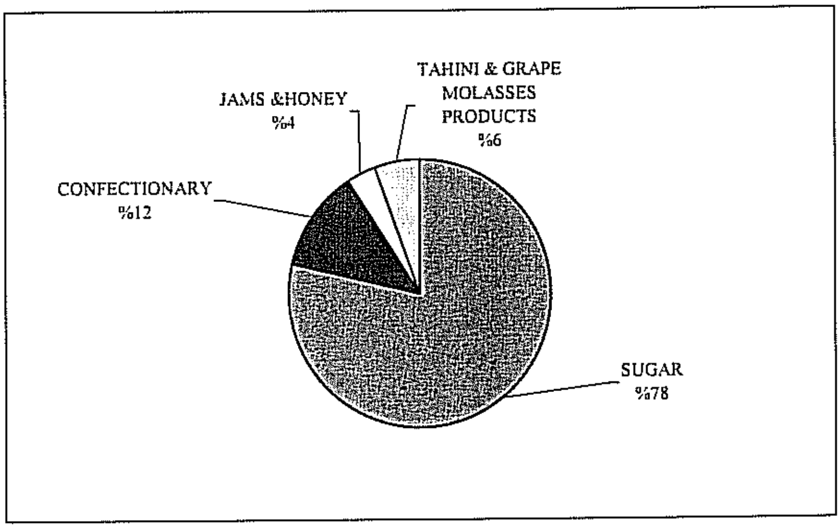
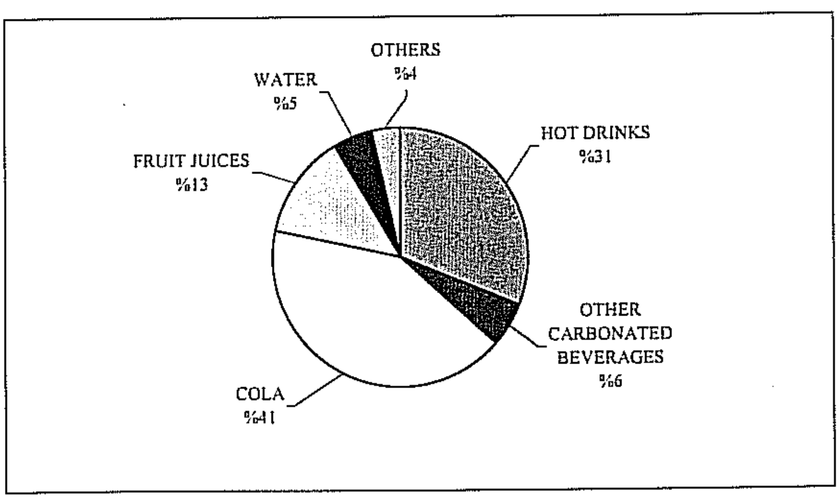


Figure 60 Sugar And Confectionary Consumption in the Mediterranean Region



Figue 61 Beverage Consumption in the Mediterranean Region

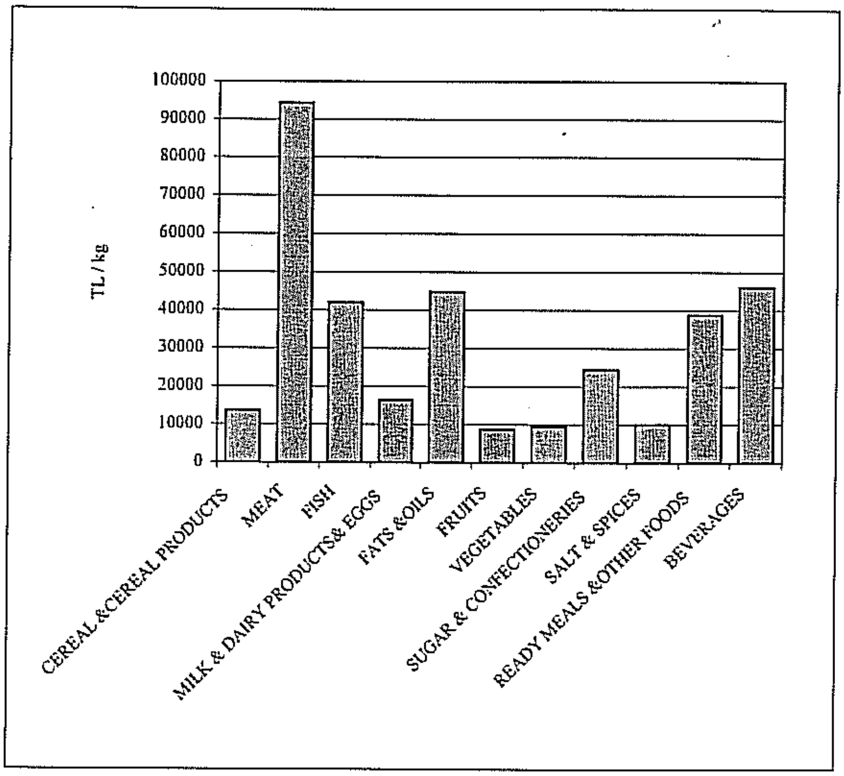


Figure 62 Price of Food Group in the Mediterranean Region (1994 Price)

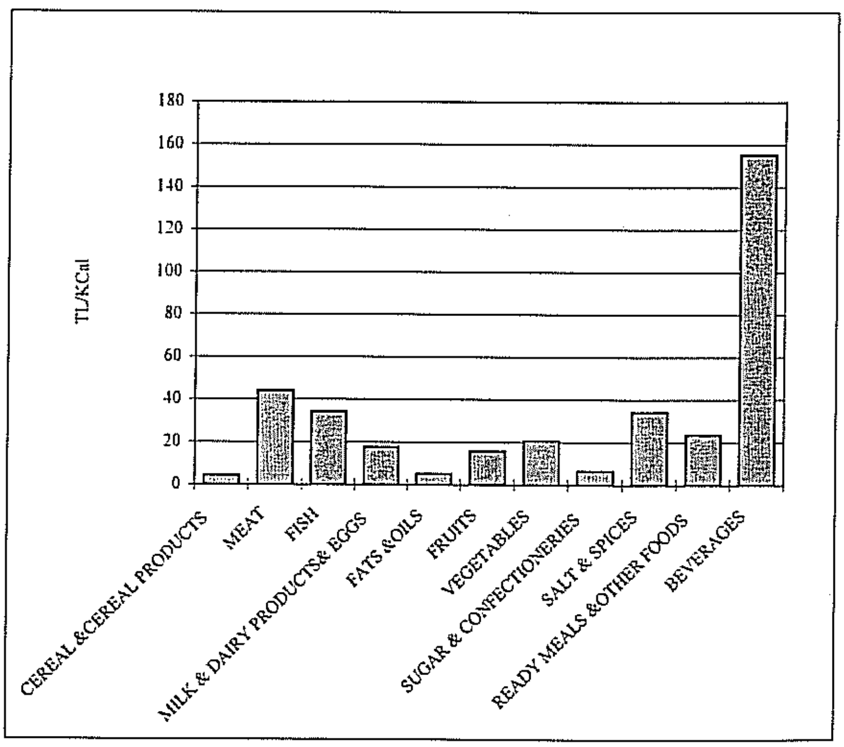


Figure 63 Price of Energy in the Mediterranean Region

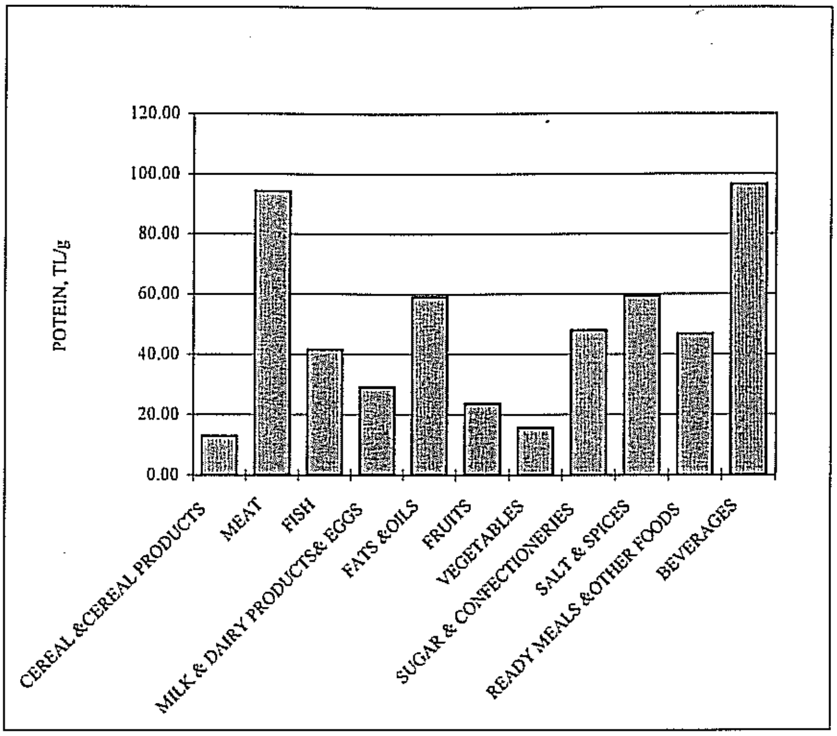


Figure 64 Price of Protein in the Mediterranean Region

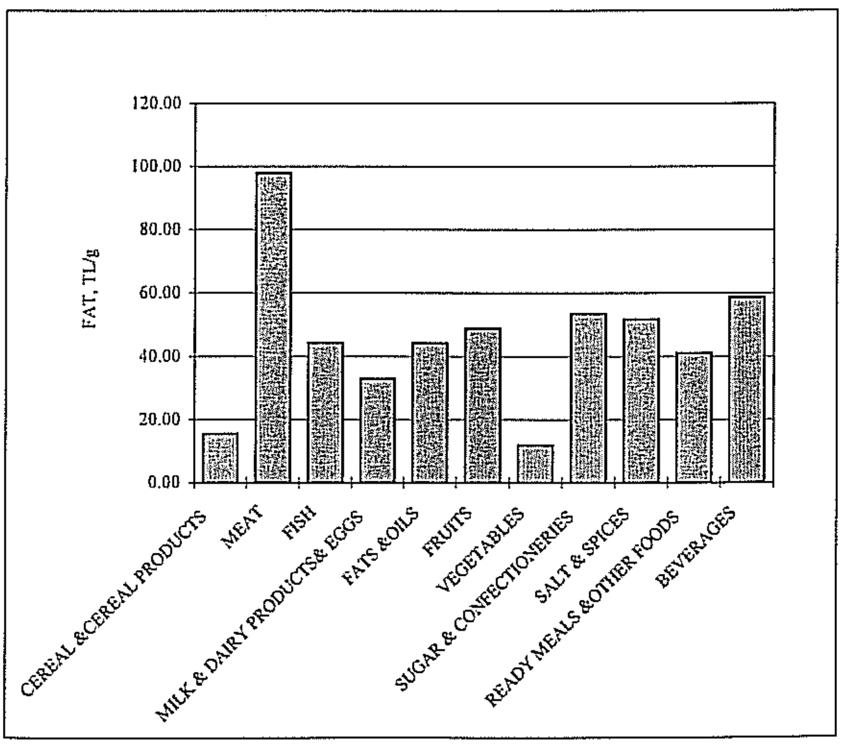


Figure 65 Price of Fat in the Mediterranean Region

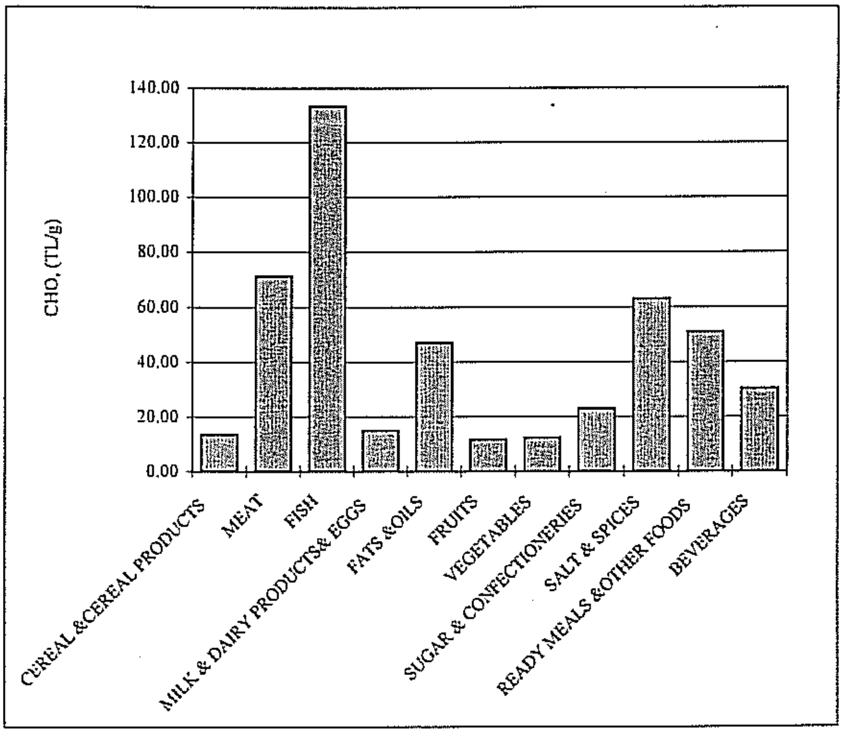


Figure 66 Price of Carbohydrate in the Mediterranean Region

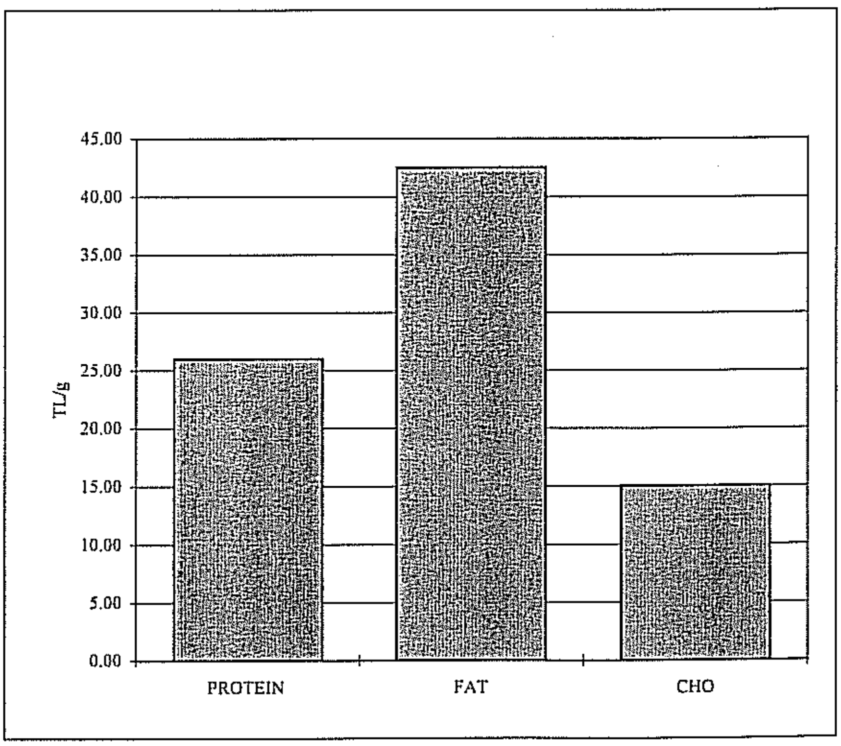


Figure 67 Price of Main Food Components in the Mediterranean Region

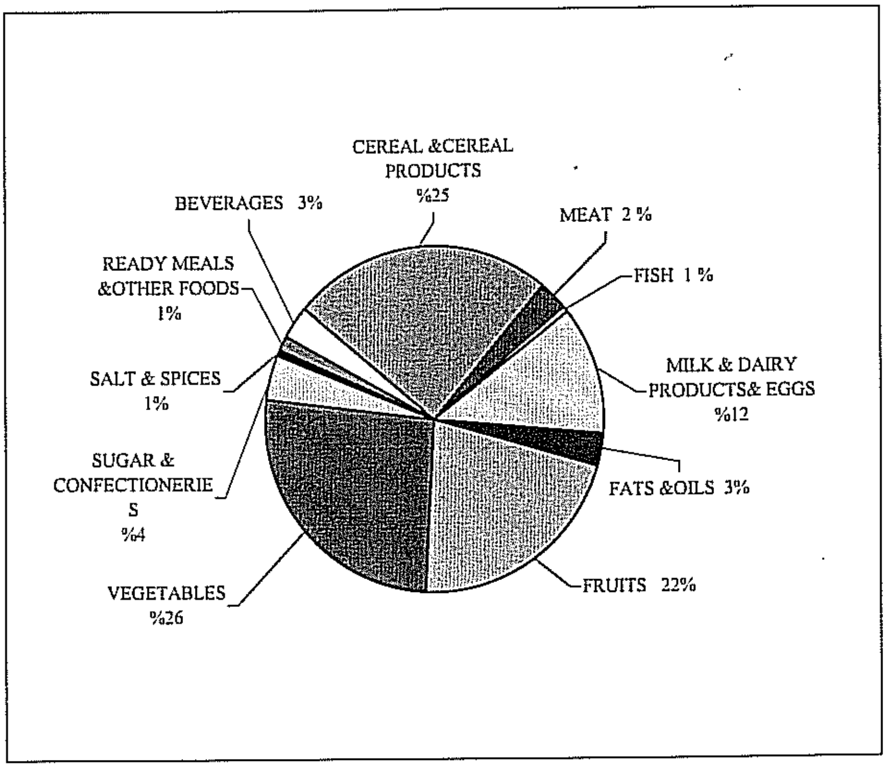


Figure 68 Mass Distribution in the Agean Region (kg)

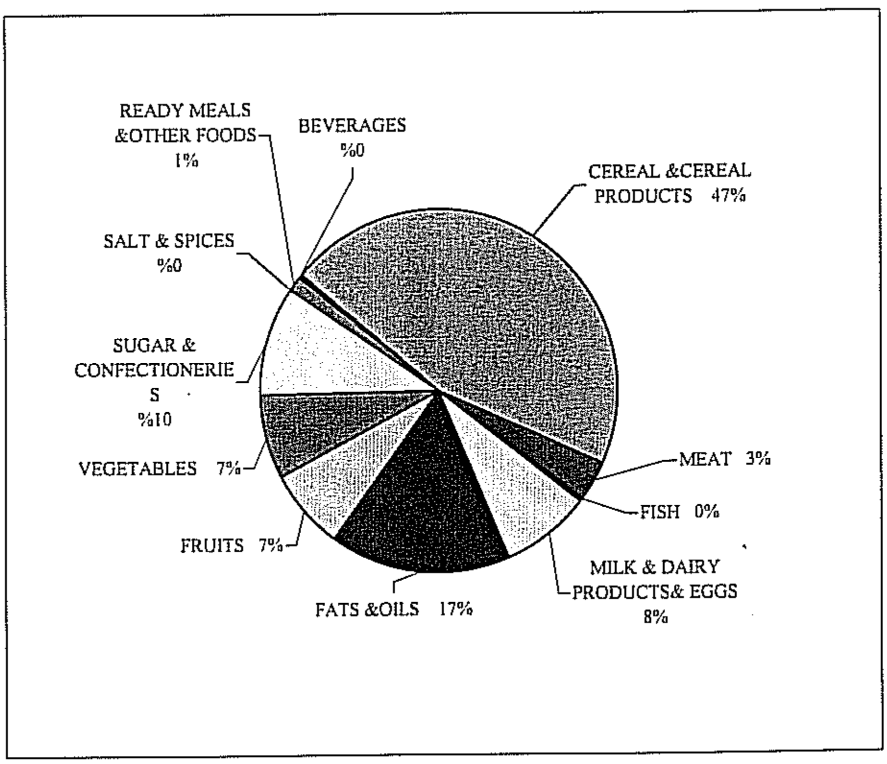


Figure 69 Daily Energy Intake from Different Food Groups in the Agean Region

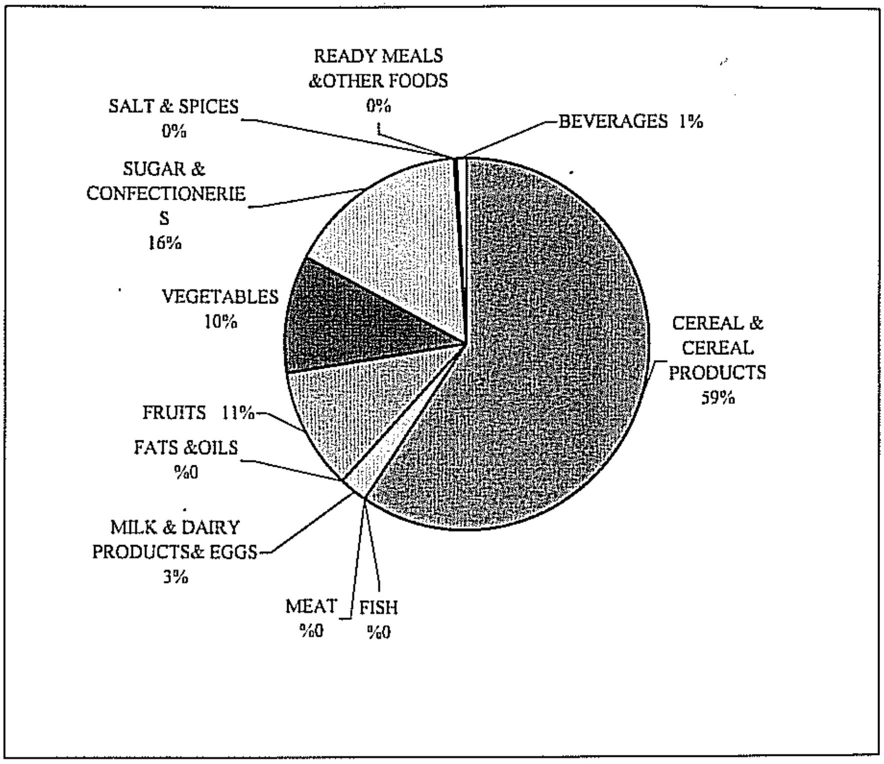


Figure 72 Daily Carbohydrate Intake from Different Food Groups in the Agean Region

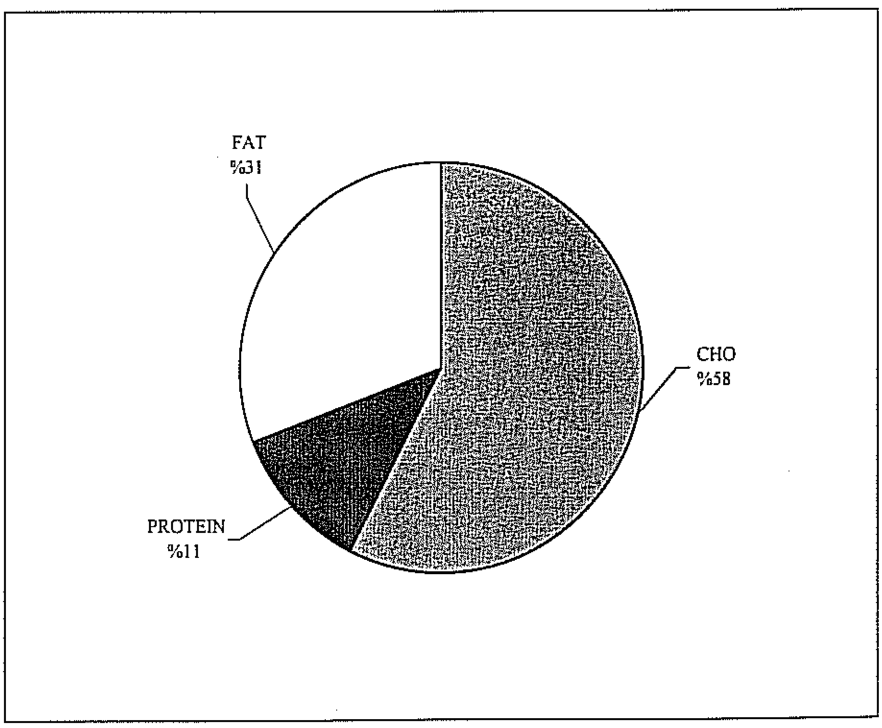


Figure 73 Per Capita Daily Energy Intake from Main Food Components in the Agean Region

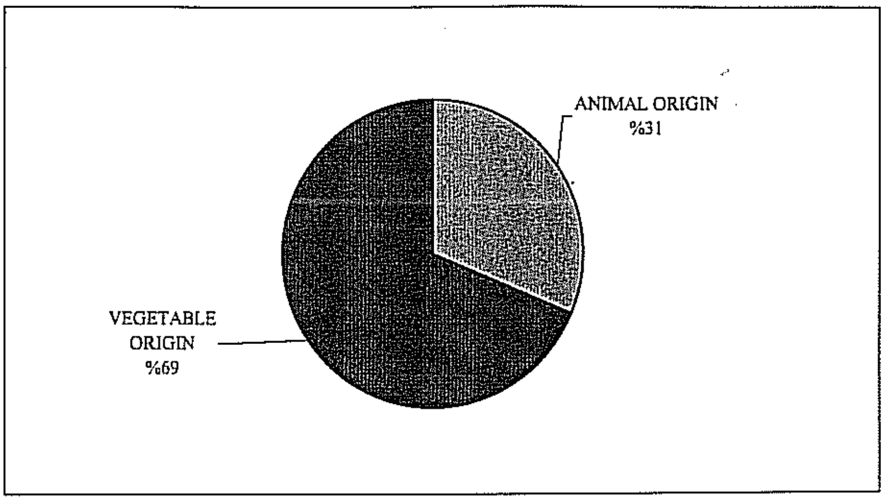


Figure 74 Sources of Proteinin the Agean Region

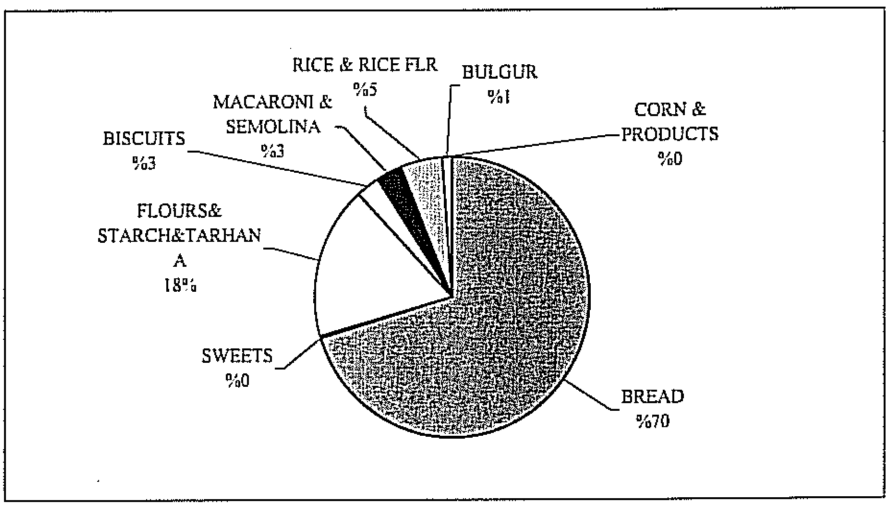


Figure 75 Cereal And Cereal Products Consumption in the Agean Region

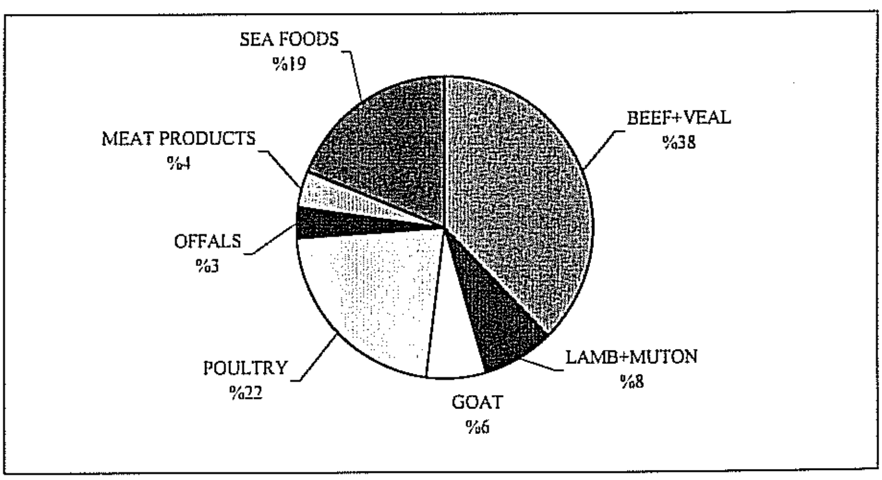


Figure 76 Meat And Meat Products Consumption in the Agean Region

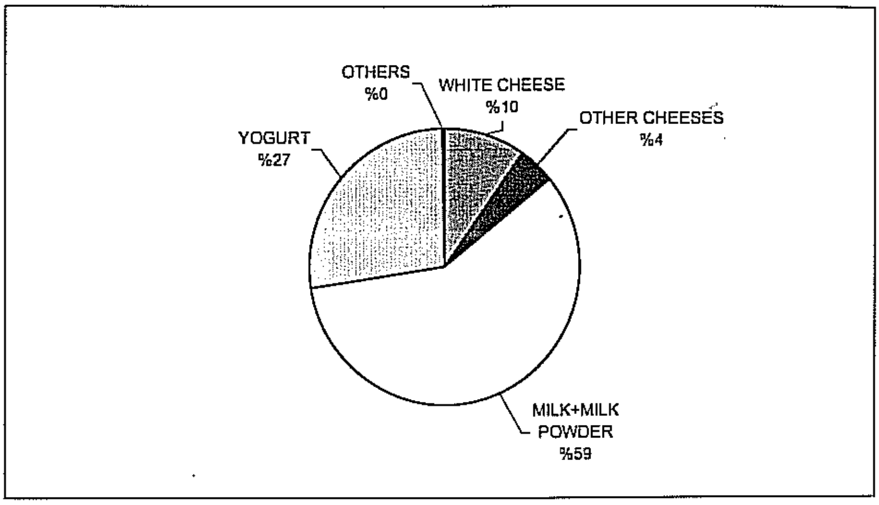


Figure 77 Dairy Consumption in the Agean Region

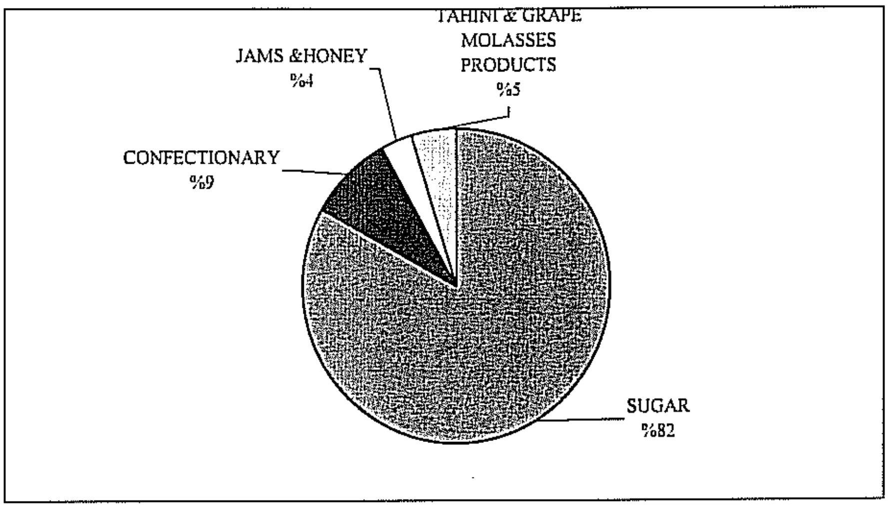


Figure 78 Sugar And Confectionary Consumption in the Agean Region

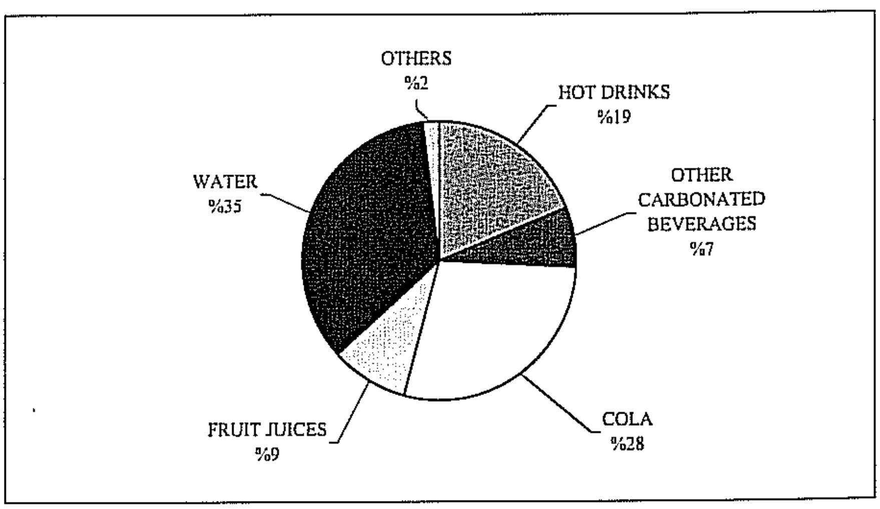


Figure 79 Beverage Consumption in the Agean Region

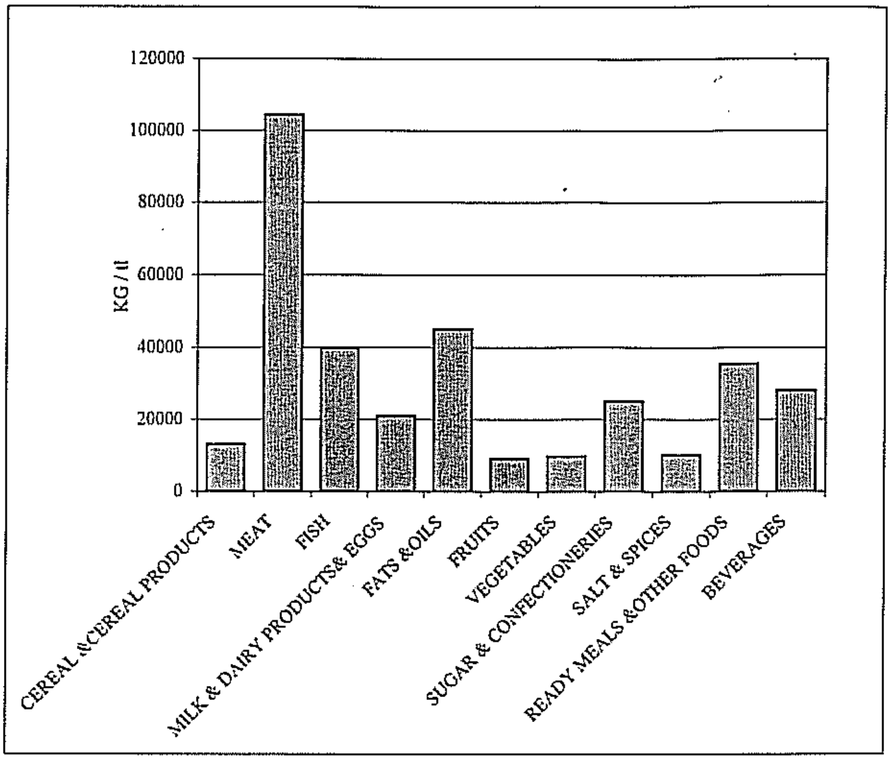


Figure 80 Price of Food Group in the Agean Region (1994 Price)

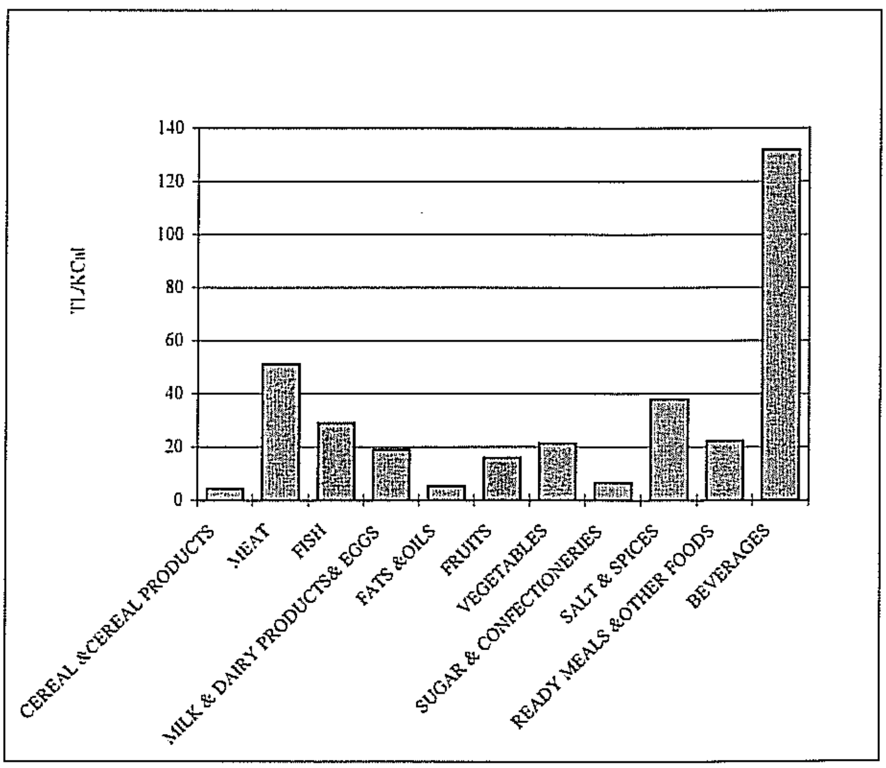


Figure 81 Price of Energy in the Agean Region

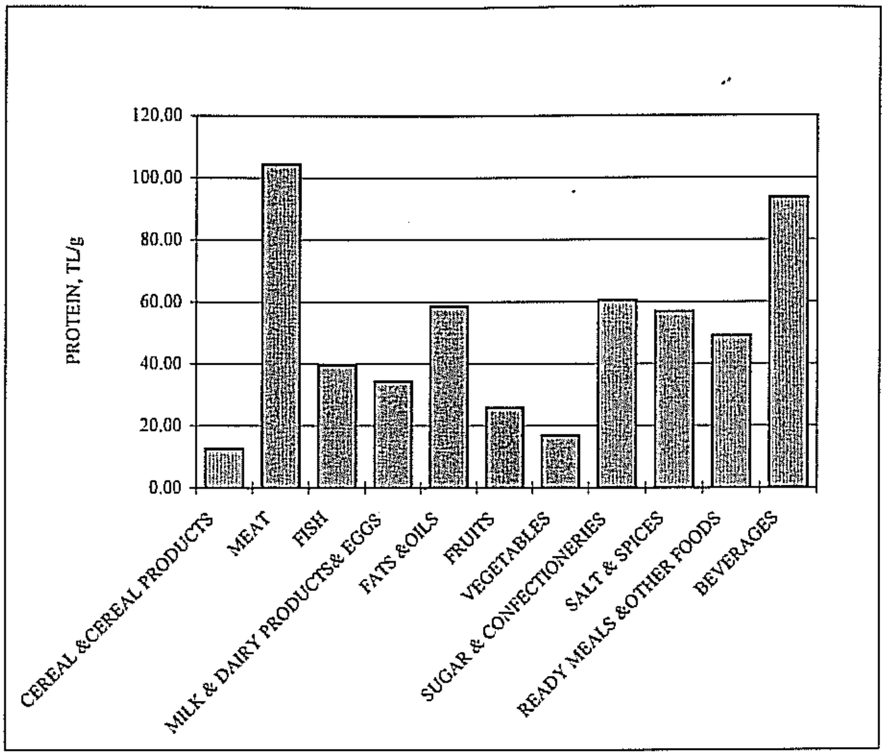


Figure 82 Price of Protein in the Agean Region

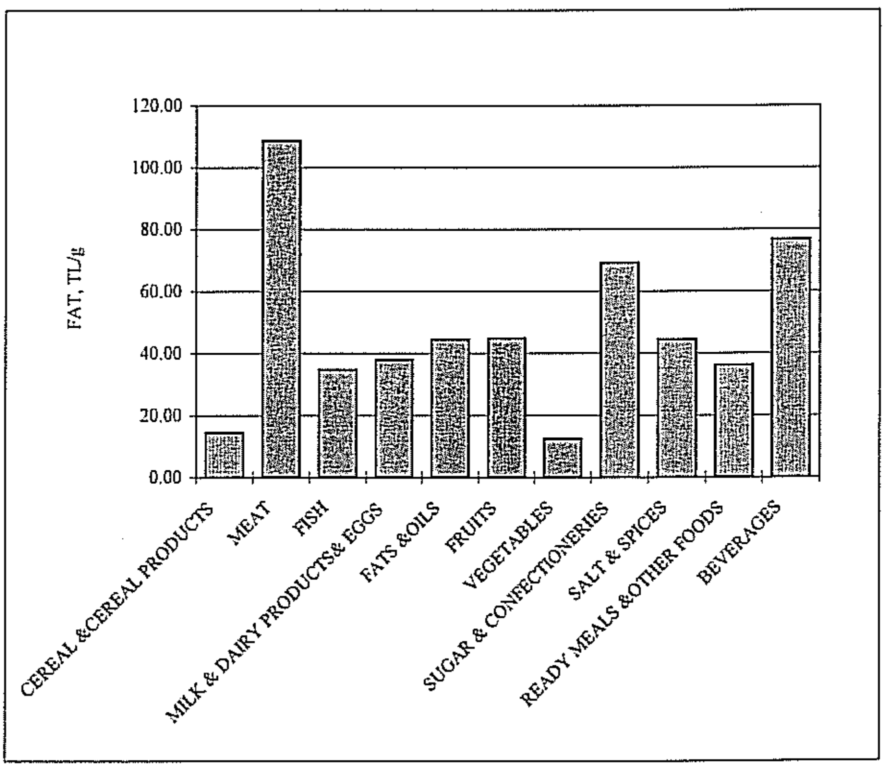


Figure 83 Price of Fat in the Agean Region

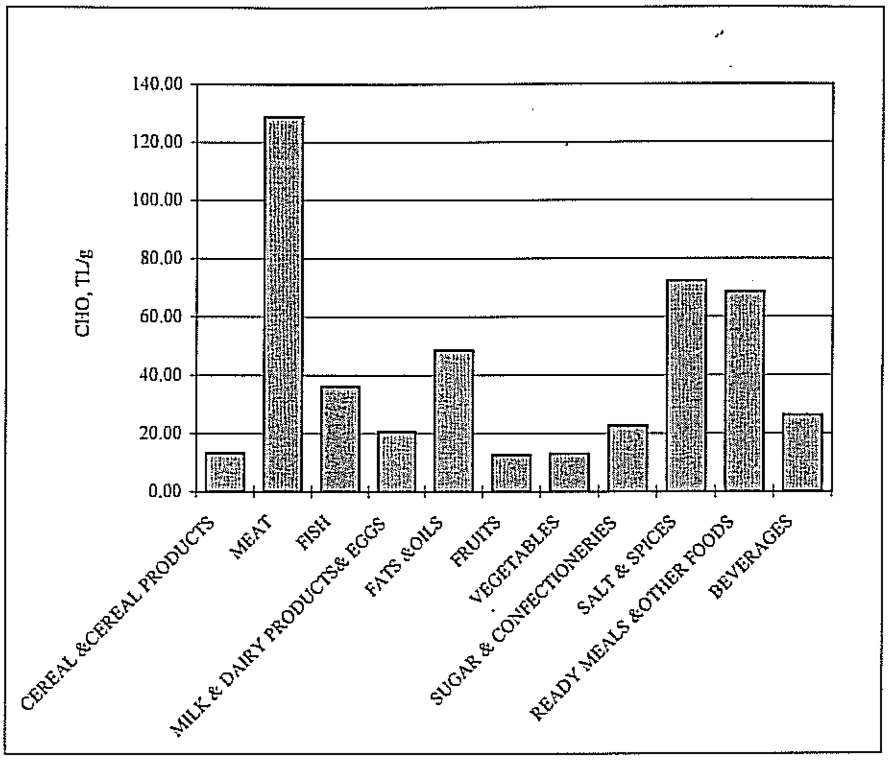


Figure 84   Price of Carbohydrate in the Agean Region

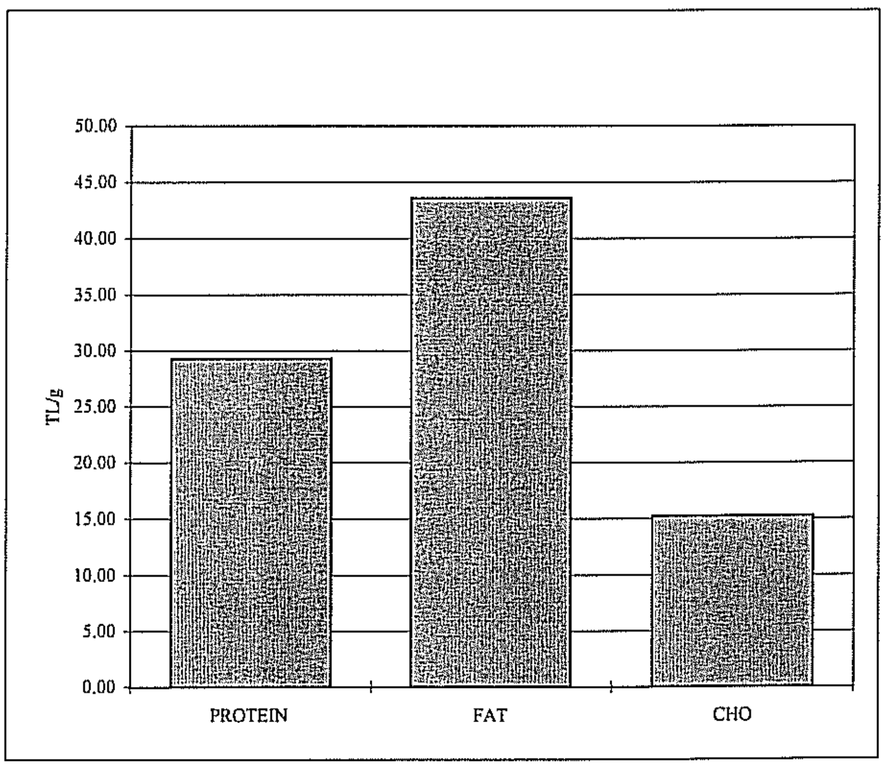


Figure 85   Price of Main Food Components in the Agean Region

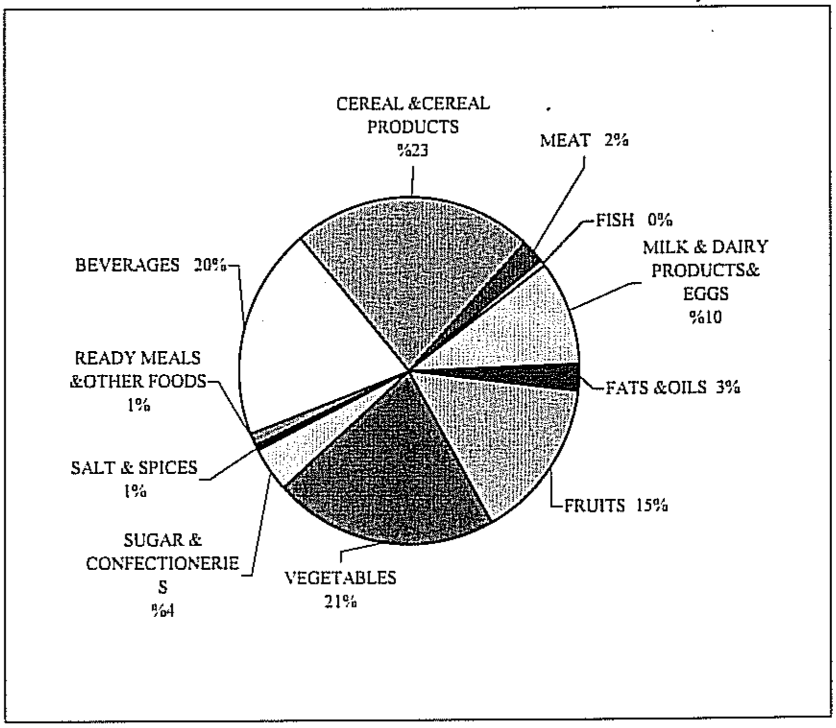


Figure 86 Mass Distribution in the Central Anatolia Region (kg)

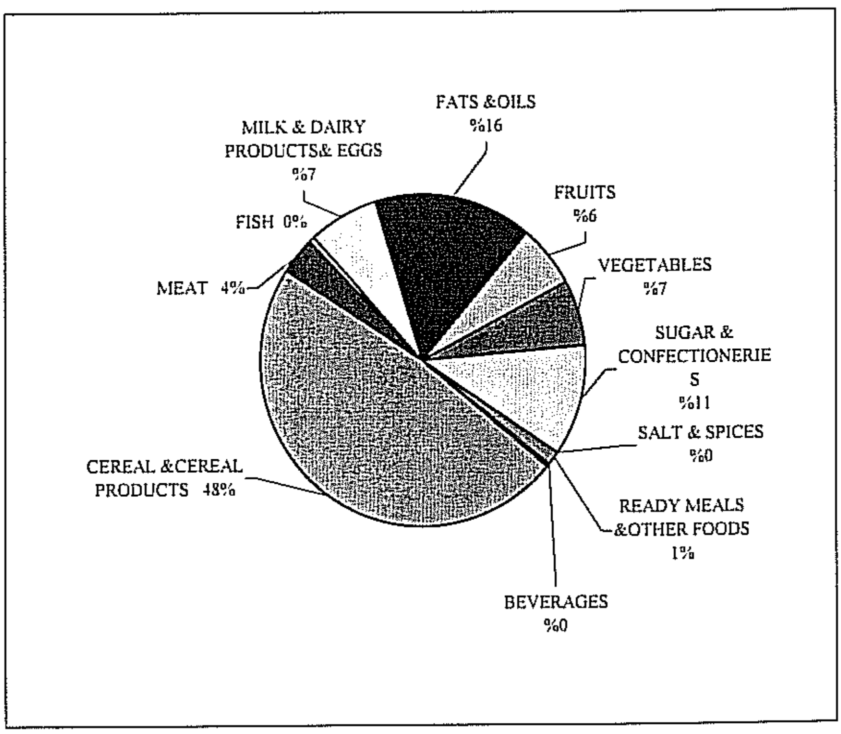


Figure 87 Daily Energy Intake from Different Food Groups in the Central Anatolia Region

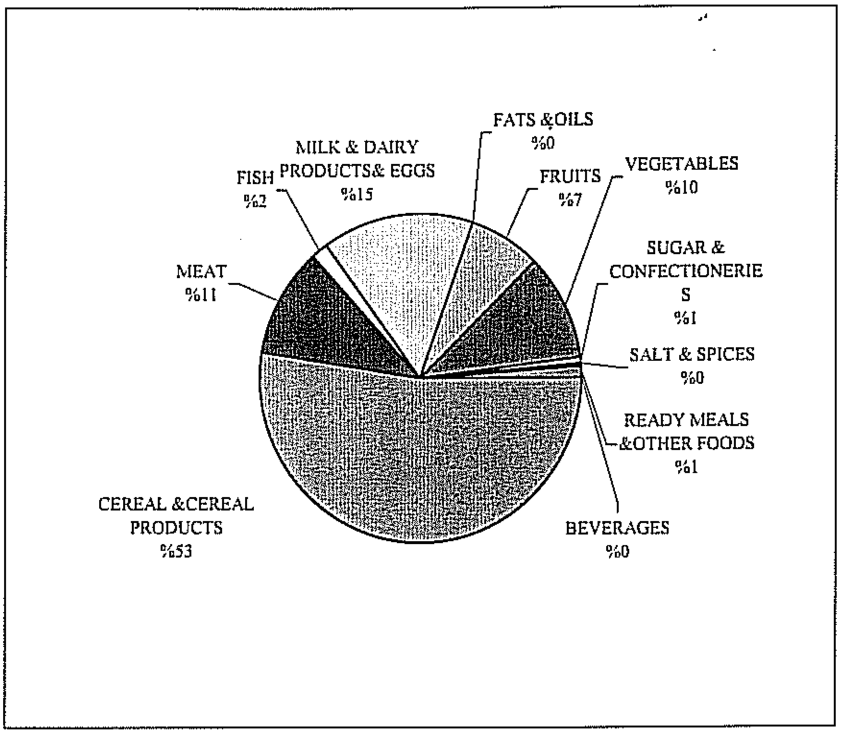


Figure 88 Daily Protein Intake from Different Food Groups in the Central Anatolia Region

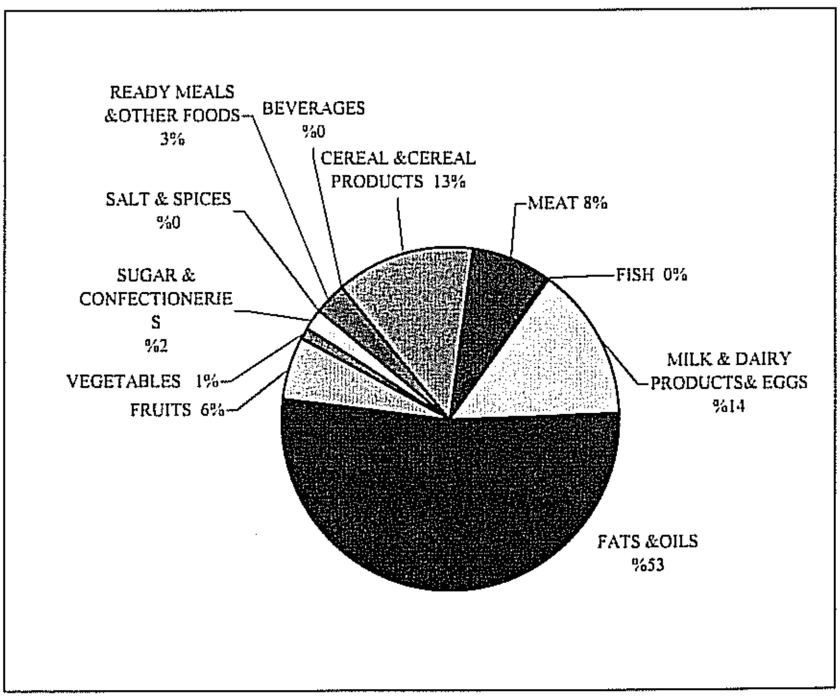


Figure 89 Daily Fat Intake from Different Food Groups in the Central Anatolia Region

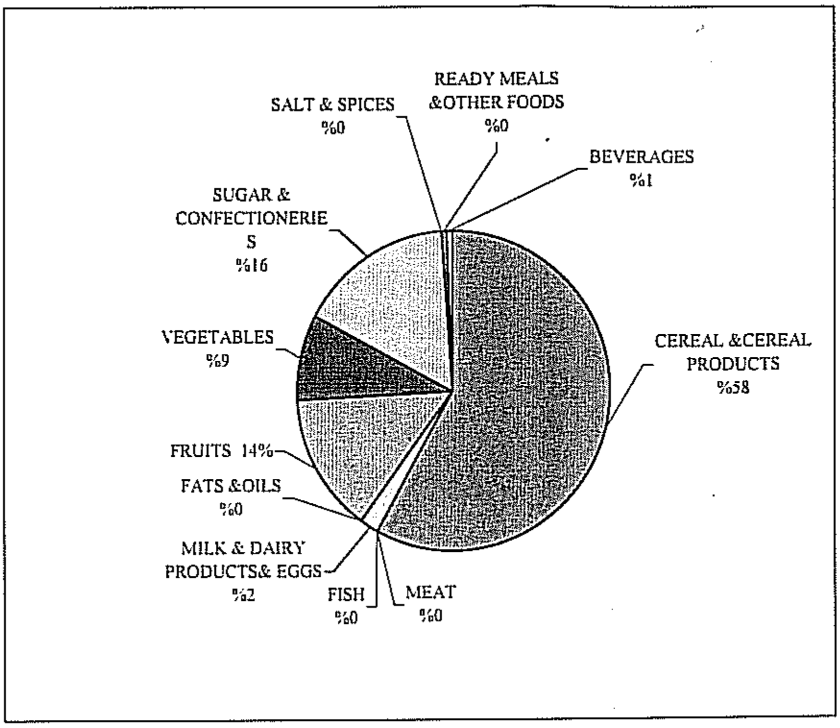


Figure 90 Daily Carbohydrate Intake from Different Food Groups in the Central Anatolia Region

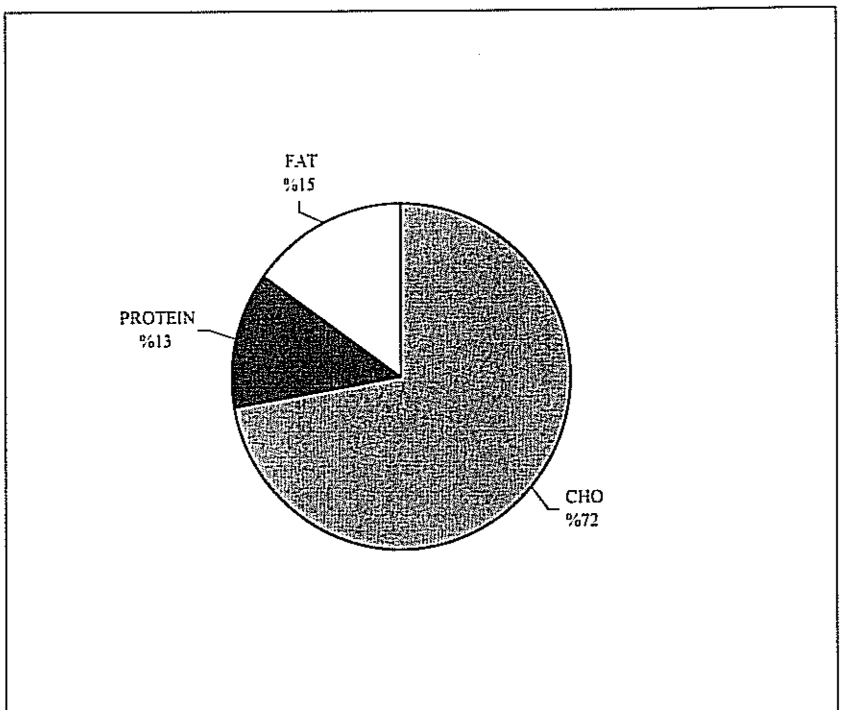


Figure 91 Per Capita Daily Energy Intake from Main Food Components in the Central Anatolia Region

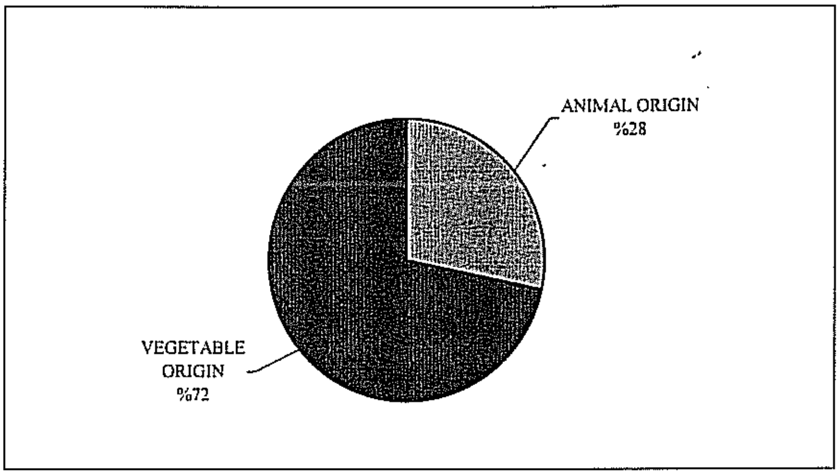


Figure 92 Sources of Proteinin the Central Anatolia Region

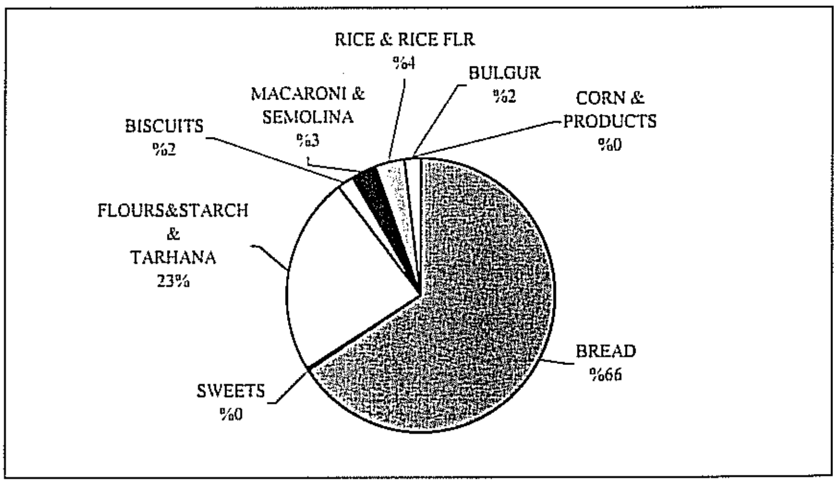


Figure 93 Cereal And Cereal Products Consumption in the Central Anatolia Region

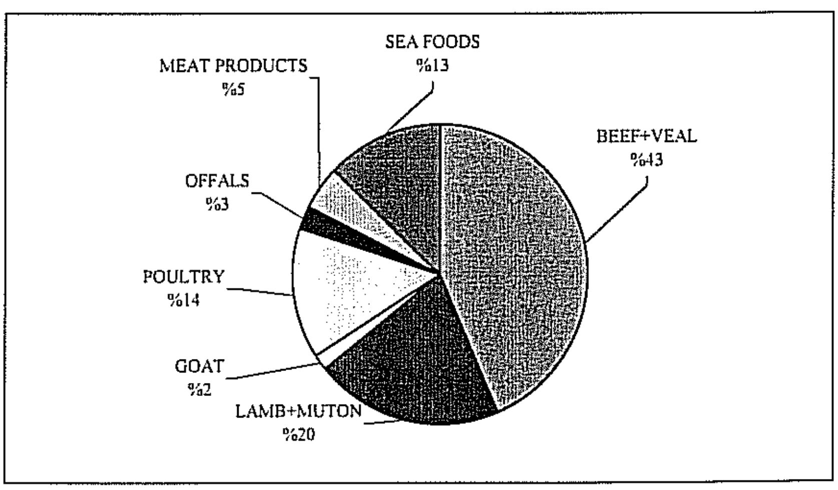


Figure 94 Meat And Meat Products Consumption in the Central Anatolia Region

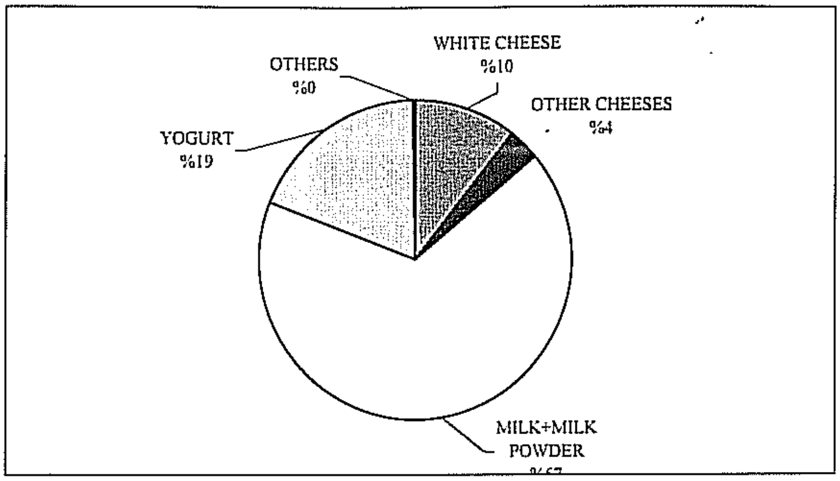


Figure 95 Dairy Consumption in the Central Anatolia Region

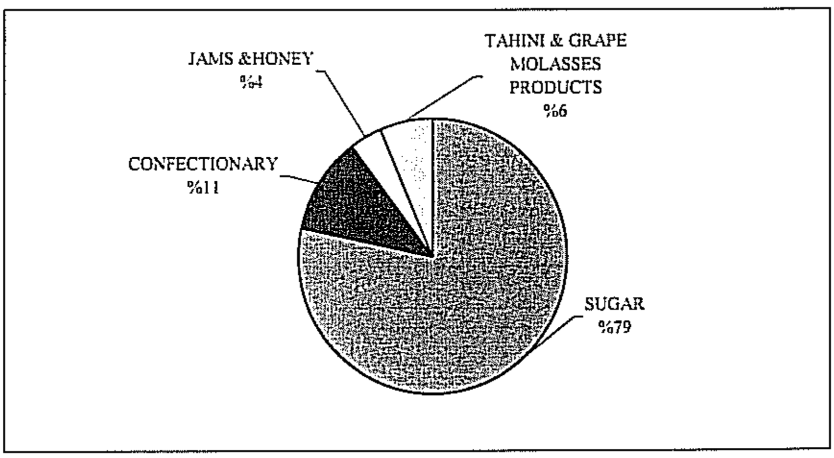


Figure 96 Sugar And Confectionary Consumption in the Central Anatolia Region

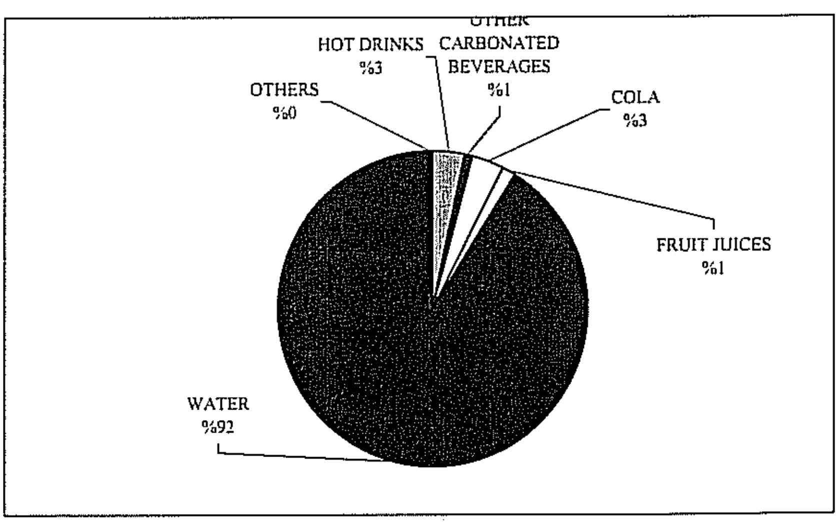


Figure 97 Beverage Consumption in the Central Anatolia Region

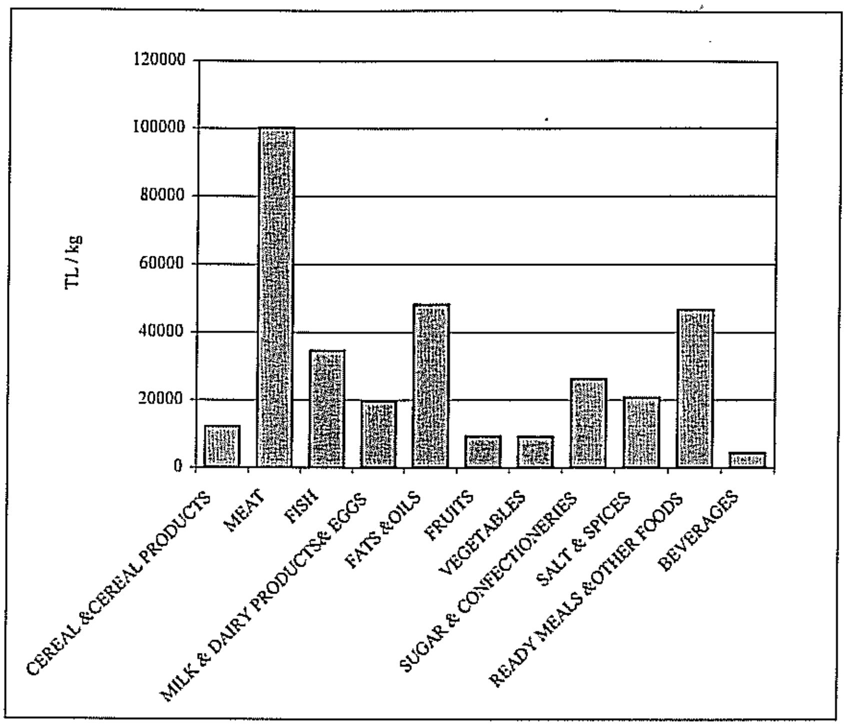


Figure 98 Price of Food Group in the Central Anatolia Region (1994 Price)

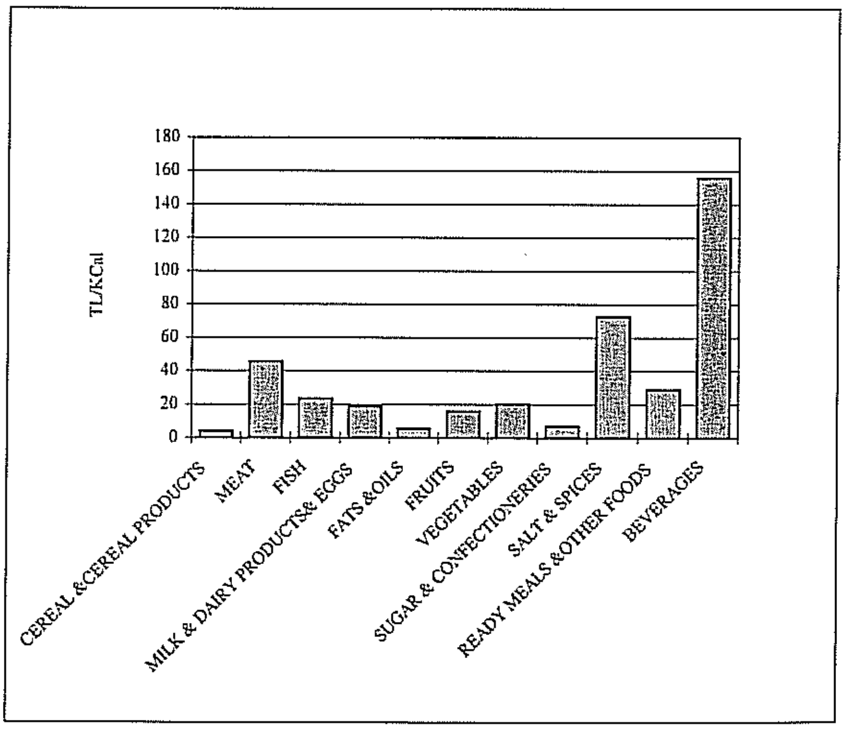


Figure 99 Price of Energy in the Central Anatolia Region

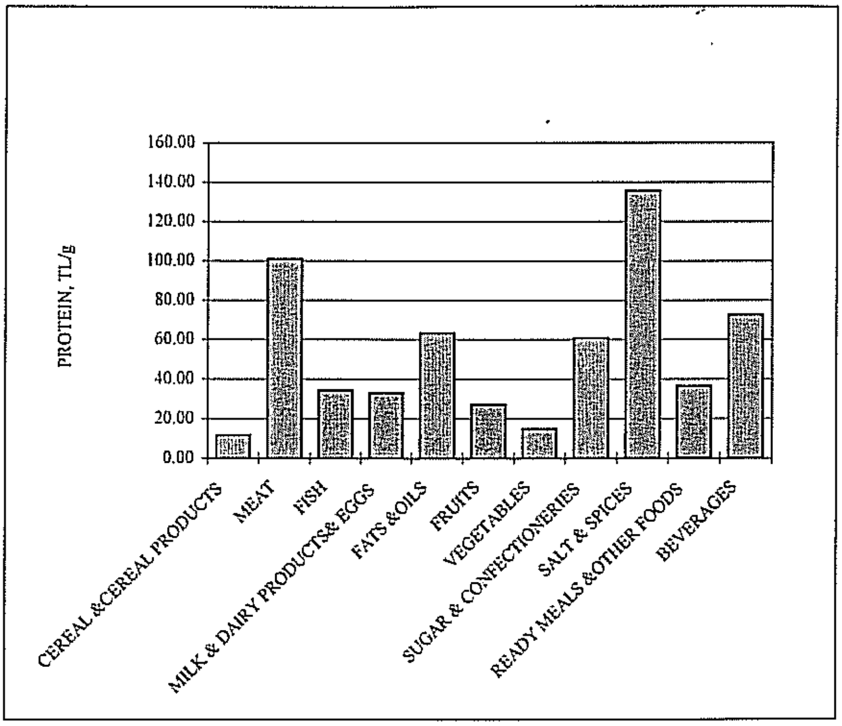


Figure 100 Price of Protein in the Central Anatolia Region

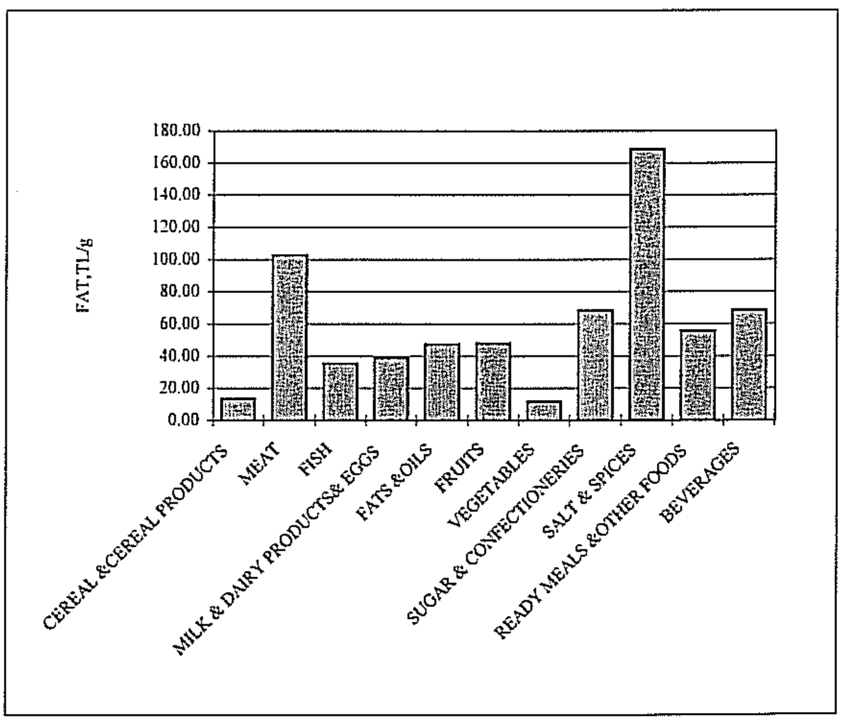


Figure 101 Price of Fat in the Central Anatolia Region

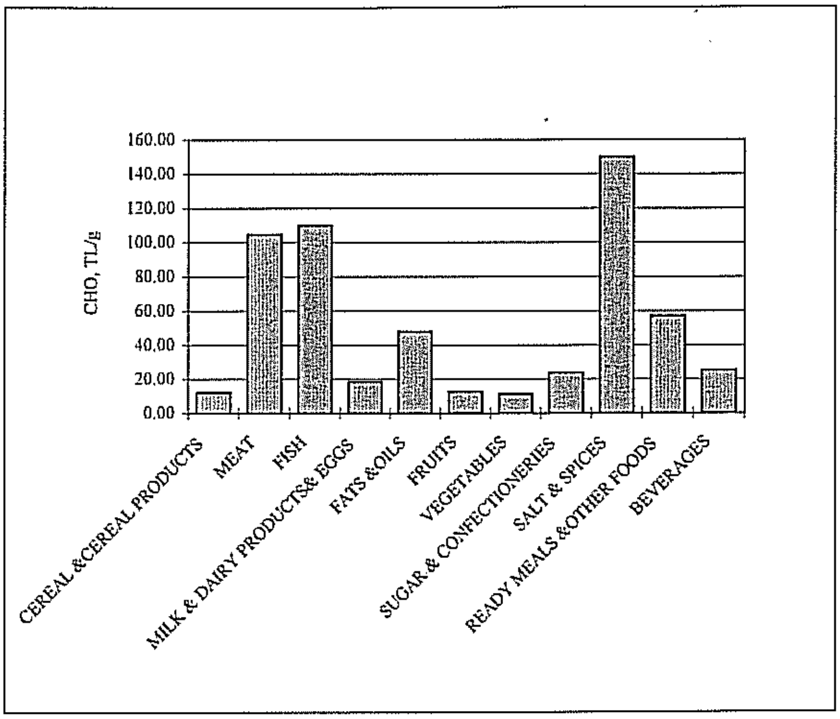


Figure 102 Price of Carbohydrate in the Central Anatolia Region

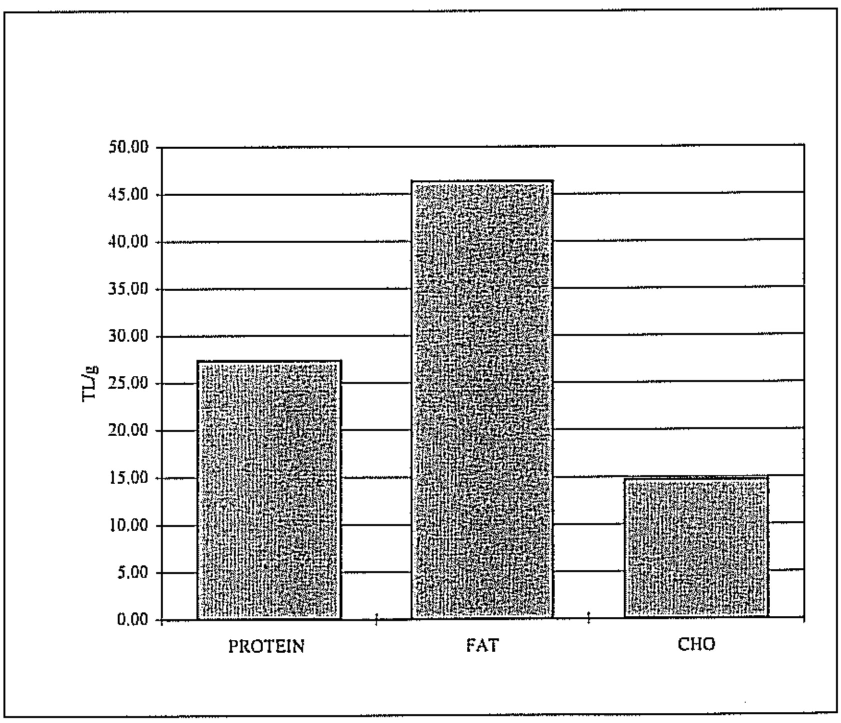


Figure 103 Price of Main Food Components in the Central Anatolia Region

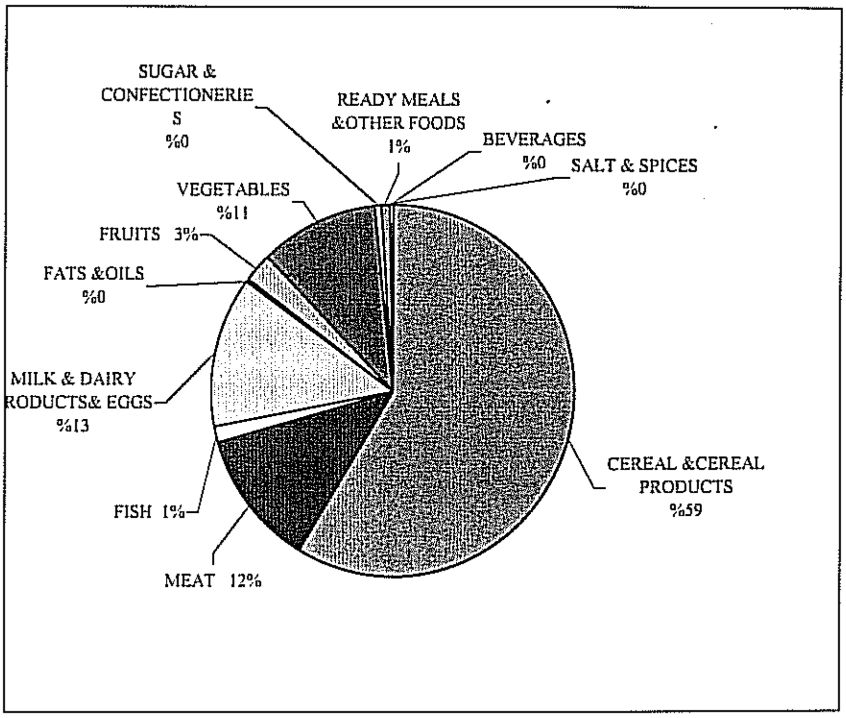


Figure 106 Daily Protein Intake from Different Food Groups in the Eastern Anatolia Region

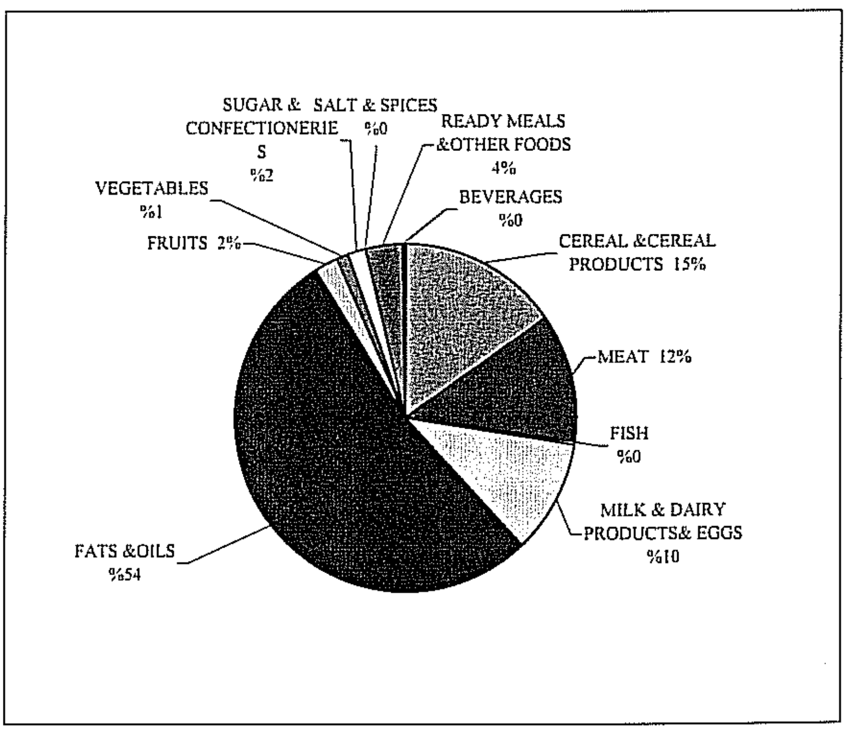


Figure 107 Daily Fat Intake from Different Food Groups in the Eastern Anatolia Region

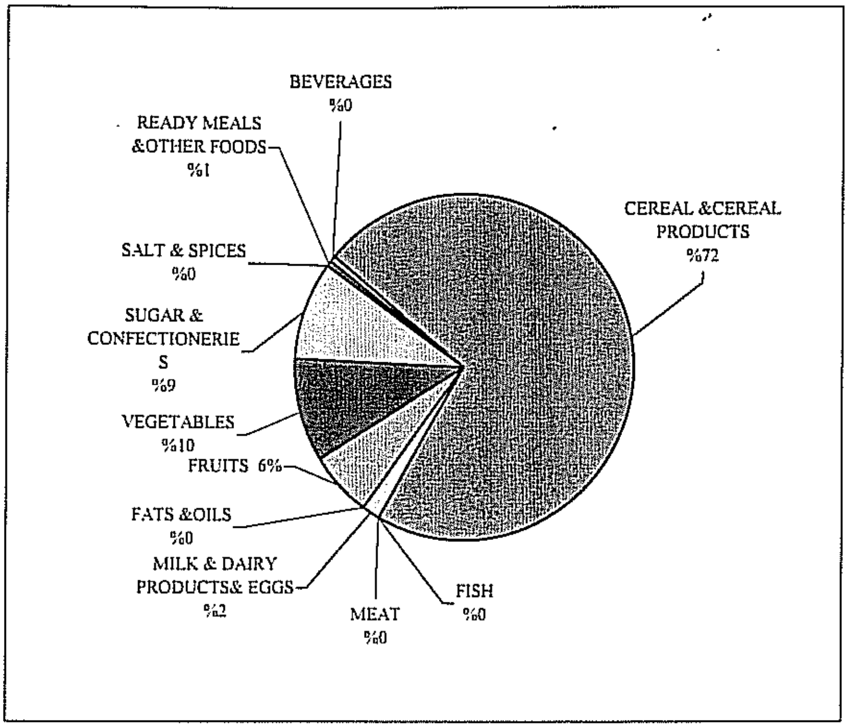


Figure 108 Daily Carbohydrate Intake from Different Food Groups in the Eastern Anatolia Region

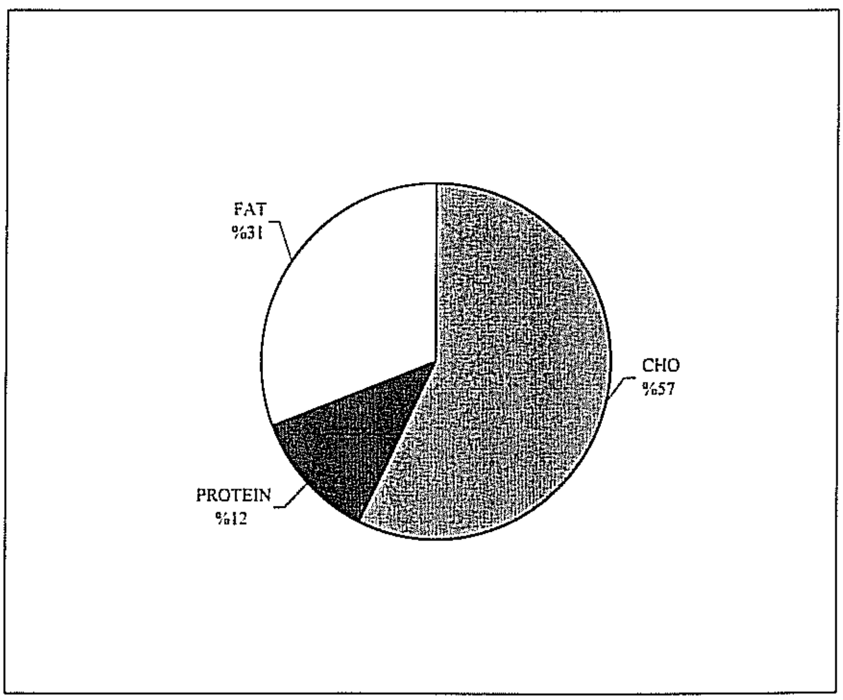


Figure 109 Per Capita Daily Energy Intake from Main Food Components in the Eastern Anatolia Region

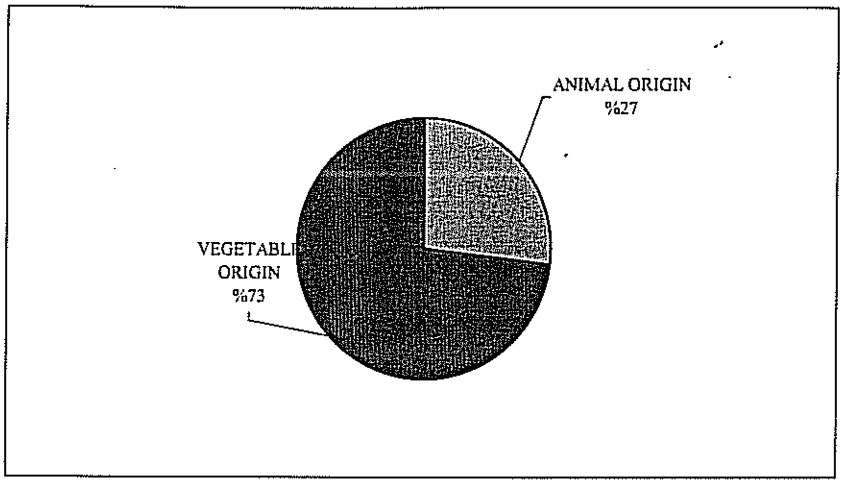


Figure 110 Sources of Protein in the Eastern Anatolia Region

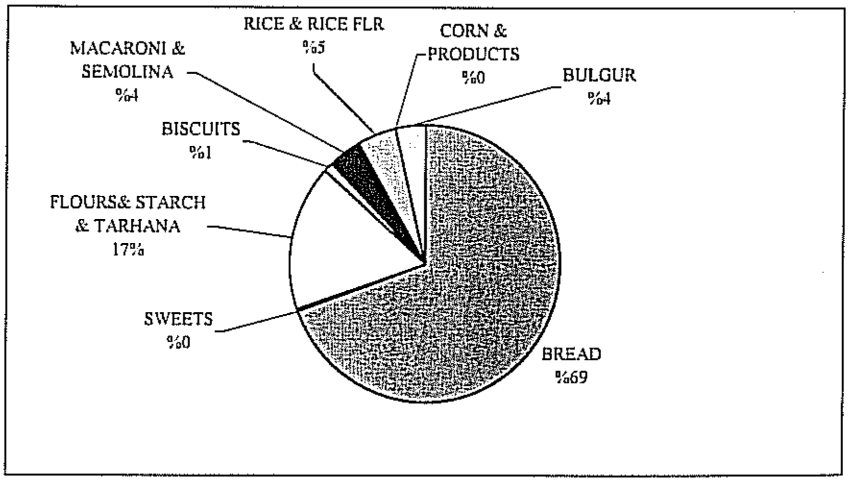


Figure 111 Cereal And Cereal Products Consumption in the Eastern Anatolia Region

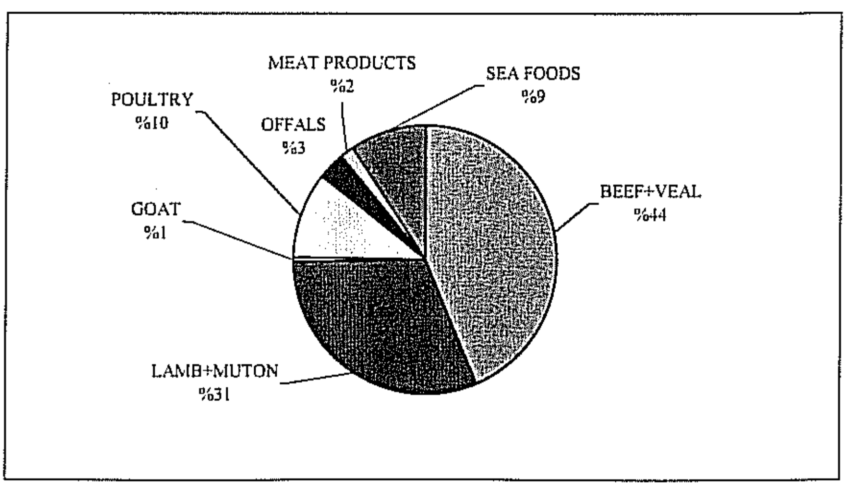


Figure 112 Meat And Meat Products Consumption in the Eastern Anatolia Region

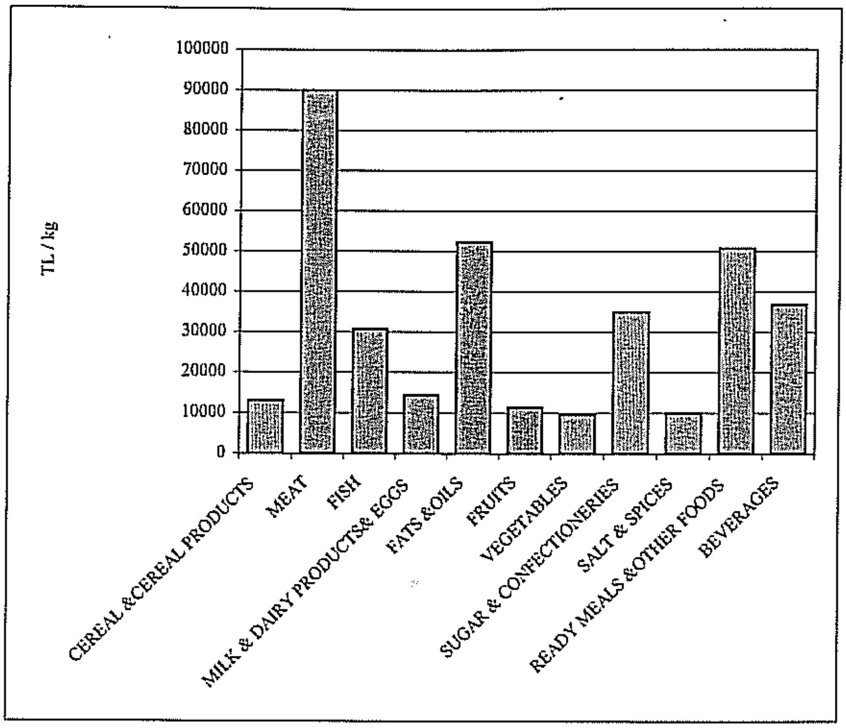


Figure 116 Price of Food Group in the Eastern Anatolia Region (1994 Price)

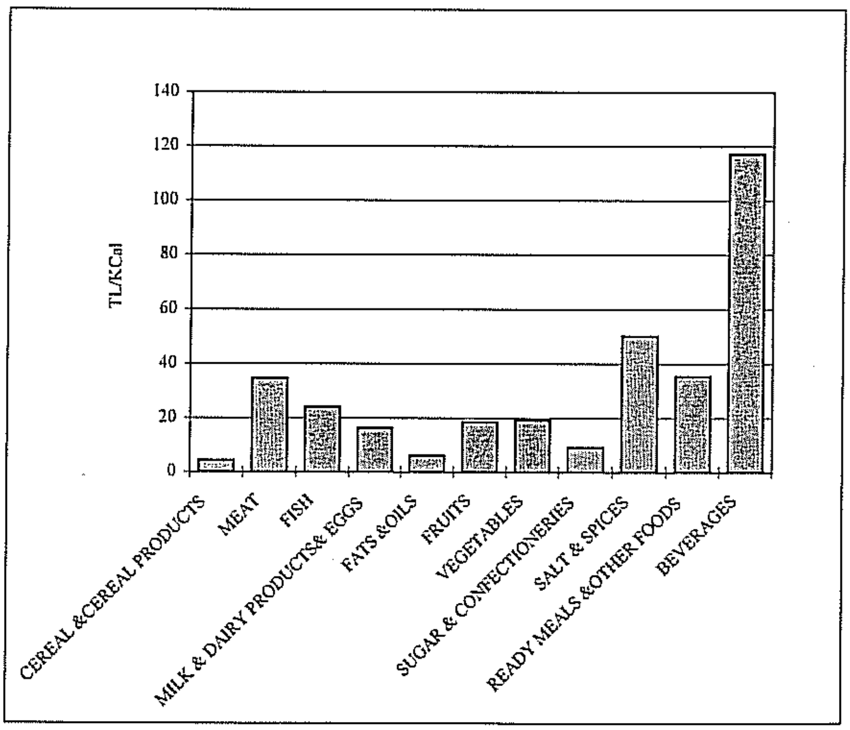


Figure 117 Price of Energy in the Eastern Anatolia Region

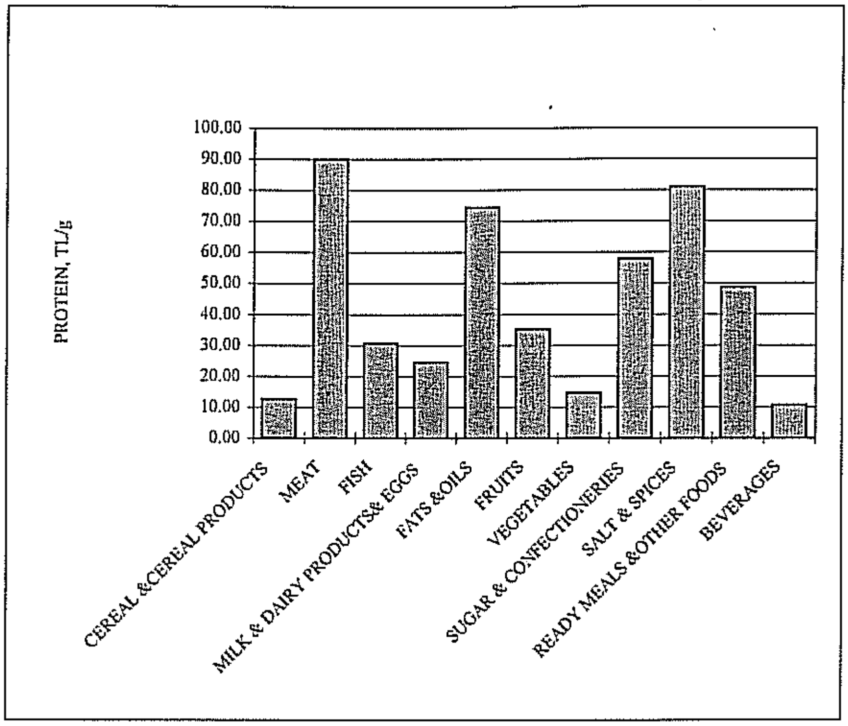


Figure 118 Price of Protein in the Eastern Anatolia Region

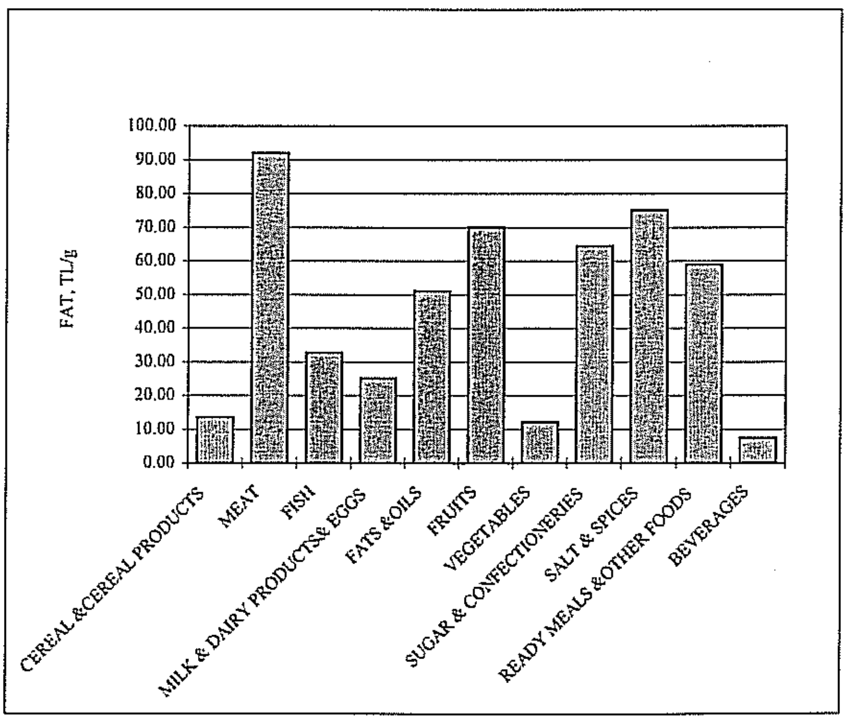


Figure 119 Price of Fat in the Eastern Anatolia Region

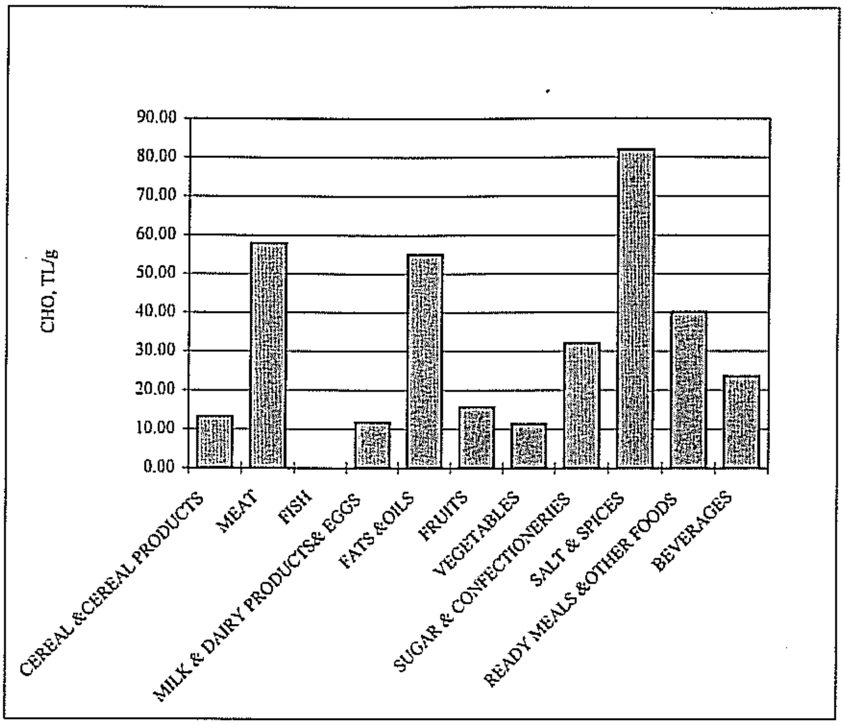


Figure 120 Price of Carbohydrate in the Eastern Anatolia Region

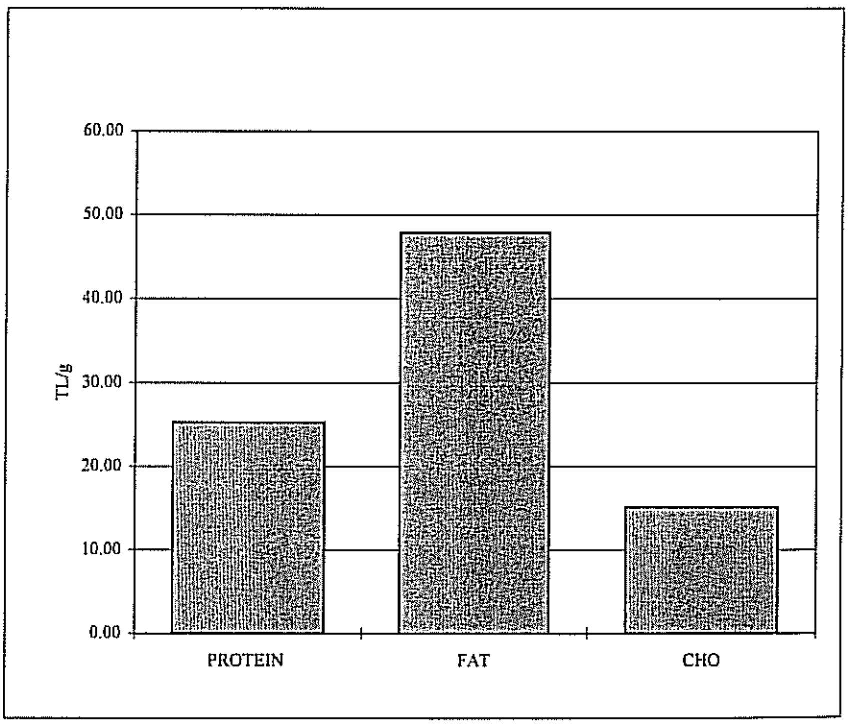


Figure 121 Price of Main Food Components in the Eastern Anatolia Region

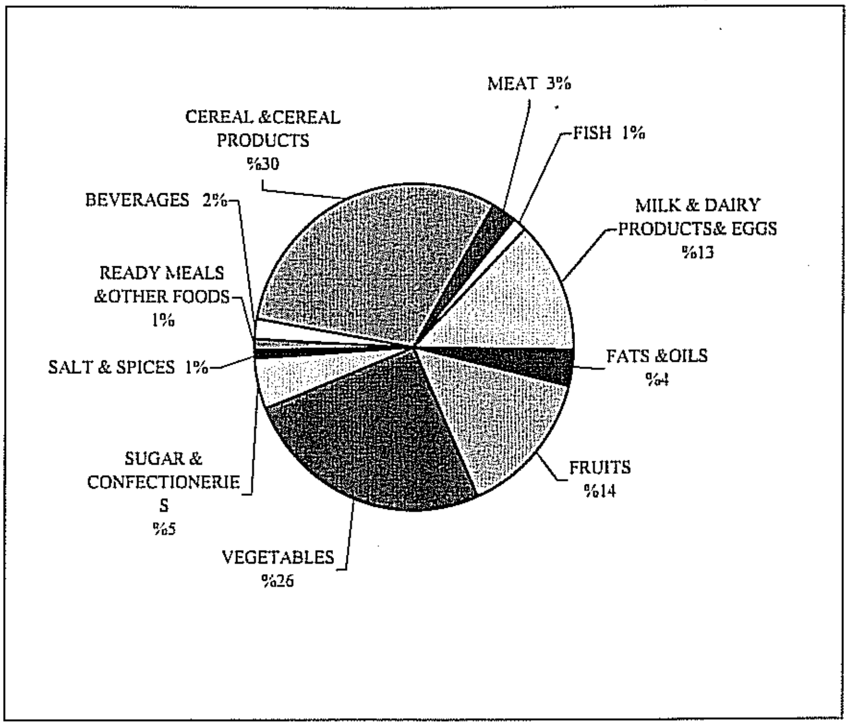


Figure 122 Mass Distribution in the Black Sea Region (kg)

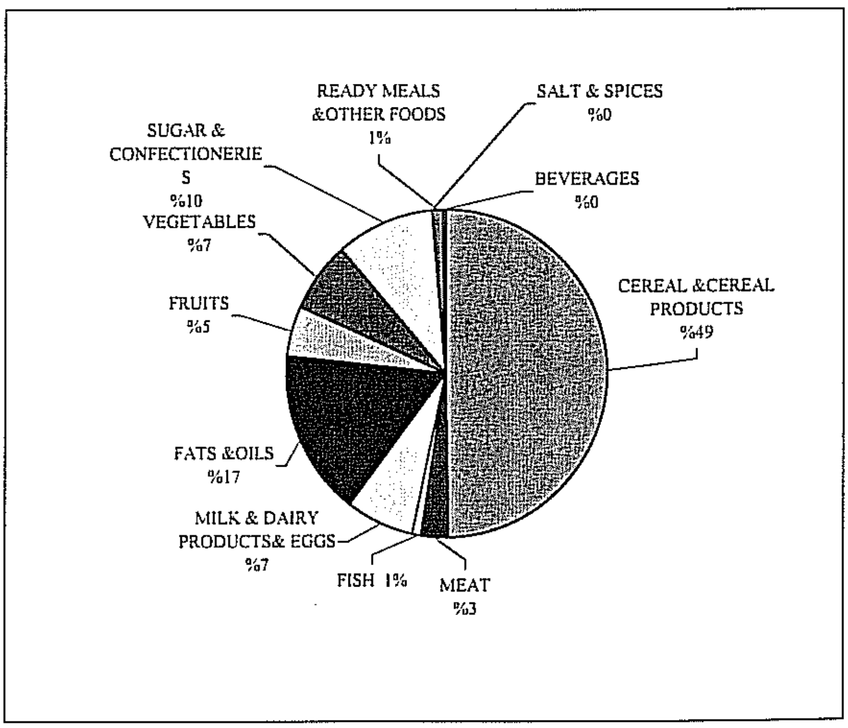


Figure 123 Daily Energy Intake from Different Food Groups in the Black Sea Region

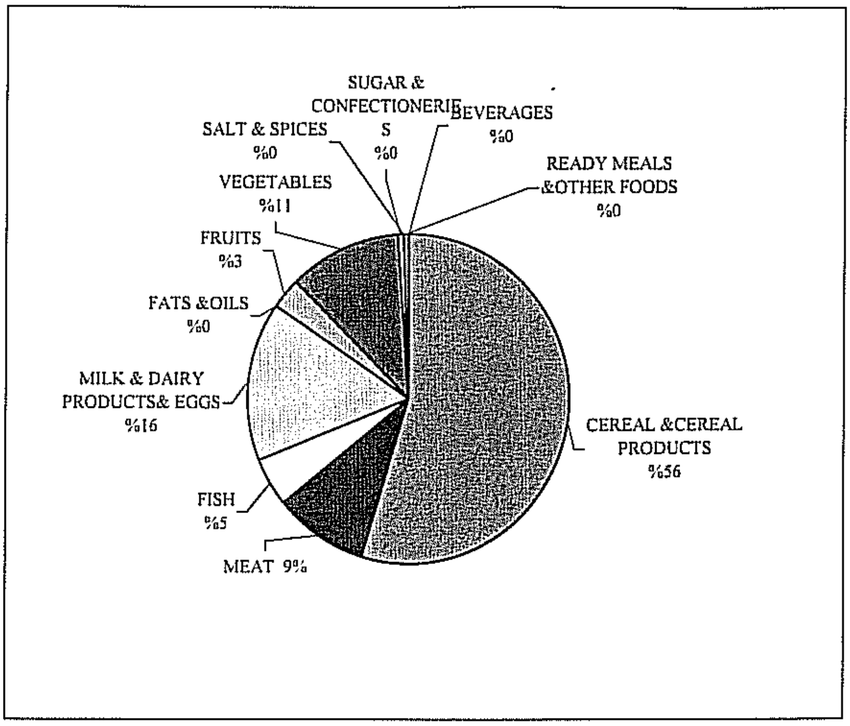


Figure 124 Daily Protein Intake from Different Food Groups in the Black Sea Region

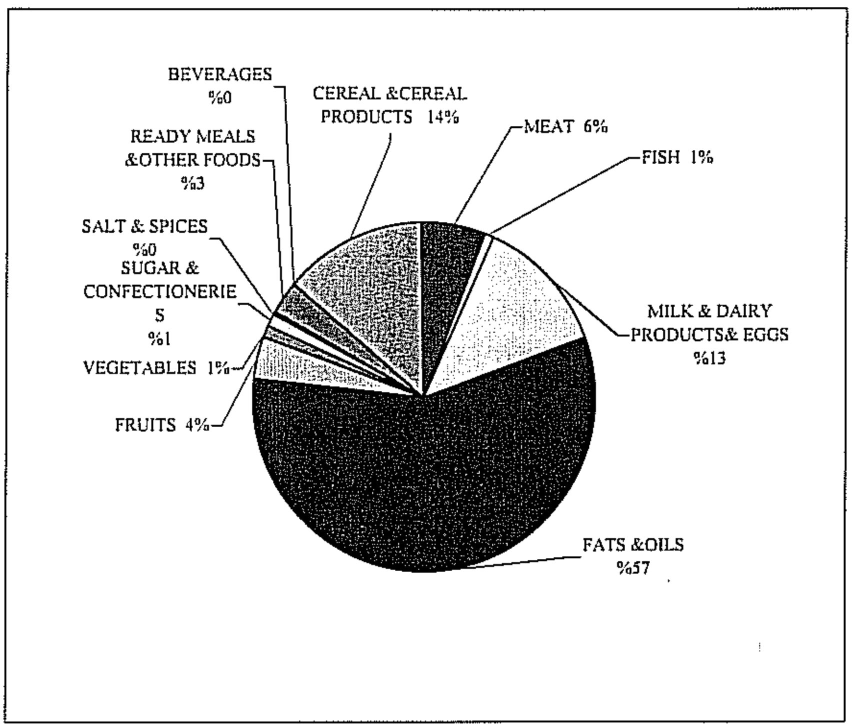


Figure 125 Daily Fat Intake from Different Food Groups in the Black Sea Region

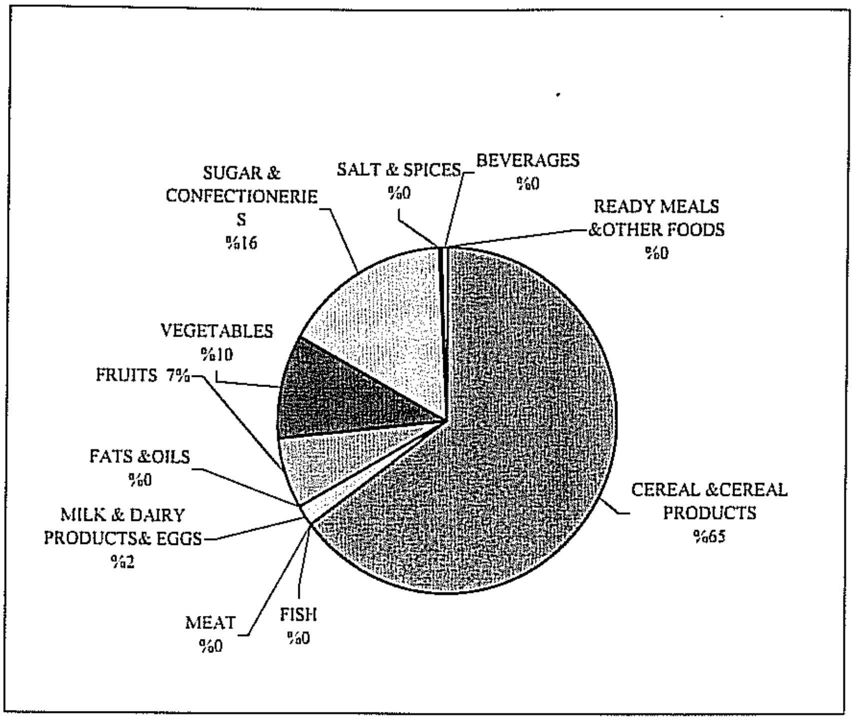


Figure 126 Daily Carbohydrate Intake from Different Food Groups in the Black Sea Region

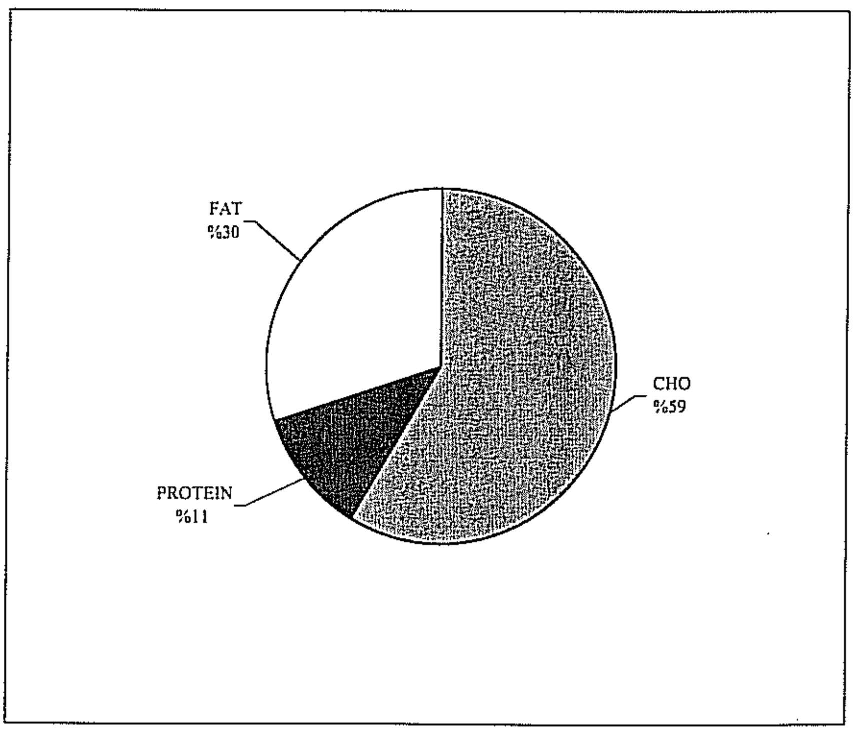


Figure 127 Per Capita Daily Energy Intake from Main Food Components in the Black Sea Region

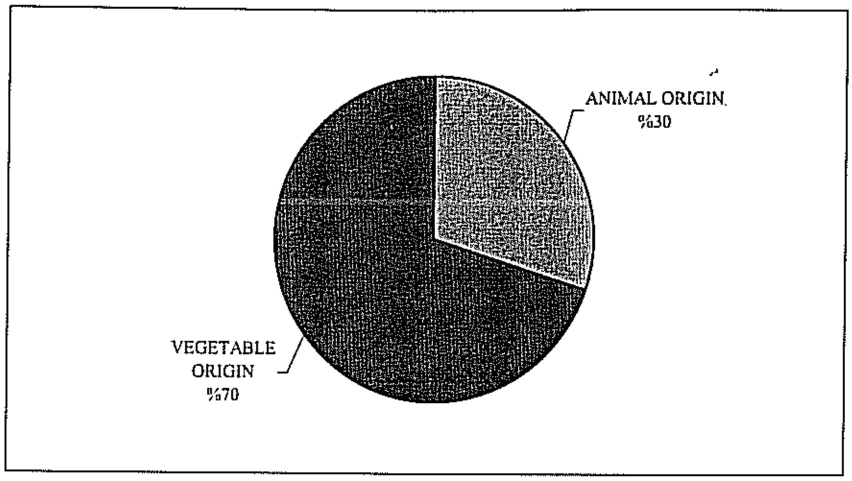


Figure 128 Sources of Protein in the Black Sea Region

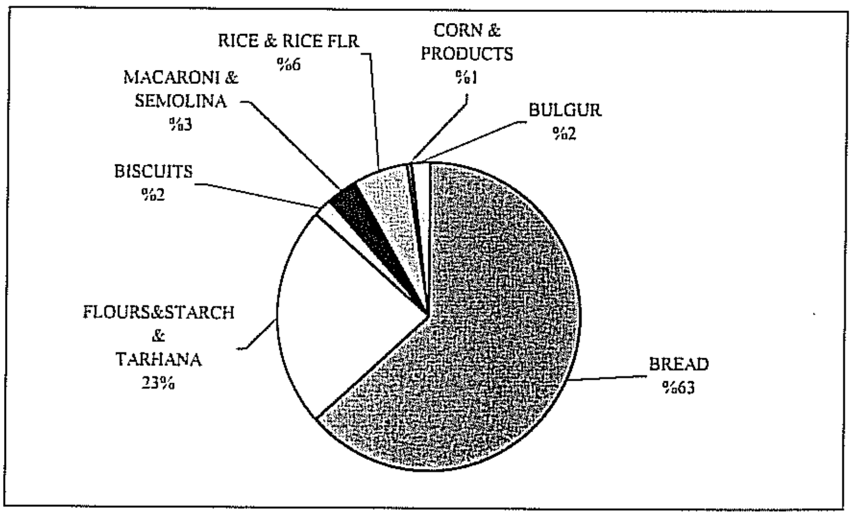


Figure 129 Cereal And Cereal Products Consumption in the Black Sea Region

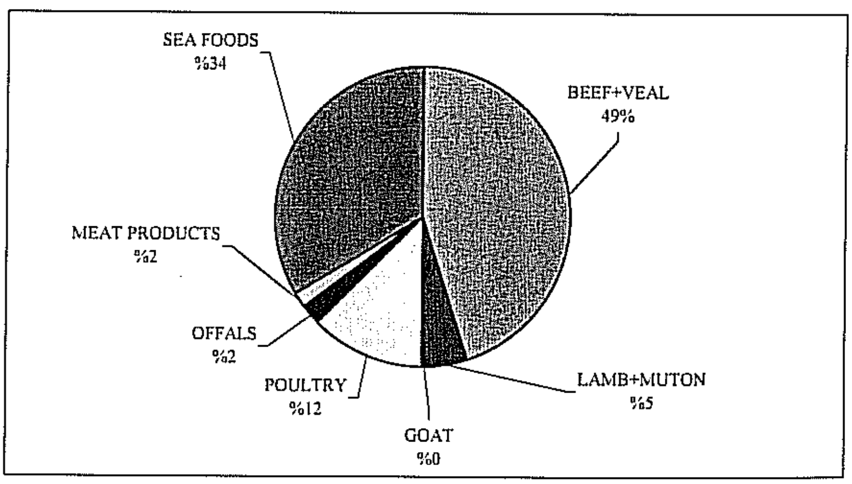


Figure 130 Meat And Meat Products Consumption in the Black Sea Region

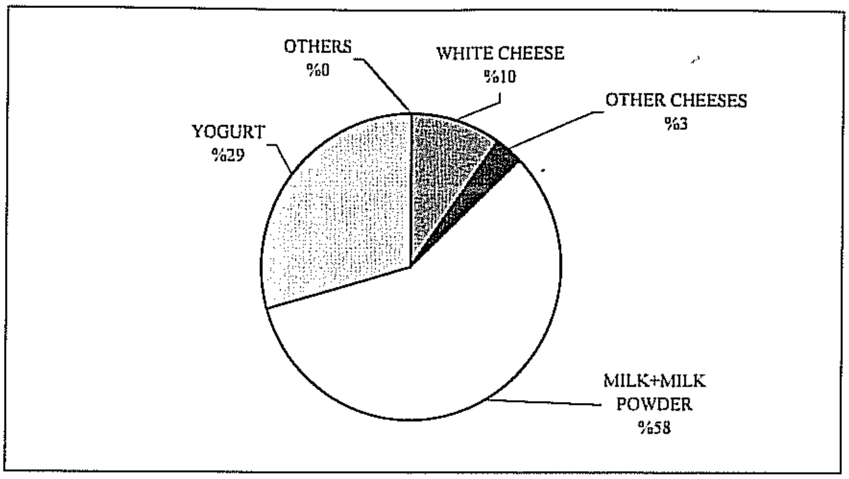


Figure 131 Dairy Consumption in the Black Sea Region

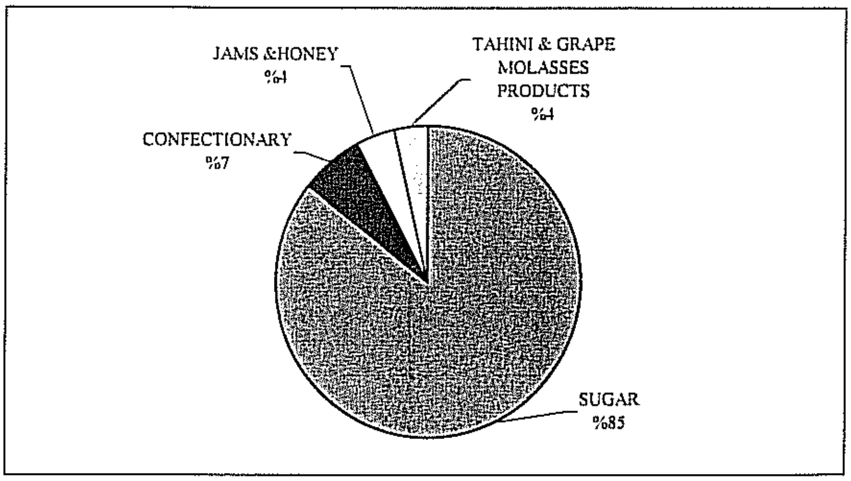


Figure 132 Sugar And Confectionary Consumption in the Black Sea Region

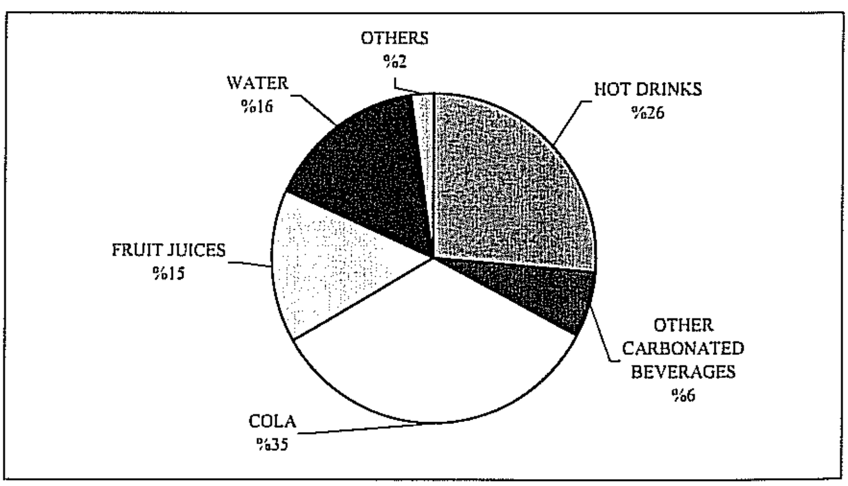


Figure 133 Beverage Consumption in the Black Sea Region

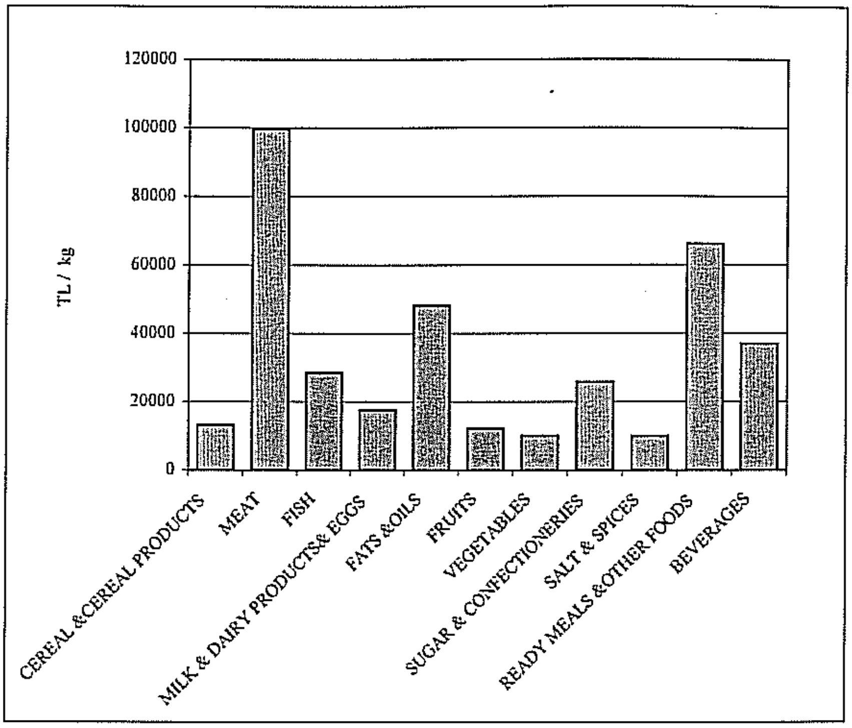


Figure 134 Price of Food Group in the Black Sea Region (1994 Price)

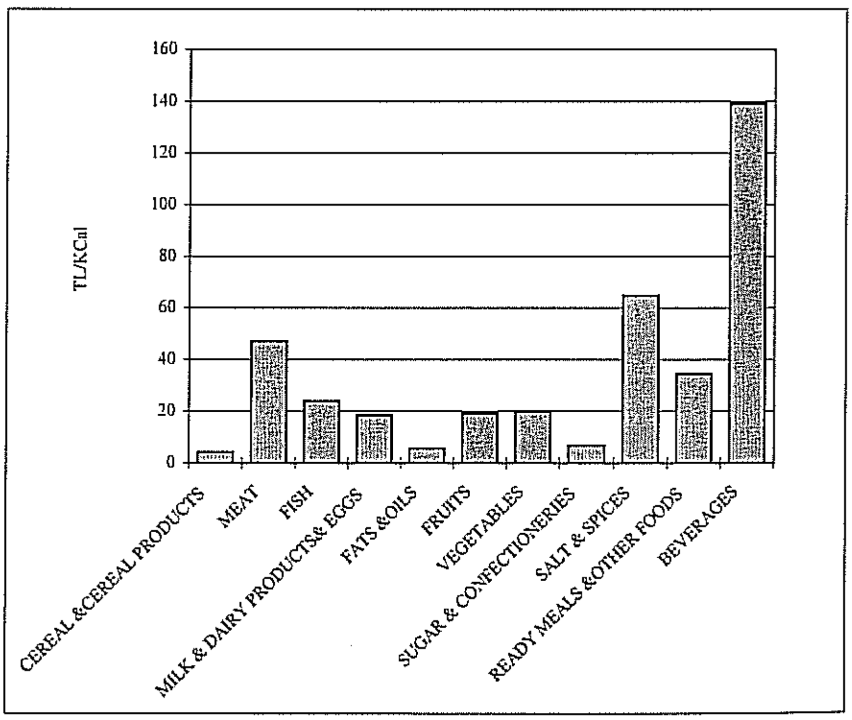


Figure 135 Price of Energy in the Black Sea Region

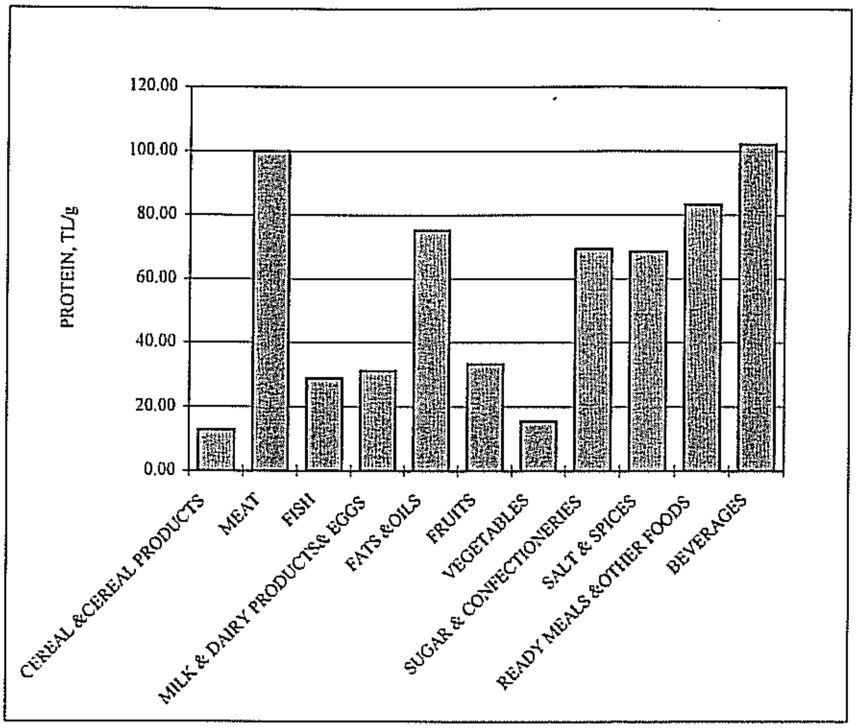


Figure 136 Price of Protein in the Black Sea Region

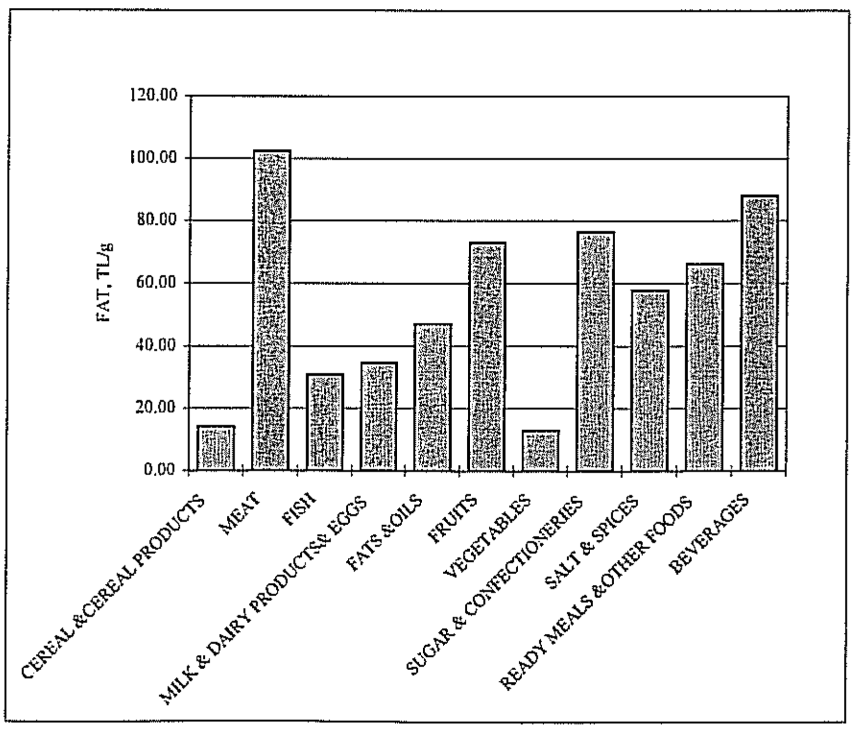


Figure 137 Price of Fat in the Black Sea Region

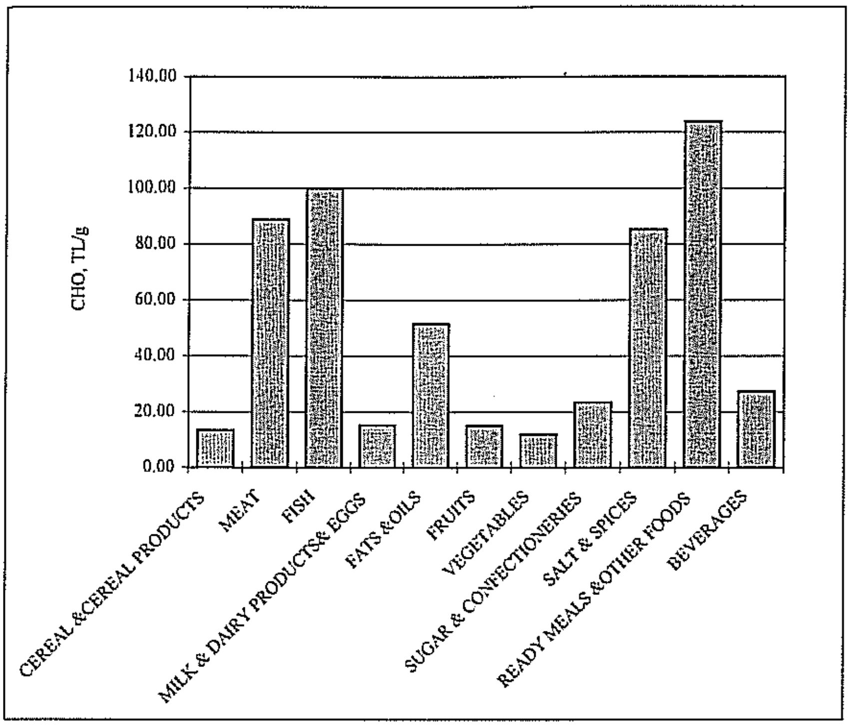


Figure 138 Price of Carbohydrate in the Black Sea Region

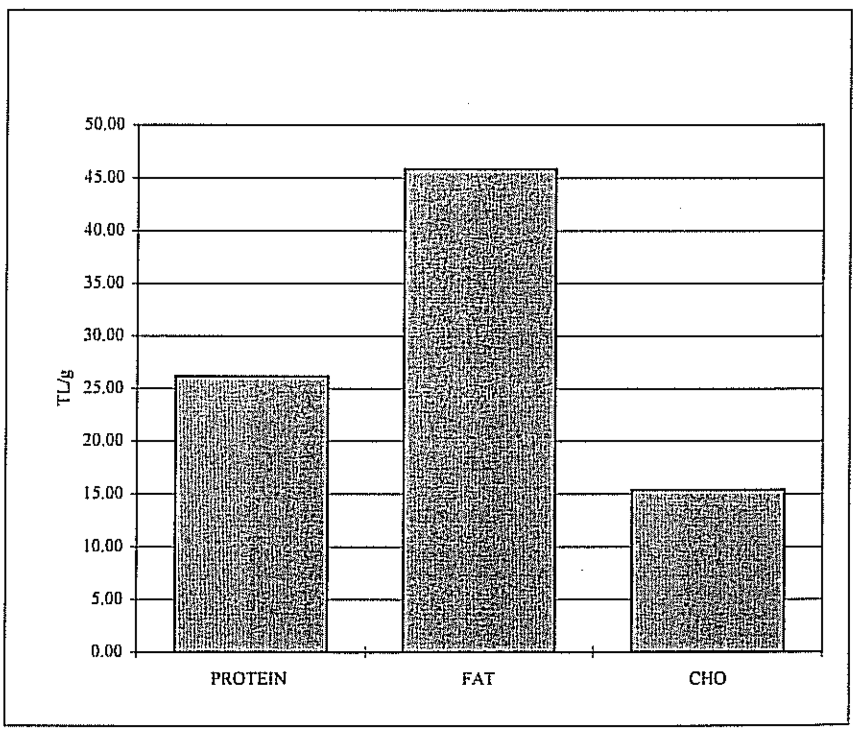


Figure 139 Price of Main Food Components in the Black Sea Region

A2

Table 1 Annual Consumption of Food Groups and Food Components in Turkey (1994 SIS Data).

FOOD GROUP	Quantity Consumed (kg/y)	Quantity of Water Consumed (kg/y)	Energy Intake (kcal/y)	Quantity of Protein Consumed (kg/y)	Quantity of Fat Consumed (kg/y)	Quantity of Carbohydrate Consumed (kg/y)
Cereal &cereal products	1,255,969	352,465	3,769,501,813	114,906	35,609	733,693
Meat	118,689	76,516	266,017,140	21,670	19,214	33
Fish	28,478	21,312	36,226,651	5,523	1,339	1
Milk & Dairy Products & Eggs	512,534	421,673	492,073,032	30,055	31,246	22,961
Fats & Oils	137,545	4,298	1,178,173,208	233	132,598	125
Fruits	665,681	639,236	387,280,513	7,872	8,092	95,680
Vegetables	1,034,916	896,736	496,574,308	23,174	2,922	104,020
Sugar & Confectioneries	161,545	6,676	612,317,702	1,102	3,563	149,367
Salt & Spices	28,510	226	6,965,179	262	376	1,143
Ready meals & Other foods	57,319	40,521	93,416,251	1,582	7,767	4,238
Beverages	310,757	279,463	25,199,542	153	140	6,021
Total	4,311,942	2,739,141	7,363,745,339	206,531	242,866	1,117,282
%		63.52		4.79	5.63	25.91

Table 2 Per Capita Daily Consumption of Food Groups and Food Components for 9974 person in Turkey.

FOOD GROUP	Quantity Consumed (g/d-pers)	Quantity of Water Consumed (g/d-pers)	Energy Consumed (kcal/d-pers)	Quantity of Protein Consumed (g/d-pers)	Quantity of Fat Consumed (g/d-pers)	Quantity of Carbohydrate Consumed (g/d pers)
Cereal &cereal products	345.00	96.82	1,035	31.56	9.78	201.54
Meat	32.60	21.02	73	5.95	5.28	0.01
Fish	7.82	5.85	10	1.52	0.37	0.00
Milk & Dairy Products & Eggs	140.79	115.83	135	8.26	8.58	6.31
Fats & Oils	37.78	1.18	324	0.06	36.42	0.03
Fruits	182.85	175.59	106	2.16	2.22	26.28
Vegetables	284.28	246.32	136	6.37	0.80	28.57
Sugar & Confectioneries	44.37	1.83	168	0.30	0.98	41.03
Salt & Spices	7.83	0.06	2	0.07	0.10	0.31
Ready meals & Other foods	15.74	11.13	26	0.43	2.13	1.16
Beverages	85.36	76.76	7	0.04	0.04	1.65
Total	1,184.43	752.41	2,023	56.73	66.71	306.90

Table 3 Annual Money Spent for Food Groups and Food Components in Turkey, 1994 Prices.

FOOD GROUP	Total Money Spent for Food Group (TL/y)	Total Money Spent for Water (TL/y)	Price of Energy (TL/kcal)	Total Money Spent for Protein (TL/y)	Total Money Spent for Fat (TL/y)	Total Money Spent for Carbohydrate (TL/y)
Cereal &cereal products	15,930,864,451	4,388,470,869	4	1,405,254,196	487,182,158	9,424,191,348
Meat	11,647,010,848	7,445,830,895	44	2,132,077,129	1,929,615,442	2,928,192
Fish	868,763,877	648,627,809	24	169,543,323	40,871,607	39,645
Milk & Dairy Products & Eggs	9,287,752,861	6,652,460,277	19	938,686,132	1,098,944,613	376,791,682
Fats & Oils	6,208,055,377	294,240,110	5	15,122,393	5,879,536,630	6,047,168
Fruits	6,684,930,186	5,512,586,846	17	216,521,707	450,572,798	1,270,233,849
Vegetables	10,101,889,073	8,315,600,212	20	369,305,115	37,064,389	1,283,469,431
Sugar & Confectioneries	4,354,487,928	329,366,403	7	66,717,197	240,753,985	3,672,987,436
Salt & Spices	345,521,993	14,466,523	50	20,290,121	29,021,199	102,724,500
Ready meals & Other foods	2,721,824,955	1,821,904,456	29	81,605,275	408,375,926	251,084,519
Beverages	3,616,489,343	1,154,733,580	144	6,414,630	3,634,026	160,344,155
Total	71,767,590,892	36,578,287,980	10	5,421,537,218	10,605,572,772	16,550,841,926
%		50.968		7.554	14.778	23.062

Table 4 Price of Food Groups and Food Components in Turkey.

FOOD GROUP	Price of Food Group (TL/kg)	Price of Water (TL/g)	Price of Energy (TL/kcal)	Price of Protein (TL/g)	Price of Fat (TL/g)	Price of Carbohydrate (TL/g)
Cereal &cereal products	12,684	12.45	4	12.23	13.68	12.84
Meat	98,131	97.31	44	98.39	100.43	88.86
Fish	30,506	30.43	24	30.70	30.53	53.19
Milk & Dairy Products & Eggs	18,121	15.78	19	31.23	35.17	16.41
Fats & Oils	45,135	68.46	5	64.93	44.34	48.50
Fruits	10,042	8.62	17	27.50	55.68	13.28
Vegetables	9,761	9.27	20	15.94	12.68	12.34
Sugar & Confectioneries	26,955	49.33	7	60.56	67.57	24.59
Salt & Spices	12,119	64.10	50	77.54	77.23	89.87
Ready meals & Other foods	47,485	44.96	29	51.59	52.58	59.25
Beverages	11,638	4.13	144	41.91	26.00	26.63
Total	16,644	13.35	10	26.25	43.67	14.81

Table 5 : Annual Consumption of Food Groups and Food Components in the Marmara Region (1994 SIS Data).

FOOD GROUP	Quantity Consumed (kg/y)	Quantity of Water Consumed (kg/y)	Energy Intake (kcal/y)	Quantity of Protein Consumed (kg/y)	Quantity of Fat Consumed (kg/y)	Quantity of Carbohydrate Consumed (kg/y)
Cereal &cereal products	170,982.86	47,843.30	514,247,341.61	15,558.87	4,887.15	100,077.19
Meat	17,515.33	11,589.66	35,939,636.18	3,289.67	2,422.61	6.66
Fish	7,724.07	5,779.02	9,769,993.23	1,487.93	377.06	0.00
Milk & Dairy Products & Eggs	79,129.93	64,943.33	78,088,603.40	4,669.28	5,078.34	3,338.80
Fats & Oils	22,395.88	666.84	191,693,638.95	35.91	21,613.45	25.03
Fruits	92,915.55	78,508.00	54,891,880.06	933.84	1,018.99	12,002.38
Vegetables	137,869.15	118,264.04	70,921,755.25	3,361.17	396.61	14,754.89
Sugar & Confectioneries	26,384.76	973.80	100,218,160.87	153.84	514.24	24,639.13
Salt & Spices	4,103.27	20.72	527,641.18	19.24	25.63	90.62
Ready meals & Other foods	7,832.48	5,458.93	13,439,046.02	233.63	1,088.94	674.11
Beverages	68,148.33	63,490.31	5,083,713.95	15.11	10.63	1,271.12
Total	635,001.62	397,537.95	1,074,821,410.71	29,758.47	37,433.65	156,879.91
%		62.60		4.69	5.90	24.71

Table 6 : Per Capita Daily Consumption of Food Groups and Food Components for 1389 person in the Marmara Region.

FOOD GROUP	Quantity Consumed (g/d-pers)	Quantity of Water Consumed (g/d-pers)	Energy Consumed (kcal/d-pers)	Quantity of Protein Consumed (g/d-pers)	Quantity of Fat Consumed (g/d-pers)	Quantity of Carbohydrate Consumed (g/d-pers)
Cereal &cereal products	337.25	94.37	1,014.32	30.69	9.64	197.40
Meat	34.55	22.86	70.89	6.49	4.78	0.01
Fish	15.24	11.40	19.27	2.93	0.74	0.00
Milk & Dairy Products & Eggs	156.08	128.10	154.03	9.21	10.02	6.59
Fats & Oils	44.17	1.32	378.11	0.07	42.63	0.05
Fruits	183.27	154.85	108.27	1.84	2.01	23.67
Vegetables	271.94	233.27	139.89	6.63	0.78	29.10
Sugar & Confectioneries	52.04	1.92	197.67	0.30	1.01	48.60
Salt & Spices	8.09	0.04	1.04	0.04	0.05	0.18
Ready meals & Other foods	15.45	10.77	26.51	0.46	2.15	1.33
Beverages	134.42	125.23	10.03	0.03	0.02	2.51
Total	1,252.51	784.12	2,120.03	58.70	73.84	309.44

Table 7 : Annual Money Spent for Food Groups and Food Components in the Marmara Region, 1994 prices

FOOD GROUP	Total Money Spent for Food Group (TL/y)	Total Money Spent for Water (TL/y)	Price of Energy (TL/kcal)	Total Money Spent for Protein (TL/y)	Total Money Spent for Fat (TL/y)	Total Money Spent for Carbohydrate (TL/y)
Cereal &cereal products	2,532,544,234	697,170,254	5	222,179,430	79,972,343	1,496,539,477
Meat	1,895,267,726	1,238,364,996	53	356,433,461	274,322,521	818,063
Fish	198,246,197	147,452,848	20	39,307,586	8,829,522	0
Milk & Dairy Products & Eggs	1,772,943,815	1,246,586,603	23	183,375,616	226,425,542	66,401,895
Fats & Oils	857,483,257	40,519,351	4	2,115,407	811,174,728	1,170,169
Fruits	1,100,527,495	818,581,142	20	27,645,099	61,658,145	183,799,491
Vegetables	1,584,541,223	1,273,677,778	22	66,668,933	6,260,100	221,699,805
Sugar & Confectioneries	713,943,655	54,538,746	7	11,549,914	43,127,847	598,073,098
Salt & Spices	48,495,169	1,217,540	92	1,699,703	2,002,601	8,189,357
Ready meals & Other foods	462,334,842	293,003,001	34	17,573,545	70,786,328	51,506,112
Beverages	617,445,335	274,490,124	121	1,148,210	634,602	32,019,957
Total	11,783,772,948	6,085,602,383	11	929,696,903	1,585,194,278	2,660,217,426
%		51.644		7.890	13.452	22.575

Table 8 : Price of Food Groups and Food Components in the Marmara Region.

FOOD GROUP	Price of Food Group (TL/kg)	Price of Water (TL/g)	Price of Energy (TL/kcal)	Price of Protein (TL/g)	Price of Fat (TL/g)	Price of Carbohydrate (TL/g)
Cereal &cereal products	14,812	14.57	5	14.28	16.36	14.95
Meat	108,206	106.85	53	108.35	113.23	122.86
Fish	25,666	25.52	20	26.42	23.42	#DIV/0!
Milk & Dairy Products & Eggs	22,405	19.19	23	39.27	44.59	19.89
Fats & Oils	38,288	60.76	4	58.91	37.53	46.76
Fruits	11,844	10.43	20	29.60	60.51	15.31
Vegetables	11,493	10.77	22	19.84	15.78	15.03
Sugar & Confectioneries	27,059	56.01	7	75.08	83.87	24.27
Salt & Spices	11,819	58.77	92	88.34	78.12	90.37
Ready meals & Other foods	59,028	53.67	34	75.22	65.01	76.41
Beverages	9,060	4.32	121	75.98	59.67	25.19
Total	18,557	15.31	11	31.24	42.35	16.96

Table 9 : Annual Consumption of Food Groups and Food Components in the Agean Region (1994 SIS Data).

FOOD GROUP	Quantity Consumed (kg/y)	Quantity of Water Consumed (kg/y)	Energy Intake (kcal/y)	Quantity of Protein Consumed (kg/y)	Quantity of Fat Consumed (kg/y)	Quantity of Carbohydrate Consumed (kg/y)
Cereal &cereal products	121,379.10	34,885.58	361,841,493.24	11,000.58	3,578.43	70,041.40
Meat	13,473.54	8,961.57	27,482,653.23	2,509.71	1,857.11	3.01
Fish	2,566.65	1,877.78	3,533,967.71	499.93	154.23	0.58
Milk & Dairy Products & Eggs	57,737.09	45,967.33	63,661,471.68	3,835.03	4,013.41	3,002.91
Fats & Oils	15,158.76	474.22	129,365,789.12	25.63	14,600.20	18.43
Fruits	104,305.94	88,980.42	58,880,323.37	1,176.24	1,128.69	12,533.10
Vegetables	126,685.62	110,519.50	58,049,351.07	2,747.23	396.92	12,053.88
Sugar & Confectioneries	20,301.47	695.64	77,333,747.87	125.20	392.30	19,006.18
Salt & Spices	3,032.47	20.72	814,397.98	28.59	55.44	82.68
Ready meals & Other foods	6,037.44	4,314.47	9,604,840.26	157.43	780.74	432.34
Beverages	15,447.54	11,870.14	3,278,232.67	8.44	5.18	824.11
Total	486,125.62	308,567.36	793,846,268.21	22,114.00	26,962.64	117,998.63
%		63.47		4.55	5.55	24.27

Table 10 : Per Capita Daily Consumption of Food Groups and Food Components for 1026 person in the Agean Region.

FOOD GROUP	Quantity Consumed (g/d-pers)	Quantity of Water Consumed (g/d-pers)	Energy Consumed (kcal/d-pers)	Quantity of Protein Consumed (g/d-pers)	Quantity of Fat Consumed (g/d-pers)	Quantity of Carbohydrate Consumed (g/d-pers)
Cereal &cereal products	324.12	93.15	966.22	29.37	9.56	187.03
Meat	35.98	23.93	73.39	6.70	4.96	0.01
Fish	6.85	5.01	9.44	1.33	0.41	0.00
Milk & Dairy Products & Eggs	154.18	122.75	170.00	10.24	10.72	8.02
Fats & Oils	40.48	1.27	345.45	0.07	38.99	0.05
Fruits	278.53	237.60	157.23	3.14	3.01	33.47
Vegetables	338.29	295.12	155.01	7.34	1.06	32.19
Sugar & Confectioneries	54.21	1.86	206.50	0.33	1.05	50.75
Salt & Spices	8.10	0.06	2.17	0.08	0.15	0.22
Ready meals & Other foods	16.12	11.52	25.65	0.42	2.08	1.15
Beverages	41.25	31.70	8.75	0.02	0.01	2.20
Total	1,298.10	823.97	2,119.81	59.05	72.00	315.09

Table 11 : Annual Money Spent for Food Groups and Food Components in the Agean Region, 1994 Prices.

FOOD GROUP	Total Money Spent for Food Group (TL/y)	Total Money Spent for Water (TL/y)	Price of Energy (TL/kcal)	Total Money Spent for Protein (TL/y)	Total Money Spent for Fat (TL/y)	Total Money Spent for Carbohydrate (TL/y)
Cereal &cereal products	1,594,893,649	448,026,208	4	138,906,599	51,905,660	933,647,518
Meat	1,405,919,826	924,886,471	51	262,001,487	201,962,589	388,211
Fish	102,427,950	76,166,401	27	19,801,674	5,359,433	20,942
Milk & Dairy Products & Eggs	1,209,030,214	825,938,119	19	131,429,658	152,798,274	62,240,835
Fats & Oils	682,988,828	28,489,778	5	1,500,318	650,172,165	896,724
Fruits	941,486,361	693,766,456	16	30,288,177	50,673,436	159,027,605
Vegetables	1,237,717,840	1,016,494,647	21	46,191,304	4,982,147	157,742,440
Sugar & Confectioneries	507,860,841	37,770,391	7	7,583,264	27,171,846	430,982,959
Salt & Spices	30,833,900	1,446,502	38	1,626,813	2,463,897	5,983,373
Ready meals & Other foods	214,218,182	132,645,856	22	7,724,914	28,324,984	29,691,668
Beverages	432,578,559	152,344,095	132	789,799	397,137	21,786,236
Total	8,359,956,150	4,337,974,924	11	647,844,006	1,176,211,568	1,802,408,512
%		51,890		7,749	14,070	21,560

Table 12 : Price of Food Groups and Food Components in the Agean Region.

FOOD GROUP	Price of Food Group (TL/kg)	Price of Water (TL/g)	Price of Energy (TL/kcal)	Price of Protein (TL/g)	Price of Fat (TL/g)	Price of Carbohydrate (TL/g)
Cereal &cereal products	13,140	12.84	4	12.63	14.51	13.33
Meat	104,347	103.21	51	104.40	108.75	128.80
Fish	39,907	40.56	27	39.61	34.75	36.27
Milk & Dairy Products & Eggs	20,940	17.97	19	34.27	38.07	20.73
Fats & Oils	45,056	60.08	5	58.54	44.53	48.65
Fruits	9,026	7.80	16	25.75	44.90	12.69
Vegetables	9,770	9.20	21	16.81	12.55	13.09
Sugar & Confectioneries	25,016	54.30	7	60.57	69.26	22.68
Salt & Spices	10,168	69.82	38	56.89	44.44	72.36
Ready meals & Other foods	35,482	30.74	22	49.07	36.28	68.68
Beverages	28,003	12.83	132	93.62	76.74	26.44
Total	17,197	14.06	11	29.30	43.62	15.27

Table 13 : Annual Consumption of Food Groups and Food Components in the Mediterannean Region (1994 SIS Data).

FOOD GROUP	Quantity Consumed (kg/y)	Quantity of Water Consumed (kg/y)	Energy Intake (kcal/y)	Quantity of Protein Consumed (kg/y)	Quantity of Fat Consumed (kg/y)	Quantity of Carbohydrate Consumed (kg/y)
Cereal &cereal products	179,662	48,409	546,283,222	16,518	4,954	107,127
Meat	17,763	11,636	38,089,124	3,272	2,672	7
Fish	2,381	1,800	2,917,099	453	109	0
Milk & Dairy Products & Eggs	83,351	68,729	78,021,935	4,906	4,819	3,696
Fats & Oils	21,426	614	183,784,698	33	20,715	20
Fruits	111,705	94,955	62,682,848	1,088	934	14,224
Vegetables	178,660	155,591	82,794,796	4,021	540	17,171
Sugar & Confectioneries	29,093	1,648	108,537,342	197	627	26,477
Salt & Spices	5,335	49	1,578,041	60	82	248
Ready meals & Other foods	9,059	6,515	14,847,032	222	1,263	631
Beverages	11,588	6,706	3,438,924	9	6	860
Total	650,021.64	396,652.40	1,122,975,062.32	30,779.61	36,721.25	170,460.95
%		61.02		4.74	5.65	26.22

Table 14: Per Capita Daily Consumption of Food Groups and Food Components for 1463 person in the Mediterannean Region.

FOOD GROUP	Quantity Consumed (g/d-pers)	Quantity of Water Consumed (g/d-pers)	Energy Consumed (kcal/d-pers)	Quantity of Protein Consumed (g/d-pers)	Quantity of Fat Consumed (g/d-pers)	Quantity of Carbohydrate Consumed (g/d-pers)
Cereal &cereal products	336.45	90.65	1,023.01	30.93	9.28	200.61
Meat	33.26	21.79	71.33	6.13	5.00	0.01
Fish	4.46	3.37	5.46	0.85	0.20	0.00
Milk & Dairy Products & Eggs	156.09	128.71	146.11	9.19	9.02	6.92
Fats & Oils	40.12	1.15	344.17	0.06	38.79	0.04
Fruits	209.19	177.82	117.38	2.04	1.75	26.64
Vegetables	334.57	291.37	155.05	7.53	1.01	32.16
Sugar & Confectioneries	54.48	3.09	203.26	0.37	1.17	49.58
Salt & Spices	9.99	0.09	2.96	0.11	0.15	0.47
Ready meals & Other foods	16.96	12.20	27.80	0.42	2.37	1.18
Beverages	21.70	12.56	6.44	0.02	0.01	1.61
Total	1,217.28	742.80	2,102.97	57.64	68.77	319.22

Table 15: Annual Money Spent for Food Groups and Food Components in the Mediterannean Region, 1994 Prices.

FOOD GROUP	Total Money Spent for Food Group (TL/y)	Total Money Spent for Water (TL/y)	Price of Energy (TL/kcal)	Total Money Spent for Protein (TL/y)	Total Money Spent for Fat (TL/y)	Total Money Spent for Carbohydrate (TL/y)
Cereal &cereal products	2,466,607,708	693,066,139.48	5	214,599,619.17	77,020,988.47	1,446,904,543.94
Meat	1,675,343,747	1,086,163,695.56	44	308,712,510.64	261,638,942.82	481,252.25
Fish	99,955,600	75,712,943.80	34	18,822,822.94	4,817,024.82	1,820.00
Milk & Dairy Products & Eggs	1,372,266,125	975,762,380.26	18	142,988,438.91	158,983,599.68	55,241,582.71
Fats & Oils	959,362,008	37,368,669.02	5	1,944,755.63	917,079,088.93	935,454.95
Fruits	987,028,471	741,948,998.03	16	25,790,047.24	45,603,375.97	166,347,313.99
Vegetables	1,718,124,992	1,419,424,091.96	21	63,056,330.26	6,448,226.77	213,219,527.85
Sugar & Confectioneries	710,579,804	53,872,138.86	7	9,439,520.00	33,548,962.54	607,315,546.27
Salt & Spices	53,901,551	2,518,458.21	34	3,564,011.75	4,257,305.10	15,661,456.07
Ready meals & Other foods	351,516,747	239,207,591.01	24	10,394,614.34	51,965,224.85	32,211,118.74
Beverages	534,526,442	161,253,385.98	155	895,124.02	343,546.32	26,046,415.70
Total	10,929,213,195	5,486,298,492	10	800,207,795	1,561,706,286	2,564,366,032
%		50.198		7.322	14.289	23.463

Table 16: Price of Food Groups and Food Components in the Mediterannean Region.

FOOD GROUP	Price of Food Group (TL/kg)	Price of Water (TL/g)	Price of Energy (TL/kcal)	Price of Protein (TL/g)	Price of Fat (TL/g)	Price of Carbohydrate (TL/g)
Cereal &cereal products	13,729	14.32	5	12.99	15.55	13.51
Meat	94,319	93.34	44	94.35	97.92	71.40
Fish	41,980	42.05	34	41.58	44.28	133.33
Milk & Dairy Products & Eggs	16,464	14.20	18	29.14	32.99	14.95
Fats & Oils	44,776	60.85	5	59.11	44.27	47.14
Fruits	8,836	7.81	16	23.70	48.85	11.69
Vegetables	9,617	9.12	21	15.68	11.94	12.42
Sugar & Confectioneries	24,424	32.68	7	47.99	53.49	22.94
Salt & Spices	10,104	51.57	34	59.51	51.71	63.05
Ready meals & Other foods	38,802	36.71	24	46.76	41.14	51.08
Beverages	46,129	24.05	155	96.58	58.62	30.27
Total	16,814	13.83	10	26.00	42.53	15.04

Table 17: Annual Consumption of Food Groups and Food Components in the Central Anatolia Region (1994 SIS Data).

FOOD GROUP	Quantity Consumed (kg/y)	Quantity of Water Consumed (kg/y)	Energy Intake (kcal/y)	Quantity of Protein Consumed (kg/y)	Quantity of Fat Consumed (kg/y)	Quantity of Carbohydrate Consumed (kg/y)
Cereal &cereal products	188,280	51,995	569,066,772	17,324	5,269	110,891
Meat	19,302	12,479	42,411,031	3,573	3,011	4
Fish	2,847	2,106	4,200,112	565	141	0
Milk & Dairy Products & Eggs	79,601	64,431	83,496,734	4,995	5,738	3,653
Fats & Oils	21,790	697	186,300,254	39	20,974	24
Fruits	122,610	178,849	71,902,750	2,393	2,289	26,816
Vegetables	173,482	151,714	78,063,638	3,422	472	16,595
Sugar & Confectioneries	33,015	1,339	125,255,616	223	731	30,541
Salt & Spices	4,648	44	1,326,039	51	74	289
Ready meals & Other foods	9,322	6,111	15,074,610	377	1,171	796
Beverages	161,833	155,226	4,465,399	14	7	1,118
Total	816,732	624,992	1,181,562,954	32,975	39,878	190,728
%		76.52		4.04	4.88	23.35

Table 18: Per Capita Daily Consumption of Food Groups and Food Components for 1600 person in the Central Anatolia Region.

FOOD GROUP	Quantity Consumed (g/d-pers)	Quantity of Water Consumed (g/d-pers)	Energy Consumed (kcal/d-pers)	Quantity of Protein Consumed (g/d-pers)	Quantity of Fat Consumed (g/d-pers)	Quantity of Carbohydrate Consumed (g/d-pers)
Cereal &cereal products	322.40	89.03	974.43	29.66	9.02	189.88
Meat	33.05	21.37	72.62	6.12	5.16	0.01
Fish	4.88	3.61	7.19	0.97	0.24	0.00
Milk & Dairy Products & Eggs	136.30	110.33	142.97	8.55	9.83	6.26
Fats & Oils	37.31	1.19	319.01	0.07	35.91	0.04
Fruits	209.95	306.25	123.12	4.10	3.92	45.92
Vegetables	297.06	259.78	133.67	5.86	0.81	28.42
Sugar & Confectioneries	56.53	2.29	214.48	0.38	1.25	52.30
Salt & Spices	7.96	0.08	2.27	0.09	0.13	0.49
Ready meals & Other foods	15.96	10.46	25.81	0.65	2.01	1.36
Beverages	277.11	265.80	7.65	0.02	0.01	1.91
Total	1,398.51	1,070.19	2,023.22	56.46	68.28	326.59

Table 19: Annual Money Spent for Food Groups and Food Components in the Central Anatolia Region , 1994 Prices.

FOOD GROUP	Total Money Spent for Food Group (TL/y)	Total Money Spent for Water (TL/y)	Price of Energy (TL/kcal)	Total Money Spent for Protein (TL/y)	Total Money Spent for Fat (TL/y)	Total Money Spent for Carbohydrate (TL/y)
Cereal &cereal products	2,291,523,435	623,419,489	4	203,556,319	71,230,066	1,361,752,723
Meat	1,935,820,447	1,238,742,309	46	360,370,881	309,432,898	443,512
Fish	98,523,130	72,841,348	23	19,442,585	5,012,609	16,145
Milk & Dairy Products & Eggs	1,578,217,766	1,102,328,136	19	164,966,065	222,970,925	67,898,496
Fats & Oils	1,050,104,204	47,022,903	6	2,461,340	996,922,996	1,148,323
Fruits	1,142,657,530	1,434,598,162	16	64,989,028	109,956,412	343,584,677
Vegetables	1,586,422,747	1,328,787,239	20	51,023,053	5,660,665	186,529,196
Sugar & Confectioneries	870,306,727	67,646,394	7	13,620,640	49,988,971	729,468,288
Salt & Spices	96,554,564	4,466,333	73	6,894,039	12,413,371	43,300,679
Ready meals & Other foods	435,175,691	284,196,251	29	13,791,080	65,281,216	45,365,052
Beverages	696,639,359	216,648,374	156	1,005,491	512,871	28,082,704
Total	11,781,945,600	6,420,696,939	10	902,120,522	1,849,383,001	2,807,589,795
%		54.496		7.657	15.697	23.830

Table 20: Price of Food Groups and Food Components in the Central Anatolia Region.

FOOD GROUP	Price of Food Group (TL/kg)	Price of Water (TL/g)	Price of Energy (TL/kcal)	Price of Protein (TL/g)	Price of Fat (TL/g)	Price of Carbohydrate (TL/g)
Cereal &cereal products	12,171	11.99	4	11.75	13.52	12.28
Meat	100,290	99.27	46	100.87	102.77	104.66
Fish	34,600	34.59	23	34.43	35.56	109.94
Milk & Dairy Products & Eggs	19,827	17.11	19	33.03	38.86	18.59
Fats & Oils	48,191	67.47	6	63.36	47.53	47.83
Fruits	9,319	8.02	16	27.16	48.03	12.81
Vegetables	9,145	8.76	20	14.91	12.00	11.24
Sugar & Confectioneries	26,361	50.53	7	60.95	68.34	23.88
Salt & Spices	20,774	100.60	73	135.67	168.67	149.94
Ready meals & Other foods	46,681	46.51	29	36.54	55.72	56.99
Beverages	4,305	1.40	156	72.86	68.58	25.12
Total	14,426	10.27	10	27.36	46.38	14.72

Table 21: Annual Consumption of Food Groups and Food Components in the Black Sea Region (1994 SIS Data).

FOOD GROUP	Quantity Consumed (kg/y)	Quantity of Water Consumed (kg/y)	Energy Intake (kcal/y)	Quantity of Protein Consumed (kg/y)	Quantity of Fat Consumed (kg/y)	Quantity of Carbohydrate Consumed (kg/y)
Cereal &cereal products	203,586	54,792	620,789,991	18,676	5,542	121,615
Meat	17,009	11,175	35,975,268	3,149	2,493	3
Fish	8,598	6,491	10,262,309	1,677	342	0
Milk & Dairy Products & Eggs	88,577	72,931	84,376,679	5,242	5,297	3,870
Fats & Oils	24,198	827	206,572,945	43	23,277	15
Fruits	96,049	80,438	61,910,883	1,001	1,592	12,545
Vegetables	170,365	146,576	85,878,908	3,907	465	17,989
Sugar & Confectioneries	32,458	907	124,043,006	169	525	30,747
Salt & Spices	5,619	28	865,326	31	56	98
Ready meals & Other foods	7,105	4,971	13,646,211	166	1,260	344
Beverages	13,721	9,330	3,647,121	12	9	916
Total	667,284	388,465	1,247,968,647	34,074	40,857	188,140
%		58.22		5.11	6.12	28.19

Table 22: Per Capita Daily Consumption of Food Groups and Food Components for 1498 person in the Black Sea Region.

FOOD GROUP	Quantity Consumed (g/d-pers)	Quantity of Water Consumed (g/d-pers)	Energy Consumed (kcal/d-pers)	Quantity of Protein Consumed (g/d-pers)	Quantity of Fat Consumed (g/d-pers)	Quantity of Carbohydrate Consumed (g/d-pers)
Cereal &cereal products	372.34	100.21	1,135.38	34.16	10.14	222.42
Meat	31.11	20.44	65.80	5.76	4.56	0.01
Fish	15.73	11.87	18.77	3.07	0.62	0.00
Milk & Dairy Products & Eggs	162.00	133.39	154.32	9.59	9.69	7.08
Fats & Oils	44.25	1.51	377.81	0.08	42.57	0.03
Fruits	175.67	147.11	113.23	1.83	2.91	22.94
Vegetables	311.59	268.08	157.07	7.15	0.85	32.90
Sugar & Confectioneries	59.36	1.66	226.87	0.31	0.96	56.23
Salt & Spices	10.28	0.05	1.58	0.06	0.10	0.18
Ready meals & Other foods	12.99	9.09	24.96	0.30	2.30	0.63
Beverages	25.09	17.06	6.67	0.02	0.02	1.67
Total	1,220.41	710.47	2,282.44	62.32	74.72	344.09

Table 23: Annual Money Spent for Food Groups and Food Components in the Black Sea Region, 1994 Prices.

FOOD GROUP	Total Money Spent for Food Group (TL/y)	Total Money Spent for Water (TL/y)	Price of Energy (TL/kcal)	Total Money Spent for Protein (TL/y)	Total Money Spent for Fat (TL/y)	Total Money Spent for Carbohydrate (TL/y)
Cereal &cereal products	2,694,536,015	706,702,044	4	238,721,242	79,286,026	1,633,894,603
Meat	1,695,551,840	1,104,582,631	47	314,681,513	255,405,768	263,572
Fish	245,761,000	184,276,220	24	48,233,981	10,557,289	738
Milk & Dairy Products & Eggs	1,558,849,366	1,110,347,751	18	163,167,086	183,474,252	59,049,782
Fats & Oils	1,165,930,694	65,268,859	6	3,246,425	1,095,117,665	753,042
Fruits	1,184,088,995	834,376,466	19	33,297,516	116,387,417	188,492,486
Vegetables	1,724,133,545	1,423,790,386	20	60,728,213	6,082,813	216,862,964
Sugar & Confectioneries	837,652,425	55,697,009	7	11,744,072	40,115,769	723,213,599
Salt & Spices	56,127,059	1,476,250	65	2,119,709	3,231,398	8,306,484
Ready meals & Other foods	470,494,054	301,548,657	34	13,828,393	83,410,923	42,605,367
Beverages	506,979,830	166,887,186	139	1,243,315	771,327	24,972,223
Total	12,140,104,823	5,954,953,459	10	891,011,465	1,873,840,646	2,898,414,861
%		49.052		7.339	15.435	23.875

Table 24: Price of Food Groups and Food Components in the Black Sea Region.

FOOD GROUP	Price of Food Group (TL/kg)	Price of Water (TL/g)	Price of Energy (TL/kcal)	Price of Protein (TL/g)	Price of Fat (TL/g)	Price of Carbohydrate (TL/g)
Cereal &cereal products	13,235	12.90	4	12.78	14.31	13.43
Meat	99,684	98.84	47	99.92	102.46	88.72
Fish	28,583	28.39	24	28.76	30.89	100.00
Milk & Dairy Products & Eggs	17,599	15.22	18	31.13	34.63	15.26
Fats & Oils	48,187	78.93	6	75.25	47.05	51.66
Fruits	12,328	10.37	19	33.26	73.09	15.03
Vegetables	10,120	9.71	20	15.54	13.08	12.06
Sugar & Confectioneries	25,807	61.41	7	69.42	76.44	23.52
Salt & Spices	9,988	52.09	65	68.60	57.96	85.19
Ready meals & Other foods	66,219	60.66	34	83.31	66.21	123.91
Beverages	36,950	17.89	139	102.16	88.20	27.27
Total	18,193	15.33	10	26.15	45.86	15.41

Table 25: Annual Consumption of Food Groups and Food Components in the Eastern Anatolia Region (1994 SIS Data).

FOOD GROUP	Quantity Consumed (kg/y)	Quantity of Water Consumed (kg/y)	Energy Intake (kcal/y)	Quantity of Protein Consumed (kg/y)	Quantity of Fat Consumed (kg/y)	Quantity of Carbohydrate Consumed (kg/y)
Cereal &cereal products	181,317	51,462	541,576,876	16,666	5,146	105,211
Meat	19,525	11,917	50,577,892	3,425	3,982	5
Fish	2,058	1,536	2,615,138	402	99	0
Milk & Dairy Products & Eggs	65,558	54,756	57,978,407	3,725	3,507	2,785
Fats & Oils	18,704	744	159,450,465	40	17,880	10
Fruits	66,847	56,159	40,947,899	713	753	8,904
Vegetables	133,749	115,231	66,840,285	3,010	350	14,145
Sugar & Confectioneries	14,660	603	56,242,612	141	533	13,258
Salt & Spices	2,982	22	593,156	23	27	108
Ready meals & Other foods	10,460	7,695	15,002,170	245	1,208	814
Beverages	11,646	7,399	3,659,777	72	79	689
Total	527,503	307,525	995,484,677	28,462	33,565	145,929
%		58.30		5.40	6.36	27.66

Table 26: Per Capita Daily Consumption of Food Groups and Food Components for 1497 person in the Eastern Anatolia Region.

FOOD GROUP	Quantity Consumed (g/d-pers)	Quantity of Water Consumed (g/d-pers)	Energy Consumed (kcal/d-pers)	Quantity of Protein Consumed (g/d-pers)	Quantity of Fat Consumed (g/d-pers)	Quantity of Carbohydrate Consumed (g/d-pers)
Cereal &cereal products	331.84	94.18	991.16	30.50	9.42	192.55
Meat	35.73	21.81	92.56	6.27	7.29	0.01
Fish	3.77	2.81	4.79	0.73	0.18	0.00
Milk & Dairy Products & Eggs	119.98	100.21	106.11	6.82	6.42	5.10
Fats & Oils	34.23	1.36	291.82	0.07	32.72	0.02
Fruits	122.34	102.78	74.94	1.31	1.38	16.29
Vegetables	244.78	210.89	122.33	5.51	0.64	25.89
Sugar & Confectioneries	26.83	1.10	102.93	0.26	0.97	24.26
Salt & Spices	5.46	0.04	1.09	0.04	0.05	0.20
Ready meals & Other foods	19.14	14.08	27.46	0.45	2.21	1.49
Beverages	21.31	13.54	6.70	0.13	0.14	1.26
Total	965.41	562.82	1,821.88	52.09	61.43	267.07

Table 27: Annual Money Spent for Food Groups and Food Components in the Eastern Anatolia Region 1994 Prices.

FOOD GROUP	Total Money Spent for Food Group (TL/y)	Total Money Spent for Water (TL/y)	Price of Energy (TL/kcal)	Total Money Spent for Protein (TL/y)	Total Money Spent for Fat (TL/y)	Total Money Spent for Carbohydrate (TL/y)
Cereal &cereal products	2,367,692,219	656,785,045	4	211,901,793	70,242,594	1,394,621,359
Meat	1,756,475,857	1,062,907,215	35	308,209,834	366,822,565	281,991
Fish	63,245,500	46,802,625	24	12,381,060	3,262,670	0
Milk & Dairy Products & Eggs	944,482,075	713,260,634	16	91,627,228	88,200,380	32,761,133
Fats & Oils	979,427,286	61,000,519	6	3,010,483	913,756,634	553,251
Fruits	758,950,034	534,576,777	19	25,208,978	52,762,908	139,816,274
Vegetables	1,281,740,948	1,061,866,517	19	44,360,363	4,264,720	159,954,793
Sugar & Confectioneries	512,669,976	36,779,906	9	8,193,512	34,366,506	426,219,284
Salt & Spices	29,828,950	1,396,531	50	1,864,357	2,053,049	8,888,410
Ready meals & Other foods	531,748,539	387,118,810	35	11,969,476	71,353,115	32,721,324
Beverages	429,218,718	109,899,176	117	768,031	589,063	16,225,330
Total	9,655,480,102	4,672,393,754	10	719,495,115	1,607,674,204	2,212,043,149
%		48.391		7.452	16.650	22.910

Table 28: Price of Food Groups and Food Components in the Eastern Anatolia Region.

FOOD GROUP	Price of Food Group (TL/kg)	Price of Water (TL/g)	Price of Energy (TL/kcal)	Price of Protein (TL/g)	Price of Fat (TL/g)	Price of Carbohydrate (TL/g)
Cereal &cereal products	13,058	12.76	4	12.71	13.65	13.26
Meat	89,962	89.19	35	89.98	92.11	57.92
Fish	30,732	30.46	24	30.83	32.79	0.00
Milk & Dairy Products & Eggs	14,407	13.03	16	24.60	25.15	11.76
Fats & Oils	52,363	82.04	6	74.46	51.10	55.00
Fruits	11,354	9.52	19	35.35	70.06	15.70
Vegetables	9,583	9.22	19	14.74	12.20	11.31
Sugar & Confectioneries	34,970	60.96	9	57.97	64.53	32.15
Salt & Spices	10,003	63.35	50	81.09	75.14	82.06
Ready meals & Other foods	50,838	50.31	35	48.82	59.04	40.20
Beverages	36,855	14.85	117	10.72	7.49	23.54
Total	18,304	15.19	10	25.28	47.90	15.16

Table 29: Annual Consumption of Food Groups and Food Components in the South Eastern Anatolia Region (1994 SIS Data).

FOOD GROUP	Quantity Consumed (kg/y)	Quantity of Water Consumed (kg/y)	Energy Intake (kcal/y)	Quantity of Protein Consumed (kg/y)	Quantity of Fat Consumed (kg/y)	Quantity of Carbohydrate Consumed (kg/y)
Cereal &cereal products	210,763	63,098	615,696,118	19,163	6,232	118,730
Meat	14,101	8,757	35,541,535	2,451	2,777	4
Fish	2,303	1,722	2,928,032	439	117	0
Milk & Dairy Products & Eggs	58,582	49,916	46,449,202	2,683	2,793	2,615
Fats & Oils	13,873	275	121,005,418	16	13,539	13
Fruits	71,249	61,347	36,063,930	566	376	8,657
Vegetables	114,105	98,841	54,025,575	2,705	302	11,310
Sugar & Confectioneries	5,632	510	20,687,216	92	240	4,699
Salt & Spices	2,790	41	1,260,578	49	56	227
Ready meals & Other foods	7,503	5,456	11,802,343	180	994	547
Beverages	28,373	25,440	1,626,373	23	23	343
Total	529,275	315,402	947,086,320	28,367	27,448	147,145
%		59.59		5.36	5.19	27.80

Table 30: Per Capita Daily Consumption of Food Groups and Food Components for 1502 person in the South Eastern Anatolia Region.

FOOD GROUP	Quantity Consumed (g/d-pers)	Quantity of Water Consumed (g/d-pers)	Energy Consumed (kcal/d-pers)	Quantity of Protein Consumed (g/d-pers)	Quantity of Fat Consumed (g/d-pers)	Quantity of Carbohydrate Consumed (g/d-pers)
Cereal &cereal products	384.44	115.09	1,123.06	34.95	11.37	216.57
Meat	25.72	15.97	64.83	4.47	5.06	0.01
Fish	4.20	3.14	5.34	0.80	0.21	0.00
Milk & Dairy Products & Eggs	106.86	91.05	84.73	4.89	5.09	4.77
Fats & Oils	25.31	0.50	220.72	0.03	24.70	0.02
Fruits	129.96	111.90	65.78	1.03	0.69	15.79
Vegetables	208.13	180.29	98.55	4.93	0.55	20.63
Sugar & Confectioneries	10.27	0.93	37.73	0.17	0.44	8.57
Salt & Spices	5.09	0.07	2.30	0.09	0.10	0.41
Ready meals & Other foods	13.69	9.95	21.53	0.33	1.81	1.00
Beverages	51.75	46.40	2.97	0.04	0.04	0.63
Total	965.43	575.31	1,727.53	51.74	50.07	268.40

Table 31: Annual Money Spent for Food Groups and Food Components in the South Eastern Anatolia Region, 1994 Prices.

FOOD GROUP	Total Money Spent for Food Group (TL/y)	Total Money Spent for Water (TL/y)	Price of Energy (TL/kcal)	Total Money Spent for Protein (TL/y)	Total Money Spent for Fat (TL/y)	Total Money Spent for Carbohydrate (TL/y)
Cereal &cereal products	1,983,067,191	563,301,689	3	175,389,195	57,524,482	1,156,831,124
Meat	1,282,631,405	790,183,577	36	221,667,443	260,030,159	251,591
Fish	60,604,500	45,375,424	21	11,553,613	3,033,060	0
Milk & Dairy Products & Eggs	851,963,500	678,236,655	18	61,132,041	66,091,640	33,197,958
Fats & Oils	512,759,100	14,570,031	4	843,665	495,313,353	590,203
Fruits	570,191,300	454,738,844	16	9,302,862	13,531,104	89,166,002
Vegetables	969,207,778	791,559,552	18	37,276,919	3,365,717	127,460,705
Sugar & Confectioneries	201,474,500	23,061,818	10	4,586,275	12,434,082	157,714,661
Salt & Spices	29,780,800	1,944,909	24	2,521,488	2,599,578	12,394,740
Ready meals & Other foods	256,336,900	184,184,290	22	6,323,252	37,254,134	16,983,878
Beverages	399,101,100	73,211,238	245	564,659	385,478	11,211,289
Total	7,117,118,074	3,620,368,029	8	531,161,412	951,562,789	1,605,802,151
%		50.868		7.463	13.370	22.563

Table 32: Price of Food Groups and Food Components in the South Eastern Anatolia Region.

FOOD GROUP	Price of Food Group (TL/kg)	Price of Water (TL/g)	Price of Energy (TL/kcal)	Price of Protein (TL/g)	Price of Fat (TL/g)	Price of Carbohydrate (TL/g)
Cereal &cereal products	9,409	8.93	3	9.15	9.23	9.74
Meat	90,959	90.24	36	90.44	93.65	56.35
Fish	26,319	26.35	21	26.32	26.03	0.00
Milk & Dairy Products & Eggs	14,543	13.59	18	22.79	23.67	12.69
Fats & Oils	36,960	52.97	4	52.54	36.58	46.32
Fruits	8,003	7.41	16	16.42	35.97	10.30
Vegetables	8,494	8.01	18	13.78	11.14	11.27
Sugar & Confectioneries	35,774	45.26	10	49.94	51.72	33.56
Salt & Spices	10,674	47.86	24	51.20	46.65	54.67
Ready meals & Other foods	34,164	33.76	22	35.13	37.46	31.07
Beverages	14,066	2.88	245	24.95	16.62	32.69
Total	13,447	11.48	8	18.72	34.67	10.91

A3

TURKISH FOOD COMPOSITION TABLES

Food items	Comp.of each food items(g/100g edible portion)					Assumption
	Water	Energy	Protein	Fat	Carbohydrate	
Allspice,ground	8.46	262.64	6.09	8.69	72.12	
Almonds,dry rstd,unblanched,w/salt	3.00	587.00	16.33	51.60	24.17	
Anchovy canned	50.30	210.00	28.89	9.71	0.00	
Anchovy,european,	73.37	131.00	20.35	4.84	0.00	
Apples, ,with skin	83.93	59.00	0.19	0.36	15.25	
Apples,frz,unswtnd,unhtd	86.85	48.00	0.28	0.32	12.31	
Apricots,	86.35	48.00	1.40	0.39	11.12	
Apricots,canned,h20 pk,w/skn,sol&liquids	92.36	27.00	0.71	0.16	6.39	
Apricots,dried,sulfured,unckd	31.09	238.00	3.65	0.46	61.75	
Apricots,frozen,sweetened	73.30	98.00	0.70	0.10	25.10	
Artichokes,(globe or french),	84.94	47.00	3.27	0.15	10.51	
Ayran	92.00	41.33	2.00	2.27	3.27	50% diluted yoghurt
Baby biscuit	9.40	404.00	8.80	8.30	73.50	Nestle-baby biscuit
Baby food	8.32	381.00	0.26	0.05	91.27	Starch
Bananas,	74.26	92.00	1.03	0.48	23.43	
Basil,ground	6.43	251.21	14.37	3.98	60.96	
Beans snap canned	91.83	28.00	1.43	0.11	6.63	Tat - beans snap canned
Beans snap dried	15.00	274.00	8.60	1.70	61.10	
Beans,kidney,all types,mature seeds,	11.75	333.00	23.58	0.83	60.01	
Beans,kidney,all types,mature seeds,	11.75	333.00	23.58	0.83	60.01	
Beans,kidney,all types,mature seeds,canned	77.95	81.00	5.20	0.31	14.88	
Beans,snap,green,	90.27	31.00	1.82	0.12	7.14	
Beans,white,mature seeds,	11.32	333.00	23.36	0.85	60.27	
Beef,carcass,ln&fat,choic,	57.26	291.00	17.32	24.05	0.00	
Beef,chuck,arm pot rst,ln&fat,1/4"fat,all grds	61.83	245.00	18.52	18.36	0.00	
Beef,ground,reg,(approx 27% fat),	56.06	310.00	16.62	26.55	0.00	
Beef,rib,whl (ribs 6-12),ln&fat,1/4"fat,all grds,	54.54	313.00	16.37	26.98	0.00	
Beef,shrt loin,pourterhouse steak,ln&fat,1/4"fat,choic,	60.21	258.00	17.98	20.08	0.00	
Beef,top sirloin,ln&fat,1/4"fat,all grds,	63.46	217.00	19.15	15.04	0.00	
Beef,var meats&by-products,brain,	78.28	126.00	9.80	9.28	0.00	
Beef,var meats&by-products,tripe,	81.43	98.00	14.56	3.95	0.00	
Beet greens,	92.15	19.00	1.82	0.06	3.97	
Beets,	87.58	43.00	1.61	0.17	9.56	
Biscuit - marine	8.00	418.00	6.60	7.90	85.40	
Biscuit - pasta type	2.80	462.00	5.40	16.10	74.40	
Blackberries,	85.64	52.00	.720	0.39	12.76	
Bluefish,	70.86	124.00	20.04	4.24	0.00	
Bonito, (palamut)	67.60	168.00	24.00	7.30	0.00	
Boza	50.85	178.91	3.35	0.38	42.49	Calculated, Appendix
Bread,cornbread,dry mix,prep	31.90	314.00	7.20	10.00	48.10	
Bread,italian	35.70	271.00	8.80	3.50	50.00	
Bread,milk	32.60	246.00	8.70	0.40	55.10	
Bread,rye	37.30	259.00	8.50	3.30	48.30	
Bread,wheat bran	37.80	248.00	8.80	3.40	47.80	
Bream	79.30	93.00	19.20	1.20	0.00	Seabass
Brined cheese	55.22	263.56	14.21	21.28	4.09	Cheese feta
Broadbean	81.80	72.00	5.20	0.40	9.80	
Broadbean dried	11.90	338.00	25.10	1.70	58.20	
Broth	4.00	120.00	20.00	3.00	5.00	
Bulgur,dry	9.00	342.00	12.29	1.33	75.87	
Butter,without salt	17.94	717.00	0.85	81.11	0.06	
Cabbage,common,freshly harvest,	92.52	24.00	1.21	0.18	5.37	
Cabbage,red,	91.55	27.00	1.39	0.26	6.12	
Candies,hard	1.30	373.00	0.00	0.00	98.20	
Candies,sweet chocolate	0.50	505.00	3.90	34.20	59.60	
Candy apple (elma sekeri)	67.40	121.80	0.15	0.29	31.84	Calculated, Appendix
Candy chestnuts	78.26	85.71	0.42	0.29	20.74	Calculated, Appendix
Candy w almond	2.83	565.60	14.70	46.44	31.57	Calculated, Appendix
Candy w chickpeas	10.51	364.90	17.37	5.44	64.41	Calculated, Appendix
Candy with hazelnut	1.84	633.10	9.01	59.67	25.92	Calculated, Appendix
Canned meal beans kidney	31.00	375.00	14.00	19.00	36.00	Tamek- canned meal
Canned meal beans white	39.00	350.00	13.00	20.00	28.00	Tamek-canned meal
Canned meal eggplant	72.00	190.00	2.00	15.00	11.00	Tamek-canned meal eggplant
Canned meal meat	67.00	172.14	14.52	10.09	5.34	Türkili- canned meat

Food items	Water	Energy	Protein	Fat	Carbohydrate	
Canned meal sardine fish	51.20	256.70	16.30	32.30	0.20	Dardanel- canned meal samine fish
Canned meal tunny fish	70.90	151.00	22.60	5.30	1.20	Dardanel- canned meal tunny fish
Canned meal yaprak dolmasi	61.00	221.96	3.00	13.00	23.00	Tamek- canned meal yaprak dolması
Carbonated bev,club soda	99.90	0.00	0.00	0.00	0.00	
Carbonated bev,tonic h20	91.10	34.00	0.00	0.00	8.80	
Carbonated beverage	87.60	48.00	0.00	0.00	12.30	Carbonated bev., Orange
Carbonated beverage,cola	89.40	41.00	0.00	0.00	10.40	
Carob	3.58	180.00	4.62	.650	88.88	Carob flour
Carp,	76.31	127.00	17.83	5.60	0.00	Pike
Carrots,	87.79	43.00	1.03	0.19	10.14	
Catsup	66.58	104.00	1.52	0.36	27.29	
Cauliflower,	91.91	25.00	1.98	0.21	5.20	
Caviar,black&red,granular	47.50	252.00	24.60	17.90	4.00	
Celery,	94.64	16.00	0.75	0.14	3.65	
Cereals rte,kellogg,kellogg's corn flakes	3.23	365.00	6.56	.710	86.49	
Cevizli sucuk	34.40	373.07	8.22	26.91	28.93	Calculated, Appendix
Cezerye	56.783	176.605	0.733	2.783	39.307	Calculated, Appendix
Chard,swiss,	92.66	19.00	1.80	0.20	3.74	
Cheddar cheese	36.75	402.58	24.90	33.14	1.28	
Cheese,feta	55.22	263.56	14.21	21.28	4.09	
Cherries,sour,red,	86.13	50.00	1.00	0.30	12.18	
Cherries,sour,red,canned,h20 pk,sol&liquids	89.93	36.00	0.77	0.10	8.94	
Cherries,sour,red,frz,unswtnd	87.20	46.00	0.92	0.44	11.02	
Cherries,sweet,	80.76	72.00	1.20	0.96	16.55	
Cherries,swt,canned,h20 pk,sol&liquids	87.05	46.00	0.77	0.13	11.76	
Cherries,swt,frz,swtnd	75.53	89.00	1.15	0.13	22.36	
Chestnuts,european, ,peeled	52.00	196.00	1.63	1.25	44.17	
Chewing gum	2.60	341.00	0.00	0.30	96.70	
Chicken,broilers or fryers,lt meat,meat&skn,	68.60	186.00	20.27	11.07	0.00	
Chicken,broilers or fryers,meat only,stwd	66.81	177.00	27.29	6.71	0.000	
Chicken,broilers or fryers,meat&skn,	65.99	215.00	18.60	15.06	0.000	
Chicken,capons,meat&skn,	63.24	234.00	18.77	17.07	0.000	
Chicken,gizzard,all classes,	76.19	118.00	18.19	4.19	0.58	
Chicken,liver,all classes,	73.59	125.00	17.97	3.86	0.00	
Chickpeas (garbanzo bns,bengal gm),mature seeds,	11.53	364.00	19.30	6.04	60.66	
Chickpeas flour	11.53	364.00	19.30	6.04	60.66	Chickpeas(garbanzo bns, bengal gm), mature seeds, raw
Chicory greens,	92.00	23.00	1.70	.300	4.70	
Cinnamon,ground	9.52	261.31	3.89	3.19	79.85	
Cloves,ground	6.86	322.69	5.98	20.07	61.21	
Cocoa,dry pdr,unswtnd	3.00	229.00	19.60	13.70	54.30	
Coconut meat,	46.99	354.00	3.33	33.49	15.23	
Coconut meat,	46.99	354.00	3.33	33.49	15.23	
Coffee,inst,reg,pdr	3.10	2.00	0.10	0.000	.400	
Cokelek cheese	44.00	215.00	35.00	5.60	3.20	
Concantrated fruitt juice powder	0.30	376.00	0.00	0.00	98.80	Lemonade powder
Cookies,chocolate wafers	4.50	433.00	6.60	14.20	72.40	
Corn dried	11.00	318.39	11.92	4.37	70.42	Corn with 11% water
Corn flr,whole-grain,yel	10.91	361.00	6.93	3.86	76.85	
Corn oil	0.00	884.00	0.00	100.00	0.00	
Corn,sweet,yellow,	75.96	86.00	3.22	1.18	19.02	
Cotton oil	0.00	884.00	0.00	100.00	0.00	
Cowpeas,common,mature seeds,	11.95	336.00	23.52	1.26	60.03	
Cracker	6.40	384.00	8.00	9.40	73.30	
Cracker- soda	4.00	439.00	9.20	13.10	70.60	
Crackers,rusk toast	5.50	407.00	13.50	7.20	72.30	
Crayfish,mxd sp,wild,	82.24	77.00	15.97	0.95	0.00	
Cream cheese	53.80	349.00	7.60	34.90	2.70	
Cream,fluid,hvy whipping	57.71	344.78	2.05	37.00	2.79	
Cream,whipped,crm topping,pressurized	61.33	257.31	3.20	22.22	12.49	
Cress,garden,	89.40	32.00	2.60	0.70	5.50	
Cucumber,with peel,	96.01	13.00	0.69	0.13	2.76	
Cumin seed	8.06	374.54	17.81	22.27	44.24	
Currants,red&white,	83.95	56.00	1.40	.200	13.80	
Çinekop	79.30	93.00	19.20	1.20	0.00	Seabass
Çupra	79.30	93.00	19.20	1.20	0.00	Seabass
Dark cabbage	88.00	45.00	4.00	0.30	5.00	
Dates,domestic,nat&dry	22.50	275.00	1.97	.450	73.51	
Desserts,pudd,choc,dry mix,reg	4.00	361.00	2.60	2.10	89.00	
Desserts,pudd,choc,dry mix,reg,prep w/whl milk	74.40	111.00	3.20	3.40	18.00	
Dil cheese	35.00	404.00	27.00	31.70	1.40	Kashar

Food items	Water	Energy	Protein	Fat	Carbohydrate	
Dill weed,fresh	85.95	43.00	3.46	1.12	7.02	
Dried salt meat(pastirma)	42.30	250.00	29.50	13.90	unknown	
Duck,domesticated,meat&skn,	48.50	404.00	11.49	39.34	0.00	
Duck,wild,meat&skn,	66.52	211.00	17.42	15.20	0.00	
Edirne cheese	58.80	235.00	15.40	18.20	0.80	
Egg,quail,whole,fresh,	74.35	158.44	13.05	11.09	0.41	
Egg,whl,ckd,hard-boiled	74.62	155.00	12.58	10.61	1.12	
Egg,whole, ,fresh	75.33	149.00	12.49	10.02	1.22	
Eggplant dried	13.00	286.00	13.70	2.30	49.00	
Eggplant,	92.03	26.00	1.02	0.18	6.07	
Figs,	79.11	74.00	.750	.300	19.18	
Figs,dried,uncooked	28.43	255.00	3.05	1.17	65.35	
Filberts or hazelnuts,dry rstd,unblanched,w/salt	1.90	662.00	10.01	66.30	17.89	
Filberts or hazelnuts,dry rstd,unblanched,wo/salt	1.90	662.00	10.01	66.30	17.89	
Fried meat	5.50	670.00	20.00	65.50	0.20	
Frozen cig borek	54.77	209.91	15.32	4.40	27.29	Calculated, Appendix
Frozen dssrt,ice crm,vanilla	61.00	201.00	3.50	11.00	23.60	
Frozen manti	35.50	272.00	9.90	1.60	53.00	Superfresh- frozen manti
Frozen pizza	45.00	280.00	10.70	12.70	31.60	Superfresh- king type frozen pizza
Fruit juice	87.93	47.00	0.06	0.11	11.68	Apple juc,cnd or btld,unswtnd, wo/vit c
Fruit juice concantrated	57.85	159.00	2.39	0.21	38.17	Orange juc, frz conc, unswtnd, undil
Game meat,buffalo,water,	76.30	99.00	20.39	1.37	0.000	
Game meat,rabbit,domesticated,comp of cuts,	72.82	136.00	20.05	5.55	0.00	
Garfish	79.30	93.00	19.20	1.20	0.00	Seabass
Garlic,	58.58	149.00	6.36	0.50	33.07	
Ginger,ground	9.38	346.97	9.12	5.95	70.79	
Goat,	75.84	109.00	20.60	2.31	0.00	
Goose,domesticated,meat&skn,	49.66	371.00	15.86	33.62	0.00	
Grape leaves	75.50	97.00	3.80	1.10	15.60	
Grape molasses	21.20	293.00	0.60	0.10	70.60	
Grapefruit, ,pink&red&white,all areas	90.89	32.00	.630	.100	8.08	
Grapes,american type (slip skn),	81.30	63.00	0.63	0.35	17.15	
Gruyere cheese	33.19	412.95	29.81	32.34	0.36	
Gullac	8.32	381.00	0.26	0.05	91.27	Corn starch
Honey,str or extracted	17.10	304.00	0.30	0.00	82.40	
Horse makerel	63.55	205.00	18.60	13.89	0.00	Mackerel
Horseradish-tree,pods,	88.20	37.00	2.10	0.20	8.53	
Hotchpotch canned	93.95	21.00	1.02	0.21	4.82	Tat- hotchpotch canned
Ice cream w cone	58.22	211.80	3.73	10.80	26.37	Calculated, Appendix
Icetea	4.30	2.00	0.00	0.00	.400	Tea,inst,unswtnd,lemon-flavored,pdr,prep +tea,inst,unswtnd,lemon-flavored,pdr
Jams and preserves, marmalade	29.00	272.00	0.60	0.10	70.00	
Jellies	28.40	271.00	0.40	0.10	70.80	
Jerusalem-artichokes,	78.01	76.00	2.00	0.01	17.44	
Kadayif cooked	39.90	286.00	4.30	9.10	46.70	
Kadayif not cooked	11.92	364.00	10.33	0.98	76.31	Wheat flour
Kashar cheese	35.00	404.00	27.00	31.70	1.40	
Kid meat	75.84	109.00	20.60	2.31	0.00	Goat, raw
Kiwi fruit,frsh,	83.05	61.00	0.99	0.44	14.88	
Lamb ground	59.47	282.00	16.56	23.41	0.00	Lamb,ground,raw
Lamb, dom, leg, whl (shk&sirl),ln&fat,1/4"fat,choi	64.32	230.00	17.91	17.07	0.00	
Lamb, var meats&by-products, tongue,	66.60	222.00	15.70	17.17	0.00	
Lamb,dom,comp of rtl cuts,ln&fat,1/4"fat,choic,	60.70	267.00	16.88	21.59	0.00	Lamb,dom,comp of rtl cuts,ln&fat,1/4"fat,choic,raw~
Lamb,dom,rib,ln&fat,1 8"fat,choic,	53.68	342.00	15.32	30.71	0.00	
Lamb,var meats&by-products,brain,	79.20	122.00	10.40	8.58	0.00	
Lamb,var meats&by-products,heart,	76.71	122.00	16.47	5.68	0.21	
Lamb,var meats&by-products,kidneys,	79.23	97.00	15.74	2.95	0.82	
Lamb,var meats&by-products,liver,	8.00	139.00	20.38	5.02	1.78	
Lamb,var meats&by-products,spleen,	78.15	101.00	17.20	3.10	0.00	
Large bonito	67.60	168.00	24.00	7.30	0.00	Bonito(palamut)
Large crap	71.40	193.00	14.80	14.40	0.00	Turbot
Leavening agents,baking pdr,double-acting,na al su	5.00	53.00	0.00	0.00	27.70	
Leavening agents,baking soda	0.20	0.00	0.00	0.00	0.00	
Leavening agents,yeast,baker's,active dry	7.60	295.00	38.30	4.60	38.20	
Leavening agents,yeast,baker's,compressed	69.00	105.00	8.40	1.90	18.10	
Leeks,(bulb&lower leaf-portion),	83.00	61.00	1.50	0.30	14.15	
Lemons, ,without peel	88.98	29.00	1.10	.300	9.32	

Food items	Water	Energy	Protein	Fat	Carbohydrate	
Lentil flr	11.19	338.00	28.06	0.96	57.09	Lentils, mature seeds, raw
Lentils,mature seeds,	11.19	338.00	28.06	0.96	57.09	
Lettuce,cos or romaine,	94.91	16.00	1.62	0.20	2.37	
Lettuce,iceberg (incl crisphead types),	95.89	12.00	1.01	0.19	2.09	
Linden tea	3.80	1.00	0.00	0.00	0.20	Tea
Loquats,	86.73	47.00	0.43	0.20	12.14	
Lor cheese(cheese of goat milk)	79.80	85.00	8.00	0.40	1.90	
M. kemal pasa sweet	8.00	433.00	20.70	14.00	57.30	Karpuzoğlu- m.kemal paşa sweet
Macaroni,dry,unenriched	10.25	371.00	12.78	1.58	74.69	
Mackerel,spanish,	71.67	139.00	19.29	6.30	0.000	
Mackerel,spanish,ckd,dry heat	68.46	158.00	23.59	6.32	0.000	
Mallow	86.70	47.00	4.40	0.60	4.30	
Margarine	15.70	719.00	0.90	80.50	0.90	
Meatball spice mix	8.22	320.54	12.98	16.46	53.89	Calculated, Appendix
Melons,cantaloupe,	89.78	35.00	0.88	0.28	8.36	
Milk powder	3.20	362.00	36.20	0.80	52.00	
Milk,whole,fluid,3.3% fat	87.99	61.44	3.29	3.34	4.66	
Mixed nuts	6.48	471.30	18.77	26.77	44.80	Calculated, Appendix
Mixed vegetables frozen	93.50	34.00	1.50	0.29	4.70	Superfresh -mixed vegetables
Mulberry	76.50	93.00	0.90	1.10	19.80	
Mullet,striped, , grey	77.01	117.00	19.35	3.79	0.00	
Mullet,striped, , red	77.01	117.00	19.35	3.79	0.00	
Mushrooms,	91.81	25.00	2.09	0.42	4.65	
Mussel,blue,	80.58	86.00	11.90	2.24	3.69	
Mustard	84.40	85.20	4.40	4.90	7.30	Calve- mustard
Mustard greens,	90.80	26.00	2.70	.200	4.90	
Muton retail cuts	60.70	267.00	16.88	21.59	0.00	Lamb,dom,comp of rtl cuts,ln&fat,1/4"fat,choic,raw
Muton rib	53.68	342.00	15.32	30.71	0.00	Lamb,dom,rib,1/8"fat,choic,raw
Nutmeg,ground	6.23	524.75	5.84	36.31	49.29	
Oat flr	9.00	388.00	12.00	7.50	68.00	
Okra canned	84.86	54.00	1.35	0.30	13.49	Tat- okra canned
Okra dried	18.00	266.00	17.40	2.20	56.10	
Okra,	89.58	38.00	2.00	0.10	7.63	
Olive dark	71.80	207.00	1.80	21.00	1.10	
Olive green	75.80	144.00	1.50	13.50	2.80	
Olive oil	0.00	884.00	0.00	100.00	0.00	
Onions,	89.68	38.00	1.16	0.16	8.63	
Onions,spring (incl tops&bulb),	89.83	32.00	1.83	0.19	7.34	
Oranges, ,all comm var	86.75	47.00	.940	.120	11.75	
Otlu cheese	48.40	327.00	20.10	27.30	0.50	
Pappermint ground	9.90	245.00	15.10	4.90	29.80	
Parsley,	87.71	36.00	2.97	0.79	6.33	
Partridge	69.65	192.00	19.63	12.05	0.00	Quail,meat and skin,raw
Pastry-cake	12.00	364.00	7.50	0.80	79.40	
Peaches,	87.66	43.00	.700	.090	11.10	
Peaches,canned,h20 pk,sol&liquids	93.13	24.00	0.44	0.06	6.11	
Peanut butter,smooth style,wo/salt	1.22	593.00	25.21	51.03	19.28	
Peanuts,all types,dry-roasted,w/salt	1.55	585.00	23.68	49.66	21.51	
Pears,	83.81	59.00	0.39	.400	15.11	
Peas green canned	79.00	88.00	4.70	0.40	16.80	
Peas,green,	78.86	81.00	5.42	0.40	14.46	
Pepper dried	12.00	293.00	16.00	2.60	64.00	
Pepper red paste	72.00	89.71	5.11	0.86	19.63	Calculated, Appendix
Pepper,black	10.51	255.00	10.95	3.26	64.81	
Pepper,red or cayenne	8.05	318.00	12.01	17.27	56.63	
Peppermint,fresh	78.65	70.00	3.75	0.94	14.89	
Peppers,sweet,green,	92.19	27.00	0.89	0.19	6.43	
Peppers,sweet,red,	92.19	27.00	0.89	0.19	6.43	
Pestil	57.13	174.30	3.73	1.06	36.75	Calculated, Appendix
Pickle,cucumber,sour	94.08	11.00	0.33	0.20	2.25	
Pike,northern,	78.92	88.00	19.26	0.69	0.00	
Pine nuts,pinyon,dried	5.90	629.00	11.57	60.98	19.30	
Pineapple,	86.50	49.00	0.39	0.43	12.39	
Pismaniye	59.03	116.25	0.07	3.33	37.57	Dostlar Şekerleme- pişmaniye
Pistachio nuts,dry rstd,wo/salt	2.09	606.00	14.93	52.82	27.53	
Plum dried	28.00	255.00	2.10	0.60	67.40	
Plums,	85.20	55.00	.790	.620	13.01	
Plums,canned,purple,h20 pk,sol&liquids	88.35	41.00	0.39	.010	11.03	
Pomegranates juice (nar eksisi)	90.73	25.00	.380	0.00	8.63	Lemon juice, raw

Food items	Water	Energy	Protein	Fat	Carbohydrate	
Pomegranates,	80.97	68.00	.950	.300	17.17	
Pop corn	4.00	386.00	12.70	5.00	76.70	
Popcorn,air-popped	4.10	382.00	12.00	4.20	77.90	Cin mısır
Poppy seed	6.78	533.19	18.04	44.70	23.69	
Poppy seed	6.78	533.19	18.04	44.70	23.69	
Potato chips,plain,salted	1.90	536.00	7.00	34.60	52.90	
Potatoes, ,flesh&skn	78.96	79.00	2.07	0.10	17.98	
Puff pastry(borek)	40.68	293.58	8.76	15.29	33.24	Calculated, Appendix
Pumpkin&squash seeds,whl,rstd,wo/salt	4.50	446.00	18.55	19.40	53.75	
Purslane,	93.92	16.00	1.30	0.10	3.43	
Quail,meat and skin,	69.65	192.00	19.63	12.05	0.00	
Quinces,	83.80	57.00	0.40	0.10	15.30	
Radishes,	94.84	17.00	0.60	0.54	3.59	
Radishes,white icicle,	95.37	14.00	1.10	0.10	2.63	
Raisins,seeded	16.57	296.00	2.52	0.54	78.47	
Raisins,seedless	15.42	300.00	3.22	0.46	79.13	
Raspberries,frz,red,swtnd	72.75	103.00	0.70	0.16	26.16	
Ready meal icli kofte	66.01	151.77	10.65	8.37	10.12	Calculated, Appendix
Ready meal arnavut cigeri	69.62	302.27	25.15	6.43	34.35	Calculated, Appendix
Ready meal cig kofte	36.01	278.47	11.51	8.65	42.69	Calculated, Appendix
Ready meal doner	54.28	229.29	26.09	12.20	2.83	Calculated, Appendix
Ready meal grill chicken	52.41	269.00	28.56	14.92	3.15	Chicken,broilers or fryers,meat&skin,ckd,fried,flr
Ready meal humus	60.21	164.00	8.86	2.59	27.41	Chickpeas,mature seeds,ckd,bld,w/salt
Ready meal kadinbudu koft	75.22	311.24	18.84	5.87	44.10	Calculated, Appendix
Ready meal kiymali pide	48.44	230.41	15.19	5.17	29.50	Calculated, Appendix
Ready meal kofte ekmek	59.78	164.58	11.80	4.86	18.67	Calculated, Appendix
Ready meal lahana dol	77.34	78.29	8.86	2.74	4.71	Calculated, Appendix
Ready meal midye dol	73.35	109.12	9.24	2.05	13.12	Calculated, Appendix
Ready meal patates kofte	62.73	201.91	6.33	12.11	16.76	Calculated, Appendix
Ready meal rus salatasi	70.97	180.08	2.53	1.23	23.17	Calculated, Appendix
Ready meal tarator	29.99	390.60	10.03	27.32	31.05	Calculated, Appendix
Ready meal yaprak dol	75.81	105.13	10.75	3.25	7.55	Calculated, Appendix
Rice flour,white	11.89	366.00	5.95	1.42	80.13	
Rice,white,medium-grain, ,unenr	12.89	360.00	6.61	0.58	79.34	
Roasted chickpeas	11.53	364.00	19.30	6.04	60.66	Chickpeas(garbanzo bns,bengal grn),mature seeds,raw
Rocket	90.50	33.00	3.00	0.60	3.20	
Rolls,hamburger or hotdog,pln	34.00	286.00	8.50	5.10	50.30	
Rool of bread (simit)	35.00	263.28	16.93	7.11	37.88	Wheat germ with %35 water
Rye flour,medium	9.85	354.00	9.39	1.77	77.49	
Sage,ground	7.96	314.78	10.63	12.75	60.73	
Salad drsng,mayo,soybn oil,w/salt(mayonnaise)	15.30	716.800	1.10	79.40	2.70	
Salami	29.80	450.00	23.80	38.10	1.20	
Salep	11.00	421.02	21.85	12.79	54.36	Calculated, Appendix
Salep	83.30	79.00	4.10	2.40	10.20	Calculated, Appendix
Salt,table	0.20	0.00	0.00	0.00	0.00	
Sardine	70.70	160.00	19.20	8.60	0.00	
Sargo	79.30	93.00	19.20	1.20	0.00	Seabass
Sausage (sosis)	54.00	322.00	11.30	29.40	2.40	
Sausage (sucuk)	31.90	452.00	21.40	40.80	unknown	
Sea bass	79.30	93.00	19.20	1.20	0.00	
Sekerpare cooked	37.52	260.78	4.21	2.99	54.42	Calculated, Appendix
Sekerpare not cooked	15.69	368.43	9.26	6.59	66.67	Calculated, Appendix
Semolina,unenriched	12.67	360.00	12.68	1.05	72.83	
Sesame butter,tahini,from rstd&tstd krnls (most cor	3.05	595.00	17.00	53.76	21.19	
Sesame sd krnls,tstd,wo/salt (decort)	5.00	567.00	16.96	48.00	26.04	
Shad,american,	68.19	197.00	16.93	13.77	0.000	
Sheat fish	78.92	88.00	19.26	0.69	0.00	
Sheep brain	79.20	122.00	10.40	8.58	0.00	Lamb,var meats&by-products,brain,raw
Shortening,household,lard&veg oil	0.00	900.00	0.00	100.00	0.00	
Shrimp,mixed species,	75.86	106.00	20.31	1.73	.910	
Silver atherine	79.30	93.00	19.20	1.20	0.00	Seabream
Soup w cream dry powder	17.84	244.16	6.01	8.20	36.88	
Soup w/o cream dry powder	8.00	219.00	7.00	1.00	45.40	Tomato soup
Soybean oil	0.00	884.00	0.00	100.00	0.00	
Spinach,	91.58	22.00	2.86	0.35	3.50	
Squash summer dried	13.00	285.00	14.10	3.60	60.60	Calculated, Appendix
Squash winter sweet(kabak tatlisi)	76.55	97.61	1.20	2.79	18.73	Calculated, Appendix
Squash,smmr,crookneck&straightneck,	94.20	19.00	.940	.240	4.04	
Squash,winter,hubbard,	88.00	40.00	2.00	0.50	8.70	

Food items	Water	Energy	Protein	Fat	Carbohydrate	
Squid,mixed species,	78.55	92.00	15.58	1.38	3.08	
St berries,	91.57	30.00	.610	.370	7.02	
St berries,canned,hvy syrup pk,sol&liquids	75.35	92.00	0.56	0.26	23.53	
St berries,frz,unswtnd	89.97	35.00	0.43	0.11	9.13	
Starch	8.32	381.00	0.26	0.05	91.27	
Sturgeon,mxd sp,	76.55	105.00	16.14	4.04	0.000	
Suet	0.00	758.00	4.70	81.80	0.00	
Sugars	0.50	385.00	0.00	0.00	99.50	
Sugars,powdered	0.30	389.00	0.00	0.10	99.50	
Sunflower oil	0.00	884.00	0.00	100.00	0.00	
Sunflower seed	4.80	560.00	24.00	47.30	19.90	
Sweet made of dough	56.80	211.00	2.40	7.60	33.20	Hanım göbeği sweet
Swordfish,	75.62	121.00	19.80	4.01	0.000	
Tahini halva	1.50	516.00	10.50	28.00	53.50	
Tail fat	0.00	902.00	0.00	100.00	0.00	
Tangerines,(mandarin oranges),	87.60	44.00	.630	.190	11.19	
Tarhana	10.40	316.00	12.20	4.40	56.40	
Tea	3.80	1.00	0.00	0.00	0.20	
Thyme,fresh	65.11	101.00	5.56	1.68	24.45	
Thyme,ground	7.79	276.18	9.11	7.43	63.94	
Tomato canned	93.75	19.58	0.93	0.28	4.29	Nieman, Nutrition, 1990
Tomato juc,canned,w/salt	93.90	17.00	0.76	0.06	4.23	
Tomato products,canned,paste,w/salt	73.80	82.00	3.67	0.55	19.30	
Tomato products,canned,puree,wo/salt	87.46	40.00	1.69	.160	9.56	
Tomatoes,red,ripe, ,year rnd average	93.76	21.00	0.85	0.33	4.64	
Toungue fish	71.40	193.00	14.80	14.40	0.00	Turbot
Trout	70.60	168.00	18.30	10.00	0.00	
Tulum cheese	35.00	382.56	20.63	30.89	5.94	Cheese feta with %35 water
Turbot,european	76.95	95.00	16.05	2.95	0.00	
Turkey,all classes,meat&skn,	70.40	160.00	20.42	8.02	0.000	
Turkish coffee	3.10	38.67	0.84	0.00	9.22	Calculated, Appendix
Turkish delight	42.00	240.00	0.00	1.00	57.00	
Turnips,	91.87	27.00	0.90	0.10	6.23	
Urfa cheese	56.40	312.00	15.20	26.50	0.20	
Vanilla extract	52.58	288.00	0.06	0.06	12.65	
Veal roast	63.64	213.00	19.72	14.29	0.00	Beef,rnd,eye of round,ln&fat,1/4"fat,all grds,raw
Veal steak	74.80	117.00	20.98	3.08	0.00	Veal,leg (top rnd),ln&fat,raw
Veal,comp of rtl cuts,ln&fat,	72.84	144.00	19.35	6.77	0.00	
Veal,cubed for stew (leg&shldr),ln,	76.39	109.00	20.27	2.50	0.00	
Veal,ground,	72.84	144.00	19.35	6.77	0.00	
Veal,rib,ln&fat,	71.15	162.00	18.86	9.01	0.00	
Veal,sirloin,ln&fat,	71.85	152.00	19.07	7.81	0.00	
Veal,var meats&by-products,brain,	79.78	118.00	10.32	8.21	0.00	
Veal,var meats&by-products,heart,	77.69	110.00	17.18	3.98	0.08	
Veal,var meats&by-products,kidneys,	79.07	99.00	15.76	3.12	0.85	
Veal,var meats&by-products,liver,	71.87	134.00	17.86	4.38	0.00	
Veal,var meats&by-products,spleen,	78.15	98.00	18.30	2.20	0.00	
Vinegar	95.00	12.00	0.00	0.00	5.00	
Vinegar,cider	93.80	14.00	0.00	0.00	5.90	
Wafer - yufka	24.60	271.00	8.90	0.50	63.90	
Walnuts,eng or persian,dried	3.65	642.00	14.29	61.87	18.34	
Water,bottled,perrier	99.90	0.00	0.00	0.00	0.00	
Watermelon,	91.51	32.00	0.62	0.43	7.18	
Wheat flr,white,all-purpose,enr,bleached	11.92	364.00	10.33	0.98	76.31	
Wheat flr,white,cake,enr	12.51	362.00	8.20	0.86	78.03	
Wheat germ,crude	11.12	360.00	23.15	9.72	51.80	
Whiting,mixed species,	80.27	90.00	18.31	1.31	0.00	
Yoghurt	88.00	62.00	3.00	3.40	4.90	
Yoghurt suzme	50.00	258.33	12.50	14.17	20.42	Yoghurt with %50 water

A4

CALCULATIONS OF FOOD COMPOSITIONS

Sample calculation	Compitions of each food items(g/100g edible portion)				
	Water	Energy	Protein	Fat	Carbohydrate
Ttt	a	b	c	d	e
X 10%	f	g	h	I	j
Y 20%	k	l	m	n	o
Z 70%					
Total	(a*0.10)+ (f*0.20)+ (k*0.70)	(b*0.10)+ (g*0.20)+ (l*0.70)	(c*0.10)+ (h*0.20)+ (m*0.70)	(d*0.10)+ (i*0.20)+ (n*0.70)	(e*0.10)+ (j*0.20)+ (o*0.70)

Sekerpare uncooked	Water	Energy	Protein	Fat	Carbohydrate
Wheat flr,white,all-purpose,enr,bleached 50%	11.92	364.00	10.33	0.98	76.31
Sugars 5%	0.50	385.00	0.00	0.00	99.50
Shortening,household,lard&veg oil 5%	0.00	900.00	0.00	100.00	0.00
Leavening agents,baking pdr,double acting,na al sulfate 2%	5.00	53.00	0.00	0.00	27.70
Egg,whole,raw,fresh 8%	75.33	149.00	12.49	10.02	1.22
Total	15.69	368.43	9.26	6.59	66.67

Sekerpare cooked	Water	Energy	Protein	Fat	Carbohydrate
Water,bottled,perrier 30.30%	99.90	0.00	0.00	0.00	0.00
Sugars 24.24%	0.50	385.00	0.00	0.00	99.50
Sekerpare 45.45%	15.69	368.43	9.26	6.59	66.67
Total	37.52	260.78	4.21	2.99	54.42

M.k.pasa cooked	Water	Energy	Protein	Fat	Carbohydrate
Water,bottled,perrier 44.44%	99.90	0.00	0.00	0.00	0.00
Sugars 37.04%	0.50	385.00	0.00	0.00	99.50
M.k.pasa 18.52 %	8.00	433.00	20.70	14.00	57.30
Total	46.06	222.80	3.83	2.59	47.47

Ice cream with cone	Water	Energy	Protein	Fat	Carbohydrate
Frozen dssrt,ice crm,vanilla 95%	61.00	201.00	3.50	11.00	23.60
Cone 5%	5.30	417.00	8.10	6.90	79.00
Total	58.22	211.80	3.73	10.80	26.37

Squash sweet	Water	Energy	Protein	Fat	Carbohydrate
Squash,wntr,acorn,ckd,bld,mshd,w o/salt 85.1 %	89.70	34.00	.670	.080	8.78
Sugars 10.5%	0.50	385.00	0.00	0.00	99.50
Walnuts,eng or persian,dried 4.4%	3.65	642.00	14.29	61.87	18.34
Total	76.55	97.61	1.20	2.79	18.73

Cezerye	Water	Energy	Protein	Fat	Carbohydrate
Sugars 35%	0.50	385.00	0.00	0.00	99.50
Water,bottled,perrier 30%	99.90	0.00	0.00	0.00	0.00
Lemons,raw,without peel 10%	88.98	29.00	1.10	.300	9.32
Carrots,raw 20%	87.79	43.00	1.03	0.19	10.14
Filberts or hazelnuts,dry rstd,unblanched,w/salt 3%	1.90	662.00	10.01	66.30	17.89
Nutmeg,ground 2%	1.90	662.00	10.01	66.30	17.89
Total	56.70	179.35	0.82	3.38	38.68

Mixed nuts	Water	Energy	Protein	Fat	Carbohydrate
Almonds,dry rstd,unblanched,w/salt 3.8%	3.00	587.00	16.33	51.60	24.17
Filberts or hazelnuts,dry rstd,unblanched,w/salt 9.3 %	1.90	662.00	10.01	66.30	17.89
Chickpeas (garbanzo bns,bengal gm),mature seeds,raw 16.3 %	11.53	364.00	19.30	6.04	60.66
Roasted chickpeas 25.7%	11.53	364.00	19.30	6.04	60.66
Peanuts,all types,dry-roasted,w/salt 18.8%	1.55	585.00	23.68	49.66	21.51
Pistachio nuts,dry rstd,wo/salt 5.1 %	2.09	606.00	14.93	52.82	27.53
Pumpkin&squash seeds,whl,rstd,wo/salt 21%	4.50	446.00	18.55	19.40	53.75
Total	6.48	471.30	18.77	26.77	44.79

Candy with hazelnuts	Water	Energy	Protein	Fat	Carbohydrate
Filberts or hazelnuts,dry rstd,unblanched,w/salt 90%	1.90	662.00	10.01	66.30	17.89
Candies,hard 10%	1.30	373.00	0.00	0.00	98.20
Total	1.84	633.10	9.01	59.67	25.92

Candy with almonds-badem sekeri	Water	Energy	Protein	Fat	Carbohydrate
Almonds,dry rstd,unblanched,w/salt 90 %	3.00	587.00	16.33	51.60	24.17
Candies, hard 10%	1.30	373.00	0.00	0.00	98.20
Total	2.83	565.60	14.70	46.44	31.57

Candy with chickpeas-leblebi sekeri	Water	Energy	Protein	Fat	Carbohydrate
Chickpeas (garbanzo bns,bengal gm),mature seeds,raw 90 %	11.53	364.00	19.30	6.04	60.66
Candies,hard 10 %	1.30	373.00	0.00	0.00	98.20
Total	10.51	364.90	17.37	5.44	64.41

candy chestnut -kestane şekeri	Water	Energy	Protein	Fat	Carbohydrate
Chestnuts,european,bld&stmd 21%	68.15	131.00	2.00	1.38	27.76
Sugars 14.9%	0.50	385.00	0.00	0.00	99.50
Vanilla extract 0.2%	52.58	288.00	0.06	0.06	12.65
Water,bottled,perrier 63.7 %	99.90	0.00	0.00	0.00	0.00
Total	78.26	85.71	0.42	0.29	20.74

Candy apple-elma şekeri	Water	Energy	Protein	Fat	Carbohydrate
Apple 80 %	83.93	59.00	0.19	0.36	15.25
Candies,hard 20%	1.30	373.00	0.00	0.00	98.20
Total	67.40	121.80	0.15	0.29	31.84

Meatball spice mix	Water	Energy	Protein	Fat	Carbohydrate
Cumin seed 20%	8.06	374.54	17.81	22.27	44.24
Pepper,red 30 %	8.05	318.00	12.01	17.27	56.63
Kiniş 25 %	8.05	318.00	12.01	17.27	56.63
Cinnamon,ground 2%	9.52	261.31	3.89	3.19	79.85
Pepper,black 3 %	10.51	255.00	10.95	3.26	64.81
Papermint 5%	9.90	245.00	15.10	4.90	29.80
Thyme,ground 5%	7.79	276.18	9.11	7.43	63.94
Pepper, cayenne 10%	8.05	318.00	12.01	17.27	56.63
Total	8.23	320.54	12.98	16.46	53.89

Filbert cream w cocoa	Water	Energy	Protein	Fat	Carbohydrate
Filberts or hazelnuts,dry rstd,unblanched,wo/salt 30%	1.90	662.00	10.01	66.30	17.89
Cocoa,dry pdr,unswtnd 10%	3.00	229.00	19.60	13.70	54.30
Sugars 40%	0.50	385.00	0.00	0.00	99.50
Milk powder 20%	3.20	362.00	36.20	0.80	52.00
Total	1.71	447.90	12.20	21.42	61.00

Bread with meatball-köfte ekmek	Water	Energy	Protein	Fat	Carbohydrate
Bread 27.47%	35.70	271.00	8.80	3.50	50.00
Veal,ground,ckd,brld28.57%	66.76	172.00	24.38	7.56	0.00
Pepper,black 2.20%	10.51	255.00	10.95	3.26	64.81
Salt,table 3.30%	0.20	0.00	0.00	0.00	0.00
Egg,whole,raw,fresh 10.99%	75.33	149.00	12.49	10.02	1.22
Parsley,raw 4.40%	87.71	36.00	2.97	0.79	6.33
Cumin seed 2.20%	8.06	374.54	17.81	22.27	44.24
Onions,ckd,bld,drnd,wo/salt 20.88%	87.86	44.00	1.36	.190	10.15
Total	59.78	164.58	11.80	4.86	18.67

Döner	Water	Energy	Protein	Fat	Carbohydrate
Veal,comp of rtl cuts,ln&fat,ckd 85 %	57.08	231.00	30.10	11.39	0.000
Salt,table 3%	0.20	0.00	0.00	0.00	0.00
Pepper,black 3%	10.51	255.00	10.95	3.26	64.81
Onions,ckd,bld,drnd,wo/salt 3%	87.86	44.00	1.36	.190	10.15
Tomato products,cnd,paste,w/salt 3%	73.80	82.00	3.67	0.55	19.30
Butter,without salt 3%	17.94	717.00	0.85	81.11	0.06
Total	54.23	229.29	26.09	12.23	2.83

Muffin with minced meat-kiymali pide	Water	Energy	Protein	Fat	Carbohydrate
Bread,italian 59 %	35.70	271.00	8.80	3.50	50.00
Veal,ground,ckd,brld 41%	66.76	172.00	24.38	7.56	0.00
Total	48.43	230.41	15.19	5.16	29.50

Canned meat	Water	Energy	Protein	Fat	Carbohydrate
Beef,rnd,eye of round,ln&fat,1/4"fat,all grds,raw~70%	63.64	213.00	19.72	14.29	0.00
Potatoes,raw,flesh&skn 19 %	78.96	79.00	2.07	0.10	17.98
Onions,ckd,bld,drnd,wo/salt 5%	87.86	44.00	1.36	.190	10.15
Tomato products,cnd,paste,w/salt 4%	73.80	82.00	3.67	0.55	19.30
Pepper,black 1%	10.51	255.00	10.95	3.26	64.81
Salt,table 1%	0.20	0.00	0.00	0.00	0.00
Total	67.00	172.14	14.52	10.09	5.34

Boza - not cooked	Water	Energy	Protein	Fat	Carbohydrate
Bulgur,dry 23.2%	9.00	342.00	12.29	1.33	75.87
Rice,white,medium-grain,raw,unenr 4.65%	12.89	360.00	6.61	0.580	79.34
Sugars 23.2%	0.50	385.00	0.00	0.00	99.50
Baker's yeast 2.32 %	69.00	105.00	8.40	1.90	18.10
Water,bottled,perrier 46.5%	99.90	0.00	0.00	0.00	0.00
Total	50.86	187.84	3.35	0.38	44.80

Boza coked (during cooking assumed that %10 sugar is converted to the alcohol; sugar :23.2-2.32 = 20.88 %)	Water	Energy	Protein	Fat	Carbohydrate
Sugars 20.88%	0.50	385.00	0.00	0.00	99.50
Total	50.85	178.91	3.35	0.38	42.49

Börek	Water	Energy	Protein	Fat	Carbohydrate
Wafer 50 %	24.60	271.00	8.90	0.50	63.90
Egg,whole,raw,fresh 15%	75.33	149.00	12.49	10.02	1.22
Cheese,feta 15 %	55.22	263.56	14.21	21.28	4.09
Shortening,household,lard&veg oil 10%	0.00	900.00	0.00	100.00	0.00
Yogurt 10%	88.00	62.00	3.00	3.40	4.90
Total	40.68	293.58	8.76	15.29	33.24

Icli köfte	Water	Energy	Protein	Fat	Carbohydrate
Bulgur,cooked 29 %	77.76	83.00	3.08	.240	18.58
Veal,ground,ckd,brld 31.7%	66.76	172.00	24.38	7.56	0.000
Pepper,red or cayenne 0.3%	8.05	318.00	12.01	17.27	56.63
Cumin seed 1.7 %	8.06	374.54	17.81	22.27	44.24
~parsley,raw~ 11.6 %	87.71	36.00	2.97	0.79	6.33
Onions,ckd,bld,drnd,wo/salt 10.4%	87.86	44.00	1.36	.190	10.15
Pine nuts,pinyon,dried 2.9 %	5.90	629.00	11.57	60.98	19.30
Currants,red&white,raw 2.9%	83.95	56.00	1.40	.200	13.80
Walnuts,eng or persian,dried 5.8%	3.65	642.00	14.29	61.87	18.34
Salt,table 1.7%	0.20	0.00	0.00	0.00	0.00
Pepper,black 1.7%	10.51	255.00	10.95	3.26	64.81
Total	66.01	151.77	10.65	8.37	10.12

Patates köfte	Water	Energy	Protein	Fat	Carbohydrate
Potatoes,bld,ckd in skn,flesh,wo/salt 59.2 %	76.98	87.00	1.87	.100	20.13
Kashar 8.9%	35.00	404.00	27.00	31.70	1.40
Shortening,household,lard&veg oil 7.4 %	0.00	900.00	0.00	100.00	0.00
Egg,whole,raw,fresh 17.7%	75.33	149.00	12.49	10.02	1.22
Wheat flr,white,all-purpose,enr,bleached 5.9%	11.92	364.00	10.33	0.98	76.31
Salt,table 0.9%	0.20	0.00	0.00	0.00	0.00
Total	62.73	201.91	6.33	12.11	16.76

Russian salad	Water	Energy	Protein	Fat	Carbohydrate
Carrots,ckd,bld,drnd,wo/salt 14.2 %	87.38	45.00	1.09	.180	10.48
Potatoes,bld,ckd in skn,flesh,wo/salt16.8%	76.98	87.00	1.87	.100	20.13
Egg,whl,ckd,hard-boiled 7.1 %	74.62	155.00	12.58	10.61	1.12
Lemons,raw,without peel 7.1 %	88.98	29.00	1.10	.300	9.32
Radishes,raw 7.1 %	94.84	17.00	0.60	0.54	3.59
Pickle,cucumber,sour 14.2%	94.08	11.00	0.33	0.20	2.25
Peas,grn,ckd,bld,drnd,wo/salt 14.2%	77.87	84.00	5.36	.220	15.64
Salt,table 1.1%	0.20	0.00	0.00	0.00	0.00
Pepper,black 0.4%	10.51	255.00	10.95	3.26	64.81
Mayonnaise 17.8%	15.70	732.00	1.10	1.70	81.50
Total	70.97	180.08	2.53	1.23	23.17

Stuffed leaves with meat- yaprak dolması	Water	Energy	Protein	Fat	Carbohydrate
Veal,ground,ckd,brld 38.7%	66.76	172.00	24.38	7.56	0.000
Grape leaves 22.2%	75.50	97.00	3.80	1.10	15.60
Rice,white,medium-grain,ckd 5.5%	68.61	130.00	2.38	.210	28.59
Onions,ckd,bld,drnd,wo/salt 13.3%	87.86	44.00	1.36	.190	10.15
Lemons,raw,without peel 7.4%	88.98	29.00	1.10	.300	9.32
Salt,table 1.1%	0.20	0.00	0.00	0.00	0.00
Pepper,black 0.7%	10.51	255.00	10.95	3.26	64.81
Water,bottled,perrier 11.1%	99.90	0.00	0.00	0.00	0.00
Total	75.81	105.13	10.75	3.25	7.55

Stuffed cabbage with meat-lahana dolması	Water	Energy	Protein	Fat	Carbohydrate
Cabbage,common,ckd,bld,drnd,w/salt 42%	93.60	22.00	1.02	.430	4.46
Veal,ground,ckd,brld 32.8%	66.76	172.00	24.38	7.56	0.000
Onions,ckd,bld,drnd,wo/salt 10.8%	87.86	44.00	1.36	.190	10.15
Tomato products,cnd,paste,w/salt 2.6%	73.80	82.00	3.67	0.55	19.30
Rice,white,medium-grain,ckd 5.7%	68.61	130.00	2.38	.210	28.59
Parsley,raw 3%	87.71	36.00	2.97	0.79	6.33
Salt,table 0.9%	0.20	0.00	0.00	0.00	0.00
Pepper,black 0.3%	10.51	255.00	10.95	3.26	64.81
Total	77.34	78.29	8.86	2.73	4.71

Stuffed mussel-midye dolma	Water	Energy	Protein	Fat	Carbohydrate
Mussel,blue,ckd,moist heat 34.3%	61.15	172.00	23.80	4.48	7.39
Onions,ckd,bld,drnd,wo/salt 20%	87.86	44.00	1.36	.190	10.15
Rice,white,medium-grain,ckd 23%	68.61	130.00	2.38	.210	28.59
Tomatoes,red,ripe,raw,year rnd average 19.7%	93.76	21.00	0.85	0.33	4.64
Pine nuts,pinyon,dried 0.5%	5.90	629.00	11.57	60.98	19.30
Currants,red&white,raw 0.5%	83.95	56.00	1.40	.200	13.80
Cinnamon,ground 0.12%	9.52	261.31	3.89	3.19	79.85
Pepper,black 0.1%	10.51	255.00	10.95	3.26	64.81
Sugars 0.7%	0.50	385.00	0.00	0.00	99.50
Salt,table 0.87%	0.20	0.00	0.00	0.00	0.00
Total	73.35	109.12	9.24	2.05	13.12

Ciğköfte	Water	Energy	Protein	Fat	Carbohydrate
Beef,ground,reg,(approx 27% fat),raw 27.6%	56.06	310.00	16.62	26.55	0.00
Bulgur,dry 55.1%	9.00	342.00	12.29	1.33	75.87
Tomato products,cnd,paste,w/salt 2.43%	73.80	82.00	3.67	0.55	19.30
Salt,table 0.44%	0.20	0.00	0.00	0.00	0.00
Pepper,black 0.22%	10.51	255.00	10.95	3.26	64.81
Cumin seed 0.22%	8.06	374.54	17.81	22.27	44.24
Cumin seed 0.22%	8.05	318.00	12.01	17.27	56.63
Water,bottled,perrier 13.78%	99.90	0.00	0.00	0.00	0.00
Total	36.05	278.08	11.54	8.17	42.64

Tarator	Water	Energy	Protein	Fat	Carbohydrate
Walnuts,eng or persian,dried 41.7%	3.65	642.00	14.29	61.87	18.34
Bread,italian 41.7%	35.70	271.00	8.80	3.50	50.00
Garlic,raw--4.2%	58.58	149.00	6.36	0.50	33.07
Lemons,raw,without peel 12.5%	88.98	29.00	1.10	.300	9.32
Total	29.99	390.60	10.03	27.32	31.05

Soup with cream	Water	Energy	Protein	Fat	Carbohydrate
Cream,fluid,hvy whipping 20%	57.71	344.78	2.05	37.00	2.79
Tomato soup 80%	8.00	219.00	7.00	1.00	45.40
Total	17.84	244.156	6.01	8.20	36.88

Kadınbudu köfte	Water	Energy	Protein	Fat	Carbohydrate
Veal,ground,ckd,brld 42.2%	66.76	172.00	24.38	7.56	0.000
Onions,ckd,bld,drnd,wo/salt 15.9%	87.86	44.00	1.36	.190	10.15
Wheat flr,white,all-purpose,enr,bleached 5.2%	11.92	364.00	10.33	0.98	76.31
Egg,whole,raw,fresh 20.6%	75.33	149.00	12.49	10.02	1.22
Rice,white,medium-grain,ckd 6.2%	68.61	130.00	2.38	.210	28.59
Pepper,black 0.4%	10.51	255.00	10.95	3.26	64.81
Salt,table 1.2%	0.20	0.00	0.00	0.00	0.00
Parsley,raw 8.2%	87.71	36.00	2.97	0.79	6.33
Total	75.22	311.24	18.84	5.87	44.10

Arnavut ciğeri	Water	Energy	Protein	Fat	Carbohydrate
Lamb,var meats&by-products,liver,ckd,brsd 66.4%	56.67	220.00	30.57	8.81	2.53
Parsley,raw 12.6%	87.71	36.00	2.97	0.79	6.33
Onions,spring (incl tops&bulb),raw 18%	89.83	32.00	1.83	0.19	7.34
Wheat flr,white,all-purpose,enr,bleached 3.98%	11.92	364.00	10.33	0.98	76.31
Salt,table 0.95%	0.20	0.00	0.00	0.00	0.00
Pepper,red or cayenne 0.32%	8.05	318.00	12.01	17.27	56.63
Total	69.62	302.27	25.15	6.43	34.35

Cevizli sucuk	Water	Energy	Protein	Fat	Carbohydrate
Walnuts,eng or persian,dried 42.5%	3.65	642.00	14.29	61.87	18.34
Pestil 57.5%	57.13	174.30	3.73	1.06	36.75
Total	34.40	373.07	8.22	26.91	28.93

Ciğ börek	Water	Energy	Protein	Fat	Carbohydrate
Wheat flr,white,all-purpose,enr,bleached 27 7%	11.92	364.00	10.33	0.98	76.31
Veal,ground,ckd,brld 44 2%	66.76	172.00	24.38	7.56	0.000
Onions,ckd,bld,drnd,wo/salt 15.5%	87.86	44.00	1.36	.190	10.15
Egg,whole,raw,fresh 5.5%	75.33	149.00	12.49	10.02	1.22
Salt,table 1.7%	0.20	0.00	0.00	0.00	0.00
Pepper,black 0.5%	10.51	255.00	10.95	3.26	64.81
Tomato products,cnd,paste,w/salt 4.9%	73.80	82.00	3.67	0.55	19.30
Total	54.77	209.91	15.32	4.40	27.29

Candy cheese -peynir sekeri	Water	Energy	Protein	Fat	Carbohydrate
Sugars 60%	0.50	385.00	0.00	0.00	99.50
Lemons,raw,without peel 10%	88.98	29.00	1.10	.300	9.32
Glucose 5%	0.50	385.00	0.00	0.00	99.50
Water,bottled,perrier 25%	99.90	0.00	0.00	0.00	0.00
Total	34.20	253.15	0.11	0.03	65.61

Pestil	Water	Energy	Protein	Fat	Carbohydrate
Mulberry 70%	76.50	93.00	0.90	1.10	19.80
Wheat flr,white,all-purpose,enr,bleached 30%	11.92	364.00	10.33	0.98	76.31
Total	57.13	174.30	3.73	1.06	36.75

Rool of bread - simit (%35 water, wheat germ)						
	Dry solid	Water	Energy	Protein	Fat	Carbohydrate
Wheat germ,crude	88.88	11.12	360.00	23.15	9.72	51.80
Rool of bread - simit (35% water, wheat germ)	65.00	35.00	65*360/88.88 =263.28	65*23.15/88.88 =16.93	65*9.72/88.88 =7.11	65*51.8/88.88 =37.88

Yogurt süzme (50% water, yogurt)						
	Dry solid	Water	Energy	Protein	Fat	Carbohydrate
Yogurt	12.00	88.00	62.00	3.00	3.40	4.90
Yogurt süzme (50% water, yogurt)	50.00	50.00	50*62/12 = 258	50*3/12 =12.5	50*3.40/12 =14.17	50*4.9/12 =20.42

Tulum cheese (35% water, feta cheese)						
	Dry solid	Water	Energy	Protein	Fat	Carbohydrate
Cheese,feta	44.78	55.22	263.56	14.21	21.28	4.09
Tulum cheese (35% water, feta cheese)	65.00	35.00	65*263.56/44.78 =382.56	65*14.21/44.78 =20.63	65*21.28/44.78 =30.89	65*4.09/44.78 =5.94

Pepper red paste (72% water, pepper swt red freeze dried)						
	Dry solid	Water	Energy	Protein	Fat	Carbohydrate
~peppers,swt,red,freeze-dried~	98.00	2.00	314.00	17.90	3.00	68.70
Pepper red paste (72% water, pepper swt red freeze dried)	28.00	72.00	28*314/98 =89.71	28*17.9/98 =5.11	3*28/98 =0.86	68.7*28/98 =19.63

Salep dry powder (11% water, salep prepared)						
	Dry solid	Water	Energy	Protein	Fat	Carbohydrate
Salep prepared	16.70	83.30	79.00	4.10	2.40	10.20
Salep dry powder (11% water, salep prepared)	89.00	11.00	79*89/16.7 =421.02	4.10*89/16.7 =21.85	2.40*89/16.7 =12.79	10.2*89/16.7 =54.36

Corn dried (11%water, corn,swt, yellow,raw)						
	Dry solid	Water	Energy	Protein	Fat	Carbohydrate
Corn,sweet,yellow,raw	24.24	75.96	86.00	3.22	1.18	19.02
Corn dried (11%water, corn,swt, yellow,raw)	89.00	11.00	86*89/24.04 = 318.39	3.22*89/24.04 =11.92	1.18*89/24.04 =4.37	19.02*89/24.04 =70.42

Ayran (%50 diluted yogurt)						
	Dry solid	Water	Energy	Protein	Fat	Carbohydrate
Yogurt	12.00	88.00	62.00	3.00	3.40	4.90
Ayran (%50 diluted yogurt)	8.00	(88+50)*100/150 =92.00	62*8/12 =41.33	3*8/12 = 2.00	3.4*8/12 =2.27	4.9*8/12 = 3.27

Squash summer dried (%13 water,squash,smmr,raw)						
	Dry solid	Water	Energy	Protein	Fat	Carbohydrate
Squash,smmr,crookneck&straightneck,raw	5.80	94.20	19.000	0.94	0.24	4.04
Squash summer dried (%13 water,squash,smmr,raw)	87.00	13.00	19*87/5.8 =285	0.94*87/5.8 =14.10	0.24*87/5.8 =3.60	4.04*87/5.8 =60.60

Turkish coffee						
	Total Soluble Solids %	Carbohydrate %	Oils %	Protein %		
Chemical composition of soluble portions of roast coffee	45.00	29.00	0.00	2.00		(Desrosier,1977)
In 45 g soluble solids		100*29/45 =9.90	0.00	100*2/45 =0.90		
	Dry solid	Water	Energy	Protein	Fat	Carbohydrate
Turkish coffee (water content of turkish coffee was assumed same as that of instant coffee, water =3.1g/100 g edible portion)	45-3.1 =41.90	3.10	(0.84*4.063)+(9.22*3.824) = 38.67	41.9*0.9/45 =0.84	0.00	41.9*9.9/45 =9.22

Density calculations for weight estimation Choi and Okos for liq food density equation (Hanbook of food engineering, pg 251, Table 2)

ρ i at T = 20°C	FORMULA	VALUE
density of protein (ρ prot)	(1.3299*POWER(10;3))-((5.184*POWER(10;-1))*20)	1319.53
density of fat (ρ fat)	(9.2559*POWER(10;2))-((4.157*POWER(10;-1))*20)	917.28
density of carbohydrate (ρ cho)	(1.5991*POWER(10;3))-((3.1046*POWER(10;-1))*20)	1592.89
density of ash (ρ ash)	(2.4238*POWER(10;3))-((2.8063*POWER(10;-1))*20)	2418.19
density of water (ρ water)		998.23
percentaue	Xi	
ρ food	1 / sum (Xi /ρi)	

Density of pudding	kg/m3 (ρi)	Xi /ρi	Xi (%)
ρ prot	1319.53	2.4251E-05	0.032
ρ fat	917.28	3.70663E-05	0.034
ρ cho	1592.89	0.000113002	0.180
ρash	2418.19	4.13533E-06	0.010
ρ water	998.23	0.000745319	0.744
ρ pudding	1082.52		

Density of catsup	kg/m3 (ρi)	Xi /ρi	Xi (%)
ρ prot	1319.53	1.15192E-05	0.015
ρ fat	917.28	3.92466E-06	0.004
ρ cho	1592.89	0.000171324	0.273
ρash	2418.19	1.75751E-05	0.043
ρ water	998.23	0.000666981	0.666
ρ catsup	1147.68		

Density of vinegar	kg/m3 (ρi)	Xi /ρi	Xi (%)
ρ prot	1319.53	0	0
ρ fat	917.28	0	0
ρ cho	1592.89	3.13895E-05	0.050
ρash	2418.19	0	0
ρ water	998.23	0.000951684	0.950
ρ vinegar	1017.22		

Density of vinegar cider	kg/m3 (ρi)	Xi /ρi	Xi (%)
ρ prot	1319.53	0	0
ρ fat	917.28	0	0
ρ cho	1592.89	3.70396E-05	0.059
ρash	2418.19	1.2406E-06	0.003
ρ water	998.23	0.000939663	0.938
ρ vinegar cider	1022.55		

Density of tomato paste	kg/m3 (ρi)	Xi /ρi	Xi (%)
ρ prot	1319.53	1.28076E-05	0.017
ρ fat	917.28	1.7443E-06	0.002
ρ cho	1592.89	6.00167E-05	0.096
ρash	2418.19	4.67292E-06	0.011
ρ water	998.23	0.000876151	0.875
ρ tomato paste	1046.69		

A5

RECEPIES

Şekerpare	g	%	RECIPE
Şekerpare (15 pieces)	750	45.45	Sarıgül (brand name)
Water,bottled,perrier	500	30.3	
Sugars	400	24.24	

Bread with meatball- köfte ekmek	g	%	RECIPE
Bread	125	27.47253	Assumed
Veal,ground,ckd,brld	130	28.57143	
Pepper,black	10	2.197802	
Salt,table	15	3.296703	
Egg,whole,raw,fresh	50	10.98901	
Parsley,raw	20	4.395604	
Cumin seed	10	2.197802	
Onions,ckd,bld,drnd,wo/salt	95	20.87912	

Boza-not cooked	g	%	RECIPE
Bulgur,dry	500	23.2	Ardakoç,B (Türk Sofrası,
Sugars	500	23.2	Alaturka Yemek ve Tatlı)
Rice,white,medium-grain,raw,unenr	100	4.65	
Baker's yeast (as big as an egg)	50	2.32	
Water,bottled,perrier	1000	46.5	

Borek	g	%	RECIPE
Wafer (3 pieces)	500	50	Ardakoç,B (Türk Sofrası,
Egg,whole,raw,fresh	150	15	Alaturka Yemek ve Tatlı)
Cheese,feta	150	15	
Shortening,household, lard&veg oil	100	10	
yoghurt (1 glass)	100	10	

Içli köfte	g	%	RECIPE
Bulgur,cooked	500	29	Ardakoç,B (Türk Sofrası,
Veal,ground,ckd,brld (500 g of minced meat + 2 spoonfull of oil)	546	31.7	Alaturka Yemek ve Tatlı)
Pepper,red or cayenne (1coffee spoonfull)	5	0.3	
Cumin seed (1coffee spoonfull)	30	1.7	
Parsley,raw (1bunch)	200	11.6	
Onions,ckd,bld,drnd,wo/salt (2 pieces)	180	10.4	
Pine nuts,pinyon,dried	50	2.9	
Currants,red&white,raw	50	2.9	
Walnuts,eng or persian,dried	100	5.8	
Salt,table	30	1.7	
Pepper,black	30	1.7	

Patates köfte	g	%	RECIPE
Potatoes,bld,ckd in skn,flesh,wo/salt	1000	59.2	Cılızoğlu, E.
Kashar	150	8.9	(Yemek Pişirme)
Shortening,household,lard&veg oil (1/2 package)	125	7.4	
Egg,whole,raw,fresh (6 pieces)	300	17.7	
Wheat flr,white,all-purpose,enr,bleached	100	5.9	
Salt,table	15	0.9	

Çiğ köfte	g	%	RECIPE
Beef,ground,reg,(approx 27% fat),raw	500	27.6	Ardakoç,B (Türk Sofrası,
Bulgur,dry	1000	55.1	Alaturka Yemek ve Tatlı)
Tomato products,cnd,paste,w/salt (1 spoonfull)	44	2.43	
Salt,table	8	0.44	
Pepper,black	4	0.22	
Cumin seed	4	0.22	
Water,bottled,perrier	250	13.78	

Tarator	g	%	RECIPE
Walnuts,eng or persian,dried	100	41.7	Ardakoç,B (Türk Sofrası,
Bread,italian	100	41.7	Alaturka Yemek ve Tatlı)
Garlic,raw (2 pieces)	10	4.2	
Lemons,raw,without peel (1/2 cup)	30	12.5	

Kadinbudu köfte	g	%	RECIPE
Veal,ground,ckd,brld (500 g of minced meat+ 12.5 g of oil)	512.5	42.2	Ardakoç,B (Türk Sofrası,
Onions,ckd,bld,drnd,wo/salt (2 onions + 12.5 g oil)	192.5	15	Alaturka Yemek ve Tatlı)
Wheat flr,white,all-purpose,enr,bleached (3 spoonfulls)	63	5.2	
Egg,whole,raw,fresh (5 pieces)	250	20.6	
Rice,white,medium-grain,ckd (2 spoonfulls of rice + 25 g water)	75	6.2	
Pepper,black	5	0.4	
Salt,table	15	1.2	
Parsley,raw	100	8.2	

Arnavut ciğer	g	%	RECIPE
Lamb,var meats&by-products,liver,ckd,brsd (1sheep liver + 200 g of olive oil)	1200	66.4	Ardakoç,B (Türk Sofrası,
Parsley,raw (1 bunch)	200	12.6	Alaturka Yemek ve Tatlı)
Onions,spring (incl tops&bulb),raw (1bunch of fresh onions + 25 g oil)	325	16.6	
Wheat flr,white,all-purpose,enr,bleached (3 spoonfulls)	63	3.98	
Salt,table	15	0.95	
Pepper,red or cayenne	5	0.32	

Çiğ börek	g	%	RECIPE
Wheat flr,white,all-purpose,enr,bleached	250	27.7	Ardakoç,B (Türk Sofrası,
Veal,ground,ckd,brld (250 g of minced meat + 150 g of oil)	400	44.2	Alaturka Yemek ve Tatlı)
Onions,ckd,bld,drnd,wo/salt (1 onion + 50 g oil)	140	15.5	
Egg,whole,raw,fresh (1 piece)	50	5.5	
Salt,table	15	1.7	
Pepper,black	5	0.55	
Tomato products,cnd,paste,w/salt (1 spoonfull)	44	4.9	

Squash sweet-kabak tatlisi	g	%	RECIPE
Squash,wntr,acorn,ckd,bld,mshd,wo/salt (1 kg squash + water)	1170	85.1	Ardakoç,B (Türk Sofrası,
Sugars (2 glass)	145	10.5	Alaturka Yemek ve Tatlı)
Walnuts,eng or persian,dried (1/2 tea cup)	60	4.4	

Candy chestnut-kestane şekeri	g	%	RECIPE
Chestnuts,european,bld&stmd	500	21.2	Ardakoç,B (Türk Sofrası,
Sugars	350	14.9	Alaturka Yemek ve Tatlı)
Vanilla extract (2 coffee spoonfull)	5	0.2	
Water,bottled,perrier	1500	63.7	

Muffin with minced meat- kiymali pide	%	RECIPE
Bread,italian	59	Assumed
Veal,ground,ckd,brld	41	

M.k.pasa cooked	%	RECIPE
Water,bottled,perrier	44.44	Karpuzoğlu (brand name)
Sugars	37.04	
M.k.pasa	18.52	

Candy with almonds- badem şekeri	%	RECIPE
Almonds,dry rstd,unblanched,w/salt	90	Assumed
Candies, hard	10	

Candy with chickpeas-leblebi şekeri	%	RECIPE
Chickpeas (garbanzo bns,bengal gm),mature seeds,raw	90	Assumed
Candies,hard	10	

Candy apple- elma şekeri	%	RECIPE
Apple	80	Assumed
Candies,hard	20	

Meatball spice mix	%	RECIPE
Cumin seed	20	Bağdat (brand name)
Pepper,red	30	
Kiniş	25	
Cinnamon,ground	2	
Pepper,black	3	
Papermint	5	
Thyme,ground	5	
Pepper, cayenne	10	

Boza - not cooked	%	RECIPE
Bulgur,dry	23.2	Ardakoç,B (Türk Sofrası,
Rice,white,medium-grain,raw,unenr	4.65	Alaturka Yemek ve Tatlı)
Sugars	23.2	
Baker's yeast	2.32	
Water,bottled,perrier	46.5	

Boza coked	%	RECIPE
Sugars (during cooking assumed that %10 sugar is converted to the alcohol; sugar :23.2-2.32 = 20.88 %)	20.88	Assumed

Sekerpare-uncooked	%	RECIPE
Wheat flr,white,all-purpose,enr,bleached	80	Sarıgül (brand name)
Sugars	5	
Shortening,household,lard&veg oil	5	
Leavening agents,baking pdr,double-acting,na al sulfate	2	
Egg,whole,raw,fresh	8	

Ice cream with cone	%	RECIPE
Frozen dssrt,ice crm,vanilla	95	Assumed
Cone	5	

Cezerye	%	RECIPE
Sugars	35	Özhicret (brand name)
Water,bottled,perrier	30	
Lemons,raw,without peel	10	
Carrots,raw	20	
Filberts or hazelnuts,dry rstd,unblanched,w/salt	3	
Nutmeg,ground	2	

Mixed nuts	%	RECIPE
Almonds,dry rstd,unblanched,w/salt	3.8	Assumed
Filberts or hazelnuts,dry rstd,unblanched,w/salt	9.3	
Chickpeas (garbanzo bns,bengal gm),mature seeds,raw	16.3	
Roasted chickpeas	25.7	
Peanuts,all types,dry-roasted,w/salt	18.8	
Pistachio nuts,dry rstd,wo/salt	5.1	
Pumpkin&squash seeds,whl,rstd,wo/salt	21	

Candy with hazelnuts-findik şekeri	%	RECIPE
Filberts or hazelnuts,dry rstd,unblanched,w/salt	90	Assumed
Candies,hard	10	

Canned meat	%	RECIPE
Beef,rnd,eye of round,ln&fat,1/4"fat,all grds,raw	70	Turkili (brand name)
Potatoes,raw,flesh&skn	19	
Onions,ckd,bld,drnd,wo/salt	5	
Tomato products,cnd,paste,w/salt	4	
Pepper,black	1	
Salt,table	1	

Cevizli sucuk	%	RECIPE
Walnuts,eng or persian,dried	42.5	Assumed
Pestil	57.5	

Candy cheese	%	RECIPE
Sugars	60	Assumed
Lemons,raw,without peel	10	
Glucose	5	
Water,bottled,perrier	25	

Pestil	%	RECIPE
Mulberry	70	Assumed
Wheat flr,white,all-purpose,enr,bleached	30	

Filbert cream w cocoa	%	RECIPE
Filberts or hazelnuts,dry rstd,unblanched,wo/salt	30	Assumed
Cocoa,dry pdr,unswtnd	10	
Sugars	40	
Milk powder	20	

Döner	%	RECIPE
Veal,comp of rtl cuts,ln&fat,ckd	85	Assumed
Salt,table	3	
Pepper,black	3	
Onions,ckd,bld,drnd, wo/salt	3	
Tomato products,cnd,paste,w/salt	3	
Butter,without salt	3	

Ayran	50% Diluted Yoghurt	**RECIPE** Assumed
Squash summer dried	Squash,Summer 13% H20	**RECIPE** Assumed
Salep (dry powder)	Salep prepared , 11% H2O	**RECIPE** Assumed
Rool of bread - simit	Wheat Germ 35 % H20	**RECIPE** Assumed
Yoghurt süzme	Yoghurt 50% H20	**RECIPE** Assumed
Tulum cheese	Feta Cheese 35% H2O	**RECIPE** Assumed

A6

FOOD GROUPS

CEREAL & CEREAL PRODUCTS
Baby biscuit
Biscuit - marine
Biscuit - pasta type
Bread,corn
Bread,milk
Bread,rools,hamburger etc...
Bread,rye
Bread,wheat bran
Bulgur
Chickpeaas flr
Chickpeas flour (humus flr)
Chocolate wafer biscuit - gofret
Corn flakes
Corn flr
Cracker
Cracker- soda
Gullac
Kadayif cooked
Kadayif not cooked
Lentil flr
M. kemal pasa sweet
Macaroni
Oat flr
Pastry-cake
Pop corn
Puff pastry(borek)
Rice
Rice flr
Rool of bread (simit)
Rusk toast (peksimet)
Rye flr
Sekerpare cooked
Sekerpare not cooked
Semolina
Squash winter sweet(kabak tatlisi)
Starch
Sweet made of dough
Tarhana
Wafer - yufka
Wheat flr
Wheat flr, cake

FATS & OILS
Butter
Corn oil
Cotton oil
Margarine
Olive oil
Shortening
Soybean oil
Suet
Sunflower oil
Tail fat

MEAT & MEAT PRODUCTS
Beef arm
Beef brain
Beef carcass
Beef ground
Beef rib
Beef sirloin
Beef steak
Beef tripe
Buffalo water
Chicken capons
Chicken gizzard
Chicken liver
Cihcken ,slaughtered, cleaned, whole
Cihcken light meat
Dried salt meat(pastirma w\ cemen)
Duck
Duck wild
Fried meat
Game meat rabit
Goat meat
Goose
Kid meat
Lamb brain
Lamb ground
Lamb heart
Lamb kidney
Lamb leg
Lamb retail cuts
Lamb rib
Lamb spleen
Lamb tongue
Muton retail cuts
Muton rib
Partridge
Quail
Salami
Sausage (sosis)
Sausage (sucuk)
Sheep brain
Sheep liver
Turkey
Veal brain
Veal cubed
Veal ground
Veal heart
Veal kidney
Veal liver
Veal retail cuts
Veal rib
Veal roast
Veal sirloin
Veal spleen
Veal steak

FISH
Anchovy
Bluefish
Bonito ,palamut
Bream
Carp
Cinekop
Cray fish
Cupra
Gar fish
Grey mullet
Horse mokerel
Large bonito
Large crap
Mackerel
Mussel
Pike
Red mullet
Sahad
Sardine
Sargo
Sea bass
Shad
Sheat fish
Sheat fish
Shrimp
Silver atherine
Squid
Sturgeon
Sword fish
Tongue fish
Trout
Turbot
Whiting fish

SUGAR & CONFECTIONERIES
Candies hard
Candy apple (elma sekeri)
Candy cheese(peynir seker)
Candy chestnuts
Candy w almond
Candy w chickpeas
Candy with hazelnut
Cevizli sucuk
Cezerye
Chewing gum
Chocolate
Chocolate wafer
Grape molasses
Hazelnut butter
Hazelnut cream w cocoa
Honey extracted
Ice cream
Ice cream w cone
Jams & marmalade
Peanut butter
Pestil
Pismaniye
Pudding prep w milk
Pudding powder
Sugar
Sugars powdered
Tahini
Tahini halva
Turkish delight

MILK & DAIRY PRODUCT &
Cheddar cheese
Cokelek cheese
Cream
Cream cheese
Creme chantilly
Dil cheese
Edirne cheese
Egg
Gruyere cheese
Kashar cheese
Lor cheese(cheese of goat milk)
Milk
Milk powder
Otlu cheese
Quail egg
Salamura
Tulum cheese
Urfa cheese
White cheese
Yogurt
Yogurt suzme

VEGETABLES
Artichoke
Beans kidney
Beans kidney canned
Beans snap
Beans snap canned
Beans snap dried
Beans white
Beet greens
Beets
Broad bean
Broadbean dried
Cabbage
Cabbage red
Carrots
Cauliflower
Celery
Chard
Chickpeas
Chicory green
Corn dried
Corn yellow
Cowpeas
Cress
Cucumber
Dark cabbage
Dillweed
Eggplant
Eggplant dried
Garlic
Grape leaves
Horseradish
Hotchpotch canned
Iceberg
Jerusalem artichoke
Leek
Lentils
Letus
Mallow
Mixed vegetables
Mushrooms
Mustard green
Okra
Okra canned
Okra dried
Onion
Onion spring
Parsley
Patatoes
Peas green
Peas green canned
Pepper dried
Peppermint green
Peppers sweet green
Poppy
Purslane

VEGETABLES
Radishes
Radishes white
Red peppers sweet
Rocket
Spinach
Squash summer
Squash summer dried
Squash winter
Tomato canned
Tomatoes
Turnips
Tymne

SALT & SPICES
Allspice
Basil
Cinnamon
Cloves
Cumin
Ginger
Meatball spice mix
Nutmeg
Papper black
Pappermint ground
Pepper red
Poppy
Salep
Salt
Sesame
Thyme

FRUITS
Almonds
Apple
Apple frozen
Apricot canned
Apricot dried
Apricot frozen
Apricots
Banana
Blackberries frozen
Carob
Cheeries, sour red
Cheeries, sweet
Cheery sour red canned
Cheery sour red frozen
Cheery sweet canned
Cheery sweet frozen
Chestnut
Coconut
Coconut meat
Currant
Dates
Figs
Figs dried
Filberts
Grapefruit
Grapes
Kiwi
Lemon
Loquats
Melons
Mixed nuts
Mulberry
Orange
Peach
Peach canned
Peanuts
Pear
Pistachionuts
Pineapple
Pinenuts
Plum
Plum dried
Plums canned
Pomegranate
Popcorn air popped
Pumpkin seed
Quince
Raisins seeded
Raisins seedless
Raspberry frozen
Roasted chicpeas
Strawberry
Strawberry canned
Strawberry frozen
Sunflower seed
Tangerine
Wallnuts
Watermelon

READY MEALS & OTHER FOODS
Anchovy canned
Baby food
Baking powder
Baking soda
Broth
Canned meal anchovy fish
Canned meal beans kidney
Canned meal beans white
Canned meal chiken stwd
Canned meal eggplant
Canned meal meat
Canned meal sardine fish
Canned meal tunny fish
Canned meal yaprak dolmasi
Catsup
Caviar
Frozen cig borek
Frozen manti
Frozen pizza
Jellies
Leavening agent active dry
Leavening agent compressed
Mayonnaise
Mustard
Olive dark
Olive green
Pepper red paste
Pickle cucumber
Potato cips
Ready meal icli kofte
Ready meal arnavut cigeri
Ready meal chickpeas cooked
Ready meal cig kofte
Ready meal doner
Ready meal egg boiled
Ready meal fish cooked
Ready meal grill chicken
Ready meal humus
Ready meal kadinbudu kofte
Ready meal kiymali pide
Ready meal kofte ekmek
Ready meal lahana dolma
Ready meal midye dolma
Ready meal patates kofte
Ready meal rus salatasi
Ready meal tarator
Ready meal yaprak dolma
Soup w cream dry powder
Soup w/o cream dry powder
Tomato paste
Tomato puree
Vanilla extract
Vinegar cider
Vinegar

BEVERAGES
Ayran
Boza
Cappuccino
Carbonated beverage
Cocoa
Coffee instant
Cola
Concantrated fruit juice powder
Fruit juice
Fruit juice concantrated
Ice tea
Lemon juice
Pomegranates juice
Sage
Salep
Soda
Tea
Tomato juice
Tonic
Turkish coffee
Water

SÖZLEŞME

TARAFLAR

MADDE 1- Bu sözleşme T.C. Orta Doğu Teknik Üniversitesi Gıda Mühendisliği Bölümü öğretim üyesi ve "Avrupa'da Gıda Tüketimi ve Kompozisyonu Verilerinin Kalite ve Uygunluğunun Geliştirilmesi (COST'99)" projesi sorumlusu Prof.Dr.Suat UNGAN ile Devlet İstatistik Enstitüsü Başkanlığı (DİE) arasında yapılmıştır. İşbu sözleşme iki sayfadan ibarettir.

HİZMET SÖZLEŞMESİNİN KONUSU

MADDE 2- DİE'nin 1994 Hanehalkı Tüketim Harcamaları Anketi'nin ekteki değişkenlerine ait tüketim harcaması verilerinin Prof.Dr.Suat UNGAN'a disket ortamında verilmesi.

MADDE 3- DİE'den alınan veriler "Avrupa'da Gıda Tüketimi ve Kompozisyonu Verilerinin Kalite ve Uygunluğunun Geliştirilmesi (COST'99) adlı proje kapsamında kullanılacaktır. Verilerin kullanıcı tarafından başka amaçla kullanılması, başkasına verilmesi, satılması DİE'nin iznine tabidir.

TARAFLARIN YÜKÜMLÜLÜKLERİ

MADDE 4- DİE, 1994 Hanehalkı Tüketim Harcamaları Anketi'nin ekte yer alan bilgilerini sözleşmenin imzalanmasından sonra Prof.Dr.Suat UNGAN'a disket ortamında verecektir.

MADDE 5- Bu hizmet karşılığında COST'99 projesi kapsamında gıda tüketimi, kompozisyonu, beslenme vb. konularda oluşturulacak tüm veri tabanlarından DİE'de yararlanacak, bu konuda daha önce hazırlanmış ve hazırlanacak rapor, makale, yayın DİE'ne gönderilecektir.

BİLDİRİM YÜKÜMLÜLÜĞÜ

MADDE 6- Sözleşme gereği yapılacak tüm bildirimler tarafların aşağıda belirtilen adreslerine taahhütlü mektupla gönderilecektir.

Prof.Dr.Suat UNGAN
ODTÜ Gıda Mühendisliği
Bölümü Öğretim Üyesi
06531, ANKARA

Devlet İstatistik Enstitüsü
Başkanlığı
Döner Sermaye İşletmesi
Necatibey Cad. No:114
06100 Yücetepe/ANKARA

İHTİLAFLAR VE UYGULANACAK HÜKÜMLER

MADDE 7- İhtilaf halinde Ankara Mahkemeleri ve İcra Daireleri yetkilidir. Hizmet sözleşmesinde hüküm bulunmayan hallerde genel hukuk hükümleri uygulanır.

MADDE 8- İşbu sözleşme 8 maddeden ibaret olup 29/4/1997 tarihinde tanzim ve imza edilmiştir. Bu sözleşme imza tarihinde yürürlüğe girer.

Mehmet Sıddık ENSARİ
Devlet İstatistik Enstitüsü Başkanı

Prof.Dr.Suat UNGAN
ODTÜ Gıda Mühendisliği
Bölümü Öğretim Üyesi

EK 2

FOOD CONSUMPTION, EXPENDITURE AND COMPOSITION DATA ANALYSIS IN TURKEY: FIBER, FATTY ACIDS, CHOLESTEROL, VITAMINS AND MINERALS

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
THE MIDDLE EAST TECHNICAL UNIVERSITY

BY

KILIÇHAN KAYNAK

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF
MASTER OF SCIENCE
IN
THE DEPARTMENT OF FOOD ENGINEERING

SEPTEMBER 1998

Approval of the Graduate School of Natural and Applied Sciences

Prof. Dr. Tayfur Öztürk
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

Prof. Dr. Faruk Bozoğlu
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Prof. Dr. Faruk Bozoğlu Co-supervisor	Prof. Dr. Suat Ungan Supervisor

Examining Committee Members

Prof. Dr. Ali Esin

Prof. Dr. Suat Ungan

Prof. Dr. Perihan Arslan

Prof. Dr. Gülden Pekcan

Prof. Dr. Levent Bayındır

ABSTRACT

FOOD CONSUMPTION, EXPENDITURE AND COMPOSITION DATA ANALYSIS IN TURKEY:
FIBER, FATTY ACIDS, CHOLESTEROL, VITAMINS AND MINERALS

Kaynak, Kılıçhan

M.S., Department of Food Engineering
Supervisor: Prof. Dr. Suat Ungan

September 1998, 148 pages

In this study, the 1994 Household Budget Survey data obtained from State Institute of Statistics was utilized to examine Turkish average per capita daily intake of fiber, fatty acids, cholesterol, vitamins and minerals. The calculated values were compared with the Recommended Dietary Allowances and Daily Reference Values. The percentage intake of each nutrient from different food groups was also analyzed.

It was observed that the country and the regional average daily intake of the nutrients specified were adequate, except some slightly "below recommended" values in iron, and calcium, and quite low values in zinc. Upon investigation, it was found out that the low zinc and iron intake was due to insufficient consumption of foods of animal origin, which are richer in these minerals. Calcium intake was supported by indeterminate water sources, especially natural springs.

Keywords: Food Consumption, Food Composition, Fiber, Fatty Acids, Cholesterol, Vitamins, Minerals

ÖZ

TÜRKİYE'DE GIDA TÜKETİM, HARCAMA VE KOMPOZİSYON VERİLERİNİN ANALİZİ: POSA, YAĞ ASİTLERİ, KOLESTEROL, VİTAMİNLER VE MİNERALLER

Kaynak, Kılıçhan

Yüksek Lisans, Gıda Mühendisliği Bölümü
Tez Yöneticisi: Prof. Dr. Suat Ungan

Eylül 1998, 148 sayfa

Bu çalışmada, Türkiye'de günlük kişi başına ortalama posa, yağ asitleri, kolesterol, vitamin ve mineral tüketimini incelemek amacıyla Devlet İstatistik Enstitüsü'nden sağlanan veriler kullanılmıştır. Hesaplanan değerler Önerilen Günlük Besin Öğeleri Tüketim Standartları ve Günlük Referans Değerleri ile karşılaştırılmıştır. Ayrıca her bir besin maddesinin yüzde olarak hangi gıda grubundan alındığı da incelenmiştir.

Belirlenen besin öğelerinin ülke ve bölge bazında ortalama günlük tüketim değerlerinin demir ve kalsiyum için önerilen değerlerin kısmen altında, çinkoda ise oldukça altında olduğu görülmekle birlikte, genelde yeterli olduğu gözlemlenmiştir. Araştırma sonuçlarına göre düşük demir ve çinko değerleri bu besin maddelerini en çok içeren hayvansal gıdaların daha az tüketilmesinden kaynaklanmaktadır. Miktarı tayin edilememekle birlikte, kalsiyum tüketimi doğal su kaynakları tarafından desteklenmektedir.

Anahtar kelimeler: Gıda Tüketimi, Gıda Kompozisyonu, Posa, Yağ Asitleri, Kolesterol, Vitaminler, Mineraller

To My Spouse Yıldız

ACKNOWLEDGMENTS

I wish to express my deepest gratitude and sincere appreciation to Prof. Dr. Suat Ungan for his guidance and insight throughout the research.

I am grateful to Prof. Dr. Faruk Bozoğlu, and Prof. Dr. Perihan Arslan for their suggestions and comments.

Special thanks go to Prof. Dr. Gülden Pekcan, for her invaluable advice and suggestions.

I would like to thank Miss Reyhan Ünsalan for her support in enduring with me the long route of this study.

I also express my thanks to Mr. Refet Turtin and all my colleagues at the State Planning Organization for their encouragement and for providing the opportunity to perform my studies.

Finally, I offer sincere thanks to my spouse Yıldız for her unshakable faith in me, and her willingness to support my endeavors.

TABLE OF CONTENTS

LIST OF FIGURES

FIGURES

CHAPTER I

INTRODUCTION

I.1. Composition of Foods

Information on the composition of foods is essential for any study in human nutrition, be it related to the provision of appropriate diets for populations or individuals either healthy or sick. In addition, there is an increasing demand for high quality and compatible food composition data to meet the needs of increased research on the relationship between diet and disease. The growing interest in the nutritional quality of foods also makes nutritional composition data on foods essential for exporting countries and the food industry. Epidemiological studies on issues related to food and nutrition depend on reliable food composition data, and there is a heightened interest in international collaboration on the content of food composition tables and nutrient databases (Castenmiller, 1996).

I.2. Food Composition Tables and Nutrient Databases

Since 1980's, considerable effort has been expended in generating and making available data on the composition of foods in Europe. There is often limited information on simple and complex foods and frequently values are imputed or calculated, or information is which the values are given. Any conversion factor used would be listed in the auxiliary data records.

Naming and descriptor systems for food items: A correct identification of a food is a prerequisite for the use, retrieval, comparison and exchange of food composition data. Very often, the common name is not enough to describe a food unambiguously and misclassification of foods may arise as a result of a food having several names. Thus, it is important to be familiar with the local and alternative names used for a food item.

I.3. National Household Surveys

One of the major sources of data on food consumption is national household surveys. Three types of household surveys have been conducted in various countries. They are the income/expenditure/budget survey, the specialized food consumption survey, and the multi-subject survey. The types of data on food consumption obtained through household inquiries vary from one type of household survey to another (FAO, 1983a).

Household Budget Surveys (HBS) are primarily concerned with providing detailed data on household income and expenditure for investigating the economic behavior of consumers and for other purposes, such as construction of cost of living indices. Household surveys collect information on food consumption only from the household sector. The non-household sector is not covered in the survey frame (FAO, 1983a).

The household surveys, which are carried out occasionally, provide information on food consumption at the household level in the country. The household surveys usually collect information from different sections of the population. As a result, they are to provide indications of the diet obtained by people living in different parts of a country, or by people of different socioeconomic groups. If the surveys are carried on through the year, they give information about seasonal variation, and they enable longer term trends to be detected and analyzed (FAO, 1983b).

Disregarding the quality of the data, food consumption data obtained through household surveys should generally give a better estimation of food consumption (provided food eaten away from home also is included), as the information is collected at the household level, which is an aggregate unit of persons actually partaking of the food consumed (FAO, 1983a).

Among the above stated methods for the assessment of dietary habits of a population, the 1994 HBS data from the State Institute of Statistics of Turkey, concerning the consumption of foods was accessible and relevant for the purposes of this study. The details of the 1994 HBS will be discussed in the next chapter.

I.4. The Idea of COST Action 99

COST is an acronym for European **CO**operation in the field of **S**cientific and **T**echnical research. In January 1995, a new action has started in the field of food science and nutrition: COST 99, research action on Food Consumption and Composition Data / EUROFOODS. Up to now, more than 20 European countries have joined this research cooperation. Turkey is one of the parties, and this study will constitute part of the requirements of this research action on Turkey's side.

COST Action 99 is a continuation of Eurofoods (established 1982) and the Eurofoods-ENFANT Project (1990-1994) of the FLAIR-Programme of the European Union and is working towards improving quality and compatibility of data on food consumption and composition in COST countries (COST99 Home Page).

I.5. Nutrition and Health

Although it is out of the direct scope of this study, in order to be able to explain the critical selection of, and the necessity for the inclusion of the appearing nutritive components, the physiological evidence, and impacts of deficiency of these particular nutrients have been included as a reference.

Nutrition is the relationship of foods to the health of the human body. Proper nutrition means that all the essential nutrients -that is, carbohydrates, fats, protein, fiber, vitamins, minerals, and water are supplied and utilized in adequate balance to maintain optimal health and well being. Nutritional deficiencies result whenever inadequate amounts of essential nutrients are provided to tissues that must function normally over a long period of time. Good nutrition is essential for normal organ development and functioning, for normal reproduction, growth, and maintenance; for optimum activity level and working efficiency; for resistance to infection and disease; and for the ability to repair bodily damage or injury.

No single substance will maintain active health. Although specific nutrients are known to be more important in the functions of certain parts of the body, even these nutrients are totally dependent upon the presence of other nutrients for their best effects. Every effort should therefore be made to attain and maintain an adequate, balanced daily intake of all the necessary nutrients throughout life (Dunne, 1990).

Knowledge of the nutrients and their functions in the body is necessary for understanding the importance of good nutrition. The six nutrients -carbohydrates, fats, protein, vitamins, minerals, and water are present in the foods we eat, and contain chemical substances that function in one or more of three ways: they furnish the body with heat and energy, they provide material for growth and repair of body tissues, and they assist in the regulation of body processes.

Processing, storage, and preparation of food may influence the nutritional value of food. Proper understanding of the nutrients and the means of balancing a diet of the foods that contain them will result in optimum health for the body and mind (Dunne, 1990). Therefore, the following sections will provide an overview of the nutrients of concern to this study.

Cellulose is the primary constituent of plant cell walls and therefore occurs in all vegetables, fruits, and legumes. Like starch, cellulose is composed of glucose units connected in long chains. Unlike starch, however, the chains do not branch, and the bonds holding the glucose units together resist digestion by human enzymes.

The hemicelluloses are the main constituent of cereal fibers. They are composed of various monosaccharide backbones with branching side chains of monosaccharides. The many backbones and side chains make the hemicelluloses a diverse group; some are soluble in water, while others are insoluble (Spiller, 1988).

All pectins consist of a backbone derived from carbohydrate with side chains of various monosaccharides. Commonly found in vegetables and fruits (especially citrus fruits and apples), pectins may be isolated and used by the food industry to thicken jelly, keep salad dressing from separating, and otherwise control texture and consistency. Pectins can perform these functions because they readily form gels in water.

When cut, the branch of a plant secretes gum from the site of the injury. Like the other fibers, gums are composed of various monosaccharides and their derivatives. Gums such as *gum arabic* are used as additives by the food industry. Similar to gums in structure, mucilages added to foods as stabilizers include *guar* and *carrageenan.*

As a nonpolysaccharide fiber, lignin has a three-dimensional structure that gives it strength. Because of its toughness, few of the foods people eat contain much lignin. It is easy to recognize as the woody parts of vegetables such as carrots or the small seeds of fruits such as strawberries (Spiller, 1988).

Scientists classify fibers in several ways. The previous paragraphs classified them according to their chemical properties. Fibers can also be classified according to their solubility in water. The effects of fibers on the body not neatly divide along the lines of solubility, but some generalization can be made.

In general, water-soluble fibers occur in higher concentrations in fruits, oats, barley, and legumes. In the body, water-soluble fibers:

(1) delay the stomach's emptying and the transit of chyme through intestines.

(2) lower blood cholesterol levels.

Water-insoluble fibers are found in higher concentrations in vegetables, wheat, and cereals. In the body, water-insoluble fibers:

(1) accelerate the transit of chyme through the intestines.

(2) increase fecal weight.

In the body, both water-soluble and water-insoluble fibers:

(1) slow starch breakdown and delay glucose absorption into the blood.

(2) are fermented by microorganisms in the digestive tract to fragments that the body can use.

These generalizations are useful, but exceptions occur. For example, water- insoluble rice bran also lowers blood cholesterol levels, and the water soluble fiber psyllium effectively promotes bowel movements.

Some researchers classify fibers according to physical properties, which are of interest because they alter GI function and nutrient absorption, thereby influencing nutrition and health. Physical properties of fibers include:

(1) *water-holding capacity* -the capacity to capture water like a sponge, swelling and increasing the bulk of the intestines' contents.

(2) *viscosity-the* capacity to form viscous, gel-like solutions.

(3) *cation-exchange capacity* -the ability to bind minerals.

(4) *bile-binding capacity* -the ability to bind bile.

(5) *fermentability -the* extent to which bacteria can ferment a fiber in the digestive tract.

In summary, fibers are not one compound, but a diverse group of compounds. They are like a basket of threads of various colors and sizes that can be used for many different projects depending on the interests of the craftsperson selecting them (Whitney, 1993).

A compound not classed as a fiber but often found with it in foods is phytic acid. Most dietary phytic acid comes from seeds such as the cereal grains. A person on a high-fiber diet may lose minerals that become bound to phytic acid and are excreted with it. (In the plant seeds phytic acid may store these minerals and hold them in plant tissue during germination) (Whitney, 1993)

To learn about the possible associations between diet and health, scientists study the incidence and distribution of diseases among populations. The findings for fiber support its benefits to health, although there are a few drawbacks to a diet high in fiber, as the following paragraphs show.

Studies of populations suggest that fiber-rich diets protect against heart disease, colon cancer, and diabetes. The protective health effects of fiber are found not in one magic food but in a *high-fiber diet.* Researchers have been unable to define a clear role for fiber alone because a rise in a person's dietary fiber intake almost invariably coincides with a fall in the person's food energy, fat, cholesterol, sugar, and salt intakes. The following paragraphs describe some of the health benefits of diets high in fiber (Spiller, 1988).

Weight control: Foods that are naturally high in fiber tend to be low in fat and simple sugars and can therefore promote weight loss by providing less food energy per bite. In addition, by slowing the rate at which food leaves the stomach and by drawing water into the GI tract, fiber-rich foods make a person feel full before taking in too much energy. One study found that people who ate high-fiber cereal for breakfast ate lower-calorie lunches than did people who ate low-fiber breakfasts.

Many weight-loss products on the market today contain bulk-inducing fibers such as methylcellulose, but buying pure fiber compounds like this is seldom necessary or advisable. One such product has been removed from the shelves because it failed to meet its label claims of helping with weight loss. To use fiber in a weight-loss plan, fresh fruits, vegetables, legumes, and whole grain foods should be selected instead of a fiber supplement. High-fiber foods not only add bulk to the diet, but also are economical and nutritious.

Improving large intestine function and health: Dietary fibers support the health of the large intestine. Their short-chain fatty acid products seem to promote salt absorption and help maintain mucosal integrity. This in turn helps the intestinal walls to bar absorption of unwanted constituents, such as bacteria. Fibers enlarge the stools, speed up transit time, and stimulate microbial digestion of absorbable products. Up to a point, transit time depends on stool weight. Water-insoluble fibers such as cellulose (as in cereal brans, fruits, and vegetables) are most important in this regard because their undigested residue, together with the microbial growth they stimulate, enlarges the stools to the greatest extent. This helps to lessen or prevent constipation.

Fibers, taken with sufficient fluids, help to prevent several GI disorders. Hemorrhoids are an example. Large, soft stools ease elimination for tile rectal muscles and reduce the pressure in the lower bowel, making it less likely that rectal veins will swell. Fiber prevents compaction of the intestinal contents, which could obstruct the appendix and permit bacteria to invade and infect it. In addition, fiber exercises the GI tract muscles so that they retain their strength and resist bulging out into pouches known as diverticula.

Preventing colon cancer: Populations consuming high-fiber diets generally have lower rates of colon cancer than similar populations consuming low-fiber diet. Fiber may prevent colon cancer by diluting,

A matter of bulk: A person who has a small capacity and eats mostly high-fiber foods may not be able to take in enough food to provide adequate energy or nutrients. The malnourished, the elderly, and children adhering to all-plant diets are especially susceptible to this problem.

Abdominal discomfort: People who increase their intakes of high-fiber foods too rapidly may experience intestinal discomfort and gas. To avoid these side effects, people should increase dietary fiber intakes gradually and be sure their fluid intakes are adequate.

Low nutrient availability: By speeding the transit of foods through the GI tract, excess fiber can limit the absorption of some nutrients. Also, insoluble fibers can bind to minerals and interfere with their absorption. When mineral intake is adequate, however, a reasonable intake of high-fiber foods does not seem to compromise mineral balance (Spiller, 1988).

Clearly, fiber is like all the nutrients in that "more" is only "better" up to a point. Too much is no better than too little. Also, fiber supplements are not as beneficial as fiber from foods; supplements are deficient of other nutrients, while foods are loaded with them. Again, the key words are balance, moderation, and variety.

Most experts seem to agree that to minimize the risks of certain diseases, people need to eat a high-carbohydrate, low-fat diet that provides sufficient fiber. There is less agreement about how much fiber to recommend. The Committee on Dietary Allowances has not established a fiber RDA; instead, the committee recommends that people obtain their fiber from fruits, vegetables, legumes, and whole-grain cereals, which provide minerals and vitamins. One source recommends from 20 to 35 grams of dietary fiber daily (Whitney, 1993). This recommendation is two to three times higher than the average intake in the United States, whereas the results of this study reveal that Turkish average is within the indicated range.

In selecting high-fiber foods, one must keep in mind the principle of variety. Some foods are rich in the kinds of fibers that lower cholesterol, while others are rich in the kinds of fibers that promote a healthy GI tract. As it may be expected by now, significant fiber contributions come from the strawberries and apple; the shredded wheat, bread, pasta, and crackers; the garbanzo beans; and the green beans (Whitney, 1993).

I.5.2. Saturated and Unsaturated Fatty Acids

The fats and oils are mostly (95 percent) triglycerides: glycerol backbones with three fatty acids attached. Fats that are fully loaded with hydrogens are saturated; fats that have double bonds are unsaturated (monounsaturated and polyunsaturated). Furthermore, the vast majority of triglycerides are mixed; that is, they contain more than one type of fatty acid.

The degree of unsaturation of fats affects health. Saturated fats eaten in foods tend to raise blood cholesterol, one of the major risk factors for heart and artery diseases. In fact a high-fat diet, especially one high in saturated fats, is the dietary factor most implicated in raising *blood* *cholesterol; dietary cholesterol* makes only a minor contribution in comparison. For this reason, health care providers advise people to control their *total* fat intakes and in particular their intakes of *saturated* fats. On the other hand, evidence seems to indicate that *monounsaturated* fats and *polyunsaturated* fats tend to lower blood cholesterol, as do low-fat diets-and that these three factors are about equally influential.

Generally speaking, vegetable and fish oils are rich in polyunsaturates, olive and canola oils are rich in monounsaturates, and the harder fats, generally animal fats, are more saturated. But not all vegetable oils are polyunsaturated. Coconut and palm oils are *saturated* even though they are of *vegetable* origin; if they are liquid, it is due to their short carbon chains. Generally, the shorter the carbon chain, and the more unsaturated a fat the more liquid it is at room temperature. Conversely, the more saturated a fat, the firmer it is. Butter is harder than margarine because butter is saturated and margarine, unsaturated; this is why people limiting their intakes of saturated fats prefer margarine. Degree of saturation also influences stability: saturated fats are less likely to become rancid (Whitney, 1993).

The triglycerides provide the body with energy. When a person dances all night, her stored triglycerides keep her moving; when a person loses his appetite, his stored triglycerides fuel much of his body's work until he can eat again. Stored fat supports many of life's activities. Stored fat also insulates the body. Fat is a poor conductor of heat, so the layer of

Researchers have debated which fatty acids should be called essential. A simple definition of an essential nutrient has already been given: it is a nutrient that the body cannot make at all or cannot make in sufficient quantities to meet physiological need. In the case of fatty acids, insisting on a clear distinction between essential and nonessential nutrients oversimplifies reality. The body can make some fatty acids only if others are supplied. Also, some may be essential only for growth or for disease prevention.

Until all have agreed on how to define essentiality, nutrition experts must be careful with their use of the term. Body cells do not possess the enzymes to make any of the omega-6 or omega-3 fatty acids from scratch; nor can they convert an omega-6 fatty acid to an omega-3 fatty acid or vice versa. They can start with the 18-carbon member of a series and make the longer fatty acids of that series, although this conversion is slowed by dietary imbalances and enzyme competition. Therefore, if a cell needs a fatty acid of either omega series, it must have either that specific fatty acid or another in that series. The conversion process is slow, so the most effective way to sustain body stores of arachidonic acid, EPA, and DHA is to obtain them directly from foods.

A deficiency of omega-6 fatty acids in the diet leads to skin lesions. A deficiency of omega-3 fatty acids leads to subtle neurological and visual problems. In addition, deficiencies of polyunsaturated fatty acids produce growth retardation, reproductive failure, skin abnormalities, and kidney and liver disorders.

People are rarely deficient in these fatty acids. Deficiencies have historically developed only in infants or hospital clients fed formulas that provided no polyunsaturated fatty acids for long times. A balanced diet that includes vegetables, or small amounts of their oils, and fish supplies the entire needed fatty acids in abundance.

Each of the fatty acids in the two omega families plays distinct roles in body systems. These fatty acids or their derivatives, hormone-like compounds known as eicosanoids, help regulate blood clot formation, blood pressure, blood lipid (including cholesterol) concentrations, the immune response, the inflammation response to injury and infection, and many other body functions (Whitney, 1993).

The preceding pages have been devoted to one of the three classes of lipids, the triglycerides, and their component parts, the fatty acids. The other two classes of lipids, the phospholipids and sterols, make up only 5 percent of the lipids in the diet, but they are nevertheless important. Among sterols, cholesterol is especially important for the examination of Turkish dietary pattern, and is briefly discussed in the following section.

I.5.3. Cholesterol

The sterols are lipid compounds with a multiple-ring structure. The most famous sterol is cholesterol. The chemical structure of cholesterol resembles a small piece of chicken wire. Other sterols have the same basic structure, but different attached side groups.

Both plant and animal foods contain sterols, but cholesterol is found only in animal foods -meat, eggs, fish, poultry, and dairy products. These foods generally are also major sources of saturated fats. Some animal foods without much total fat can also contain appreciable cholesterol.

Some people, confused about the distinction between dietary and blood cholesterol, have asked which foods contain the "good" cholesterol. "Good" cholesterol is not a type of cholesterol found in foods; "good" cholesterol refers to the way the body transports cholesterol in the blood (Whitney, 1993).

Organ meats, such as liver and kidneys, and eggs contain the most cholesterol; less is contained in cheeses and meats. Shellfish contain some chemical relatives of cholesterol, but they contain much less cholesterol than has been thought in the past.

Eggs contain just over 200 milligrams of cholesterol each, all of it in the yolks. A person on a strict low-cholesterol diet must therefore curtail the use of egg yolks. For most people who are trying to lower blood cholesterol, however, it is more effective to limit saturated fat than to limit cholesterol intake. Thus, some eggs may still be a valuable part of the diet because they are inexpensive, useful in cooking, and a source of high-quality protein. Food manufacturers have produced several low-fat, low-cholesterol egg substitutes.

The sterols include many vitally important body compounds. Among them are the bile acids, the sex hormones (such as testosterone), the adrenal hormones (such as cortisol), and vitamin D, as well as cholesterol itself.

The effects of body cholesterol may be beneficial or harmful, depending on how much is present -and where. Cholesterol forms part of the multitude of external and internal membranes that make up the cell structures. More than nine-tenths of all the body's cholesterol resides in cell membranes. Cholesterol elsewhere can serve as the starting material for synthesis of the hormones just mentioned, vitamin D, and bile. Despite popular impressions, cholesterol is a compound the body makes and uses. The raw materials that the liver uses to make cholesterol can be derived from carbohydrate, protein, or fat (Whitney, 1993).

Most people are aware that the amounts of lipids in their blood reflect their risks of heart disease. They may also know that the amounts of fats they eat may affect their susceptibility to cancer. In fact, of all the nutrients, fat is the one most often linked with diseases. Fat contributes to obesity, diabetes, cancer, hypertension, and atherosclerosis.

Most people realize that elevated blood cholesterol means trouble for the heart and arteries. Actually, the cholesterol in *foods* is not as influential in raising *blood* cholesterol as *total* fat, especially *saturated* fat. Among the most influential dietary factors that *raise* low-density lipids (LDL) are total fat, saturated fat, and a high-energy intake. If people were to make only one change in their diets, they would be wise to limit their intakes of total fat, which would moderate their energy intakes as well. A second change might be to specifically limit saturated fat. As for dietary polyunsaturated fats from fish oils (mostly omega-3 fatty acids). Specific study of omega-3 fatty acids suggests that they may delay cancer development and reduce the rate of growth and the size and number of tumors.

The American Heart Association currently recommends two to three fish meals a week. Fish are not only excellent sources of omega-3 fatty acids, but contain many other valuable nutrients. They are leaner than most other animal-protein sources and rich in many minerals (except iron) and vitamins. In an effort to improve health, people are well advised to eat fish periodically (Garrison, 1985).

I.5.4. Vitamins

All natural vitamins are organic food substances found only in living things, that is, plants and animals. Less than twenty substances have been discovered so far that are believed to be active as vitamins in human nutrition. Each of these vitamins is present in varying quantities in specific foods, and each is absolutely necessary for proper growth and maintenance of health. With a few exceptions, the body cannot synthesize vitamins; they must be supplied in the diet or in dietary supplements (Dunne, 1990).

Vitamins function with chemicals called enzymes, which have numerous essential functions within the body. Enzymes are made up of two parts: one is a protein molecule and the other is a coenzyme. This coenzyme is often a vitamin itself, or it contains one. Another possibility is that it may be a molecule manufactured from a vitamin. Enzymes are responsible for the oxidation process within the body. Oxidation begins when oxygen enters the bloodstream. Oxygen is then transported to the cells where oxidation actually takes place. Then the wastes are removed - carbon dioxide via the lungs and other waste products via the urine. Enzymes are also a major factor in biochemical processes such as growth, metabolism, cellular reproduction, and digestion. Most enzymes remain within the cell, acting as a catalyst; in other words, they initiate and speed up chemical reactions that enable other materials to continue their work. Since vitamins work on the cellular level, a lack of one or several can cause many varied symptoms (Dunne, 1990).

I.5.4.i. Vitamin A

Vitamin A is a fat-soluble nutrient that occurs in nature in two forms: preformed vitamin A and provitamin A, or carotene. Preformed vitamin A is concentrated only in certain tissues of animal products in which the animal has metabolized the carotene contained in its food into vitamin A. One of the richest natural sources of preformed vitamin A is fish-liver oil, which is classified as a food supplement. Some animal products, such as cream and butter, may contain both preformed vitamin A and carotene.

Carotene is a substance that must be converted into vitamin A before it can be utilized by the body. Carotene is abundant in carrots, from which its name is derived, but it is present in even higher concentrations in certain green leafy vegetables, such as beet greens, spinach, and broccoli. If, owing to any disorder, the body is unable to use carotene, a vitamin A deficiency may arise (Dunne, 1990).

Vitamin A aids in the growth and repair of body tissues and helps maintain smooth, soft, disease-free skin. Internally it helps protect the mucous membranes of the mouth, nose, throat, and lungs, thereby reducing susceptibility to infection. This protection also aids the mucous membranes in combating the effects of various air pollutants. The soft tissue and all linings of the digestive tract, kidneys, and bladder are also protected. In addition, vitamin A prompts the secretion of gastric juices necessary for proper digestion of proteins. Other important functions of vitamin A include the building of strong bones and teeth, the formation of rich blood, and the maintenance of good eyesight. Heavy use of the eyes for watching television and working under glaring lights require more vitamin A. It is essential in the formation of visual purple, a substance in the eye which is necessary for proper night vision.

RNA (ribonucleic acid) production is greatly enhanced by vitamin A. RNA is a nucleic acid that transmits instructions on how to perform to each cell of the body, so that life, health, and proper functions can be maintained. The body must be able to synthesize new RNA or cell degeneration begins. Studies have revealed that new RNA can be produced in vitamin A deficient bodies, however, the rate of production of new RNA is much less than if sufficient vitamin A is available (Dunne, 1990).

I.5.4.ii. Vitamin B1 (Thiamine)

Thiamine, or vitamin B1, is a water-soluble vitamin that acts as a coenzyme participating in the complex process of glucose conversion into energy. Thiamine is susceptible to heat, air, and water in cooking.

Thiamine is a component of the germ and bran of wheat, the husk of rice, and that portion of all grains which is commercially milled away to give the grain a lighter color and finer texture.

Known as the "morale vitamin" because of its relation to a healthy nervous system and its beneficial effect on mental attitude, thiamine is also linked with improving individual learning capacity. It is necessary for consistent growth in children and for the improvement of muscle tone in the stomach, the intestines, and the heart. Thiamine is essential for stabilizing the appetite by improving food assimilation and digestion, particularly that of starches, sugars, and alcohol.

A diet rich in brewer's yeast, wheat germ, blackstrap molasses, and bran will provide the body with adequate thiamine and will help prevent undue accumulation of fatty deposits in the artery walls.

A deficiency of thiamine not only makes it difficult for a person to digest carbohydrates but also leaves too much pyruvic acid in the blood. This causes loss of mental alertness, labored breathing, and cardiac damage. A mild deficiency of thiamine is difficult to diagnose and easily attributed to other problems. First signs include easy fatigue, loss of appetite, irritability, and emotional instability. If the deficiency is not arrested, confusion and loss of memory appear, followed closely by gastric enzymes in the utilization of cell oxygen. It also is necessary for the maintenance of good vision, skin, nails, and hair.

The amount of B2 found in most foods is so little that it normally is quite difficult to obtain a sufficient supply without supplementing the diet. Good sources of riboflavin are liver, tongue, and other organ meats, milk and milk products, eggs, leafy green vegetables and brewer's yeast.

Riboflavin deficiency may result from one or several of these factors: (1) long-established faulty dietary habits; (2) food idiosyncrasies; (3) alcoholism; and (4) arbitrarily selected diets for relief of symptoms of digestive trouble. A riboflavin deficiency can result in cheilosis and angular lesion (Dunne, 1990).

I.5.4.iv. Niacin (B3, Nicotinic Acid, Niacinamide, Nicotinamide)

Niacin, a member of the vitamin B complex, is water-soluble. It is more stable than thiamine or riboflavin and is remarkably resistant to heat, light, air, acids, and alkalies. There are also three synthetic forms of niacin: niacinamide, nicotinic acid, and nicotinamide. As a coenzyme, niacin assists enzymes in the breakdown and utilization of proteins, fats, and carbohydrates. Niacin is effective in improving circulation and reducing the cholesterol level in the blood. It is vital to the proper activity of the nervous system and for formation and maintenance of healthy skin, tongue, and digestive-system tissues. Niacin is necessary for the synthesis of sex hormones.

Relatively small amounts of pure niacin are present in most foods. The niacin "equivalent" listed in dietary tables means either pure niacin or adequate supply of tryptophan, an amino acid that can be converted into niacin by the body. Lean meats, poultry, fish, cereals and peanuts are rich daily sources of both niacin and tryptophan, as are such dietary supplements as brewer's yeast, wheat germ, and desiccated liver. Niacin is difficult to obtain except from these foods.

The symptoms of niacin deficiency are many. In the early stages, muscular weakness, general fatigue, loss of appetite, indigestion, and various skin eruptions occur. A niacin deficiency may also cause bad breath, small ulcers, canker sores, insomnia, irritability, nausea, vomiting, recurring headaches, tender gums, strain, tension, and deep depression. Severe niacin deficiency results in pellagra, which is characterized by dermatitis; dementia; diarrhea; rough, inflamed skin; tremors; and nervous disorders. Many digestive abnormalities causing irritation and inflammation of mucous membranes in the mouth and gastrointestinal tract develop from a niacin deficiency (Dunne, 1990).

I.5.4.v. Folic Acid (Folacin, Folate)

Folic acid is part of the water-soluble vitamin B complex and functions as a coenzyme, together with vitamins B12 and C, in the breakdown and utilization of proteins. Folic acid performs its basic role as a carbon carrier in the formation of heme, the iron-containing protein found in hemoglobin, necessary for the formation of red blood cells. It also is needed for the formation of nucleic acid, which is essential for the processes of growth and reproduction of all body cells.

Folic acid is necessary for proper brain function, being concentrated in the spinal and extracellular fluids. It is essential for mental and emotional health. It also increases the appetite and stimulates the production of hydrochloric acid, which helps prevent intestinal parasites and food poisoning. In addition, it aids in performance of the liver. Folic acid is easily destroyed by high temperature, exposure to light, and being left at room temperature for long periods of time.

In surveys conducted, folic acid was shown to be one of the nutrients most often deficient in our diets. The best sources of folic acid are green leafy vegetables, liver, and brewer's yeast (Dunne, 1990).

Deficiency of folic acid results in poor growth, graying hair, glossitis (tongue inflammation), and gastro-intestinal tract disturbances arising from inadequate dietary intake, impaired absorption, excessive demands by tissues of the body, and metabolic disturbances. Because of the role folic acid plays in the formation of red blood cells, a deficiency could lead to anemia that cannot be corrected by supplementary iron.

A folate deficiency can lead to irritability, forgetfulness, and mental sluggishness. It can be the cause of lesions at the corners of the mouth called cheiloses. A deficiency has been found in mentally retarded children, the aged, and in people with ailments such as Hodgkin's disease and leukemia where the requirement for folic acid is above normal.

Alcohol, phenobarbital and anticonvulsants can produce a folic acid deficiency. Low serum and cerebrospinal fluid folate levels have been observed in epileptics administered anticonvulsant medication.

In the past few years there have been a number of studies implicating folic acid deficiency as a contributing factor in mental illness. Studies have shown that prolonged folic acid deficiency can cause neurological changes and mental deterioration. Because of their close interrelationship, vitamin B12, in almost every case, should accompany any folic acid therapy.

A need for the vitamin is especially increased during pregnancy. The fetus, meeting its need for rapid growth, easily depletes the mother's reserves. The World Health Organization reports that one-third to one-half of pregnant women are folic acid deficient in the last three months of pregnancy (Dunne, 1990).

I.5.4.vi. Vitamin C (Ascorbic Acid)

Vitamin C, also known as ascorbic acid, is a water-soluble nutrient. Although fairly stable in acid solution, it is normally the least stable of vitamins and is very sensitive to oxygen. Its potency can be lost through exposure to light, heat, and air, which stimulate the activity of oxidative enzymes.

A primary function of vitamin C is maintaining collagen, a protein necessary for the formation of connective tissue in skin, ligaments, and bones. Vitamin C plays a role in healing wounds and burns because it by clots. The blood level of ascorbic acid is known to be lowered by smoking. Nicotine added to a sample of human blood of known ascorbic acid content decreased the ascorbic acid content of the blood by 24 to 31 percent.

Alcoholics have a very low C serum level because so much of the vitamin is used to destroy the toxic effects (Dunne, 1990).

I.5.4.vii. Vitamin E (Tocopherol)

Vitamin E, a fat-soluble vitamin, is composed of a group of compounds called tocopherols. Seven forms of tocopherol exist in nature: alpha, beta, delta, epsilon, eta, gamma, and zeta. Of these, alpha tocopherol is the most potent form of vitamin E and has the greatest nutritional and biological value. Tocopherols occur in highest concentrations in cold-pressed vegetable oils, all whole raw seeds and nuts, and soybeans. Wheat-germ oil is the source from which vitamin E was first obtained.

Vitamin E is an antioxidant, which means it opposes oxidation of substances in the body. Oxidation involves a compound called an oxidizer which attacks another compound, removing an electron from it. Vitamin E prevents saturated fatty acids and vitamin A from breaking down and combining with other substances that may become harmful to the body. Fat oxidization results in the formation of free radicals. Free radicals are highly destructive molecules that can cause extensive damage to the body, from cancer to blood clots to damage of DNA.

the body, the essential fatty acids are altered so that blood cells break down and hemoglobin formation is impaired. In addition, several amino acids cannot be utilized, and pituitary and adrenal glands reduce their level of functioning. Iron absorption and hemoglobin formation also are impaired. A severe deficiency can cause damage to the kidneys and liver (Dunne, 1990).

Perhaps the widest incidence of vitamin E deficiency among adults in the United States is in gastro-intestinal disease, where prolonged deficiency can cause faulty absorption of fat and of fat-soluble vitamins, possibly resulting in cystic fibrosis, blockage of the bile ducts, and chronic inflammation of the pancreas. Poor utilization of the vitamin or an increased vitamin E demand characteristic to the individual can cause anemia and edema in premature and malnourished infants. Serious deficiencies of vitamin E in men may lead to degeneration of tissues in the testes. No amount of vitamin E therapy can repair the permanent damage, and such men may become sterile. Women who are severely deficient in vitamin E cannot carry a pregnancy term successfully and often have miscarriages. Premature births frequently result from insufficient intake of vitamin E during pregnancy, leaving the infants more susceptible to anemia. Hemorrhaging can occur in newborn infants who lack vitamin E. The blood cells of vitamin E-deficient babies are prone to weakness (hemolysis).

In addition, vitamin E deficiency appears to make red blood cells more susceptible to damage from medication and from environmental stresses (Dunne, 1990).

I.5.5. Minerals

Minerals are nutrients that exist in the body and in food in organic and inorganic combinations. Approximately seventeen minerals are essential in human nutrition. Although only 4 or 5 percent of the human body weight is mineral matter, minerals are vital to overall mental and physical well-being. All tissues and internal fluids of living things contain varying quantities of minerals. Minerals are constituents of the bones, teeth, soft tissue, muscle, blood, and nerve cells. They are important factors in maintaining physiological processes, strengthening skeletal structures, and preserving the strength of the heart and brain as well as all muscle and nerve systems.

Minerals, just like vitamins, act as catalysts for many biological reactions within the human body, including muscle response, the transmission of messages through the nervous system, digestion, and metabolism or utilization of nutrients in foods. They are important in the production of hormones (Dunne, 1990).

Minerals coexist with vitamins and their work is interrelated. For example, some B-complex vitamins are absorbed only when combined with phosphorus. Vitamin C greatly increases the absorption of iron, and calcium absorption would not occur without vitamin D. Zinc helps vitamin A to be released from the liver. Some minerals are even part of vitamins: vitamin B, contains sulfur and B12 contains cobalt.

Minerals help to maintain the water balance essential to the proper functioning of mental and physical processes. They keep blood and tissue fluids from becoming either too acid or too alkaline and permit other nutrients to pass into the bloodstream. They also help draw chemical substances in and out of the cells and aid in the creation of antibodies. All of the minerals known to be needed by the human body must be supplied in the diet.

Calcium, chlorine, phosphorus, potassium, magnesium, sodium, and sulfur are known as the "macrominerals" because they are present in relatively high amounts in body tissues. They are measured in milligrams. Other minerals, termed "trace minerals," are present in the body only in the most minute quantities but are essential for proper body functioning. Trace minerals are measured in micrograms.

Although the minerals are discussed separately, it is important to note that their actions within the body are interrelated; no one mineral can function without affecting others. Physical and emotional stress causes a pressure on the supply of minerals to the body. A mineral deficiency often results in illness, which may be checked by the addition of the missing mineral to the diet (Dunne, 1990).

I.5.5.i. Calcium

Calcium is the most abundant mineral in the body. About 99 percent of the calcium in the body is deposited in the bones and teeth. One percent is involved in the blood-clotting process, in nerve and muscle stimulation, parathyroid hormone function, and metabolism of vitamin D.

The ratio of calcium to phosphorus in the bones is 2.5 to 1. To function properly, calcium must be accompanied by magnesium, phosphorus, and vitamins A, C, D, and very possibly vitamin E.

The major function of calcium is to act in cooperation with phosphorus to build and maintain bones and teeth. It is essential for healthy blood, eases insomnia, and helps regulate the heartbeat. An important calcium partner in cardiovascular health is magnesium (Dunne, 1990).

In addition, calcium assists in the process of blood clotting and helps prevent the accumulation of too much acid or too much alkali in the blood. It also plays a part in muscle growth, muscle contraction, and nerve transmission. Calcium aids in the body's utilization of iron, helps activate several enzymes (catalysts important for metabolism), and helps regulate the passage of nutrients in and out of the cell walls (Rodale, 1961).

Calcium is present in significant amounts in a very limited number of foods. Milk and dairy products are dependable sources. One of the first signs of a calcium deficiency is a nervous affliction, tetany, characterized by muscle cramps and numbness and tingling in the arms and legs. A calcium deficiency can result in bone malformation, causing rickets in children and osteomalacia in adults. Another calcium deficiency illness is osteoporosis, in which the bones become porous and fragile (Garrison, 1985).

I.5.5.ii. Iron

Iron is a mineral concentrate in the blood which is present in every living cell. All iron exists in the body combined with protein.

The major function of iron is to combine with protein and copper in making hemoglobin, the coloring matter of red blood cells. Hemoglobin transports oxygen in the blood from the lungs to the tissues, which need oxygen to maintain the basic life functions. Thus iron builds up the quality of the blood and increases resistance to stress and disease. Iron is also necessary for the formation of myoglobin, which is found only in muscle tissue. Myoglobin is also a transporter of oxygen; it supplies oxygen to the muscle cells for use in the chemical reaction that results in muscle contraction.

Iron is present in enzymes that promote protein metabolism, and it works with other nutrients to improve respiratory action. Calcium and copper must be present for iron to function properly.

The best source of dietary iron is liver, with oysters, heart, lean meat, and tongue as second choices. Leafy green vegetables, whole grains, dried fruits, legumes, and molasses are rich in iron (Dunne, 1990).

The most common deficiency of iron is iron-deficiency anemia (hypochromic anemia), in which the amount of hemoglobin in the red blood cells is reduced and the cells consequently become smaller. As in other forms of anemia, iron-deficiency anemia reduces the oxygen-carrying capacity of the blood, resulting in pale skin and abnormal fatigue. Symptoms of anemia may include constipation, lusterless, brittle nails, and difficult breathing.

A deficiency of B6 and zinc can cause blood disorders that mimic an iron deficiency. Measuring serum ferritin, not the hemoglobin, is the most efficient way to diagnose an iron deficiency.

Hemorrhagic anemia, marked by internal hemorrhaging, may not be detected for some time, especially when associated with the bleeding that may occur in peptic ulcers. Excessive donation of blood may cause this type of anemia. Infections and peptic ulcers may also lead to anemia (Whitney, 1993).

I.5.5.iii. Zinc

Zinc is an essential trace mineral occurring in the body in larger amounts than any other trace element except iron. The human body contains approximately 1.8 grams of zinc compared to nearly 5 grams of iron.

Zinc has a variety of functions. It is related to the normal absorption and action of vitamins, especially the B complex. It is a constituent of at least 25 enzymes involved in digestion and metabolism, including carbonic anhydrase, which is necessary for tissue respiration. Zinc is a component of insulin, and it is part of the enzyme that is needed to break down alcohol. It also plays a part in carbohydrate digestion and phosphorus metabolism. In addition, it is essential in the synthesis of nucleic acid, which controls the formation of different proteins in the cell. Zinc is essential for general growth and proper development of the reproductive organs and for normal functioning of the prostate gland (Dunne, 1990).

Recent medical findings indicate that zinc is important in healing wounds and burns. It may also be required in the synthesis of DNA, which is the master substance of life, carrying all inherited traits and directing the activity of each cell.

Soil exhaustion and the processing of food adversely affect the zinc value of the food we eat. The best sources of all trace elements in proper balance are natural unprocessed foods. Diets high in protein, whole-grain products, brewer's yeast, wheat bran, wheat germ, and pumpkin seeds are usually high in zinc.

The most common cause of zinc deficiency is an unbalanced diet, although other factors may also be responsible. For example, the consumption of alcohol may precipitate a deficiency by flushing stored zinc out of the liver and into the urine. Zinc deficiency is also a factor in stress, fatigue, susceptibility to infection, injury, and decreased alertness.

Zinc deficiency can cause retarded growth, delayed sexual maturity, and prolonged healing of wounds. A deficiency of zinc, copper, and vanadium may result in atherosclerosis. Stretch marks in the skin and white spots in the fingernails may be signs of a zinc deficiency. Brittle nails and hair and hair lacking pigment, irregular menstrual cycles in teen women, impotence in young males, and painful knee and hip joints in teenagers are also indications of a deficiency .

Chronic zinc depletion can predispose body cells to cancer.

Cadmium, a toxic mineral, also plays an important role in zinc deficiencies. High intakes of cadmium will emphasize the signs of a zinc deficiency, and the cadmium will be stored in the body in the absence of zinc. This creates a detrimental situation that can be reversed by increasing the consumption of zinc.

Chelating compounds used to remove excess copper from the body also leach out zinc, which then must be replaced.

Recent studies demonstrate conclusively that zinc deficiency causes sterility and dwarfism in humans. The deficiency leads to unhealthy changes in the size and structure of the prostate gland, which contains more zinc than any other part of the human anatomy. In prostate problems, particularly prostate cancer, the levels of zinc in the prostate gland decline.

It was found that zinc levels are low in the blood plasma of people suffering from alcoholic cirrhosis, other types of liver disease, ulcers, heart attacks, mongolism, and cystic fibrosis. Pregnant woman and women taking oral contraceptives also had low levels of zinc in their blood plasma.

I.6. The Concept of Recommended Dietary Allowances

Many of the vitamins and minerals are given specific recommended allowances. They have been well studied and restudied for decades. To set vitamin and mineral recommendations, the U.S. Committee on Dietary Allowances reviews and selects the most valid studies of deficiency states, of the body's nutrient stores and their depletion, of nutrient intakes of apparently healthy people, and of findings from animal research. From this information, the committee estimates a *requirement* for each nutrient. Requirement is defined as the amount of a nutrient that will just prevent the development of specific deficiency signs; distinguished from the Recommended Dietary Allowances (RDA), which is a *recommended and generous allowance* that provides for variability among individuals. When people consistently obtain less than the *requirement*, nutrient stores begin to decline. Over time, this can lead to deficiency symptoms (Whitney, 1993).

Examining all the available data, the committee finds that each person's body is unique and has its own set of requirements. A look at enough individuals might reveal that their requirements fall into a symmetrical distribution, with most of the observations near the midpoint and only a few at the extremes.

Then, to set the RDA, the committee must decide what intake to recommend for everybody. The mean, or average, requirement for each nutrient is probably closest to everyone's need, assuming a symmetrical distribution (actually, the data for most nutrients other than protein indicate a distribution that is much less symmetrical). However, if people consumed exactly the average requirement of a given nutrient each day, half of the population would develop deficiencies of that nutrient.

Therefore, a point can be calculated mathematically so that it covers about 98 percent of a population. Even those whose needs were higher than the average would be covered, and relatively few people's requirements would exceed the RDA.

Committee members make this kind of judgment in setting the RDA for each vitamin and mineral. They set it well above the mean requirement determined from the best available information. For these reasons, people cannot use the RDA as their own individual requirements, but they can be sure that the RDA probably cover their needs adequately.

The RDA for protein, vitamins, and minerals are generous, and although they do not necessarily cover every individual for every nutrient, people's intakes should not exceed the RDA by much. Some nutrients can be toxic at intakes above the RDA, and people's tolerances for high doses of nutrients vary. It is naive to think of the RDA as minimum amounts. A more accurate view is to see a person's nutrient needs as falling within a range, with marginal and danger zones both below and above it. The RDA reflect this consideration especially clearly in Figure I. which states recommended intakes in terms of *safe* and *adequate* ranges, meaning “not too high” and “not too low” respectively.

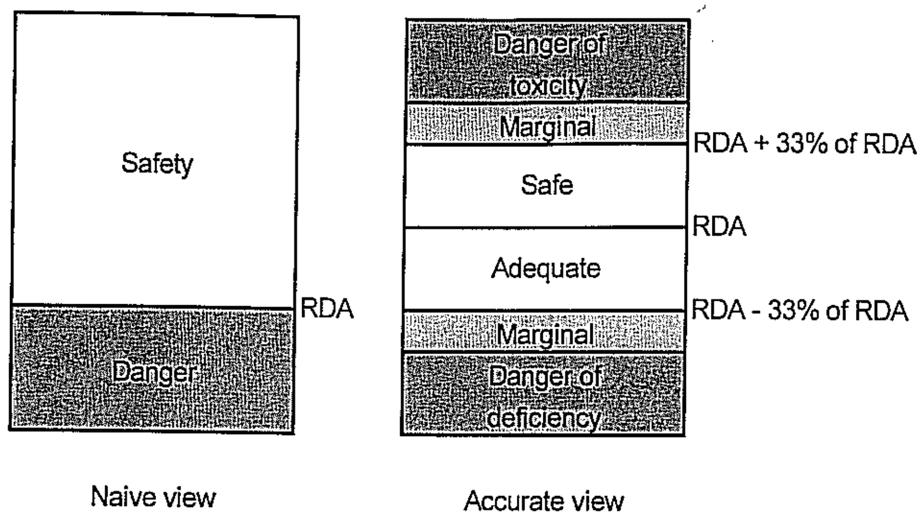


Figure I. Naive and accurate views for evaluations based on RDA (Whitney, 1993)

In the case of vitamins and minerals, small amounts above the daily requirement do no harm, whereas amounts below the *requirement* lead to deficiencies. Their RDA are set near the top end of the range of the population's known requirements, so that as many people as possible will meet their requirements if they consume the RDA.

The preceding discussion has covered most of the goals for the start -setting recommended intakes for fiber, vitamins and minerals. These nutrients represent the primary focus of the RDA committee. The remaining dietary constituents (salt, fat, alcohol and others) differ from these, in that deficiencies are not a risk, but excesses threaten health. Therefore, another concept, Daily Reference Values (DRV), are defined for the purpose of assigning the upper boundary of the intake for these constituents (Whitney, 1993).

As simple as the intent of the RDA may sound, much misunderstanding and controversy surround them. The following facts will help put the RDA in perspective.

First, the RDA serve as estimates of adequate energy and nutrient intakes for healthy people. They do not apply to people with health problems who may require supplemented or restricted intakes.

Second, the RDA are safe and adequate recommendations that include a generous margin of safety. They are not minimum requirements, nor are they necessarily optimal levels of intake for all individuals.

Third, the RDA are intended to be met through diets composed of a variety of foods. Because foods contain mixtures of nutrients, they will deliver more than just those nutrients named in the RDA table. Excess intakes of vitamins and minerals are unlikely when their sources are foods rather than supplements.

Fourth, the RDA are average daily intakes. To try to meet the RDA for every nutrient every day is difficult and unnecessary. The length of time over which a person's intake can deviate from the average without risk of deficiency or overdose varies; for most nutrients, it is best to try to achieve the average intakes recommended by the RDA within three days or so (NAS, 1980).

Fifth, the RDA are most appropriately used to plan and evaluate diets for populations such as schoolchildren or military personnel. The

RDA can be used to estimate the probable risks of deficiencies for an individual only if the person's intakes are determined and averaged over a sufficient length of time. After all, the recommended intakes do meet the needs of essentially all members of a healthy population, so by definition, they apply to individuals within that population. It must, though, be the individual's typical intake, and not just an arbitrary day's intake that is compared with the RDA (NAS, 1980).

With these understandings, researchers use the RDA as a yardstick to assess the adequacy of diets -for example, in nutrition surveys. Diet planners use them as guidelines to aid in planning and evaluating diets for groups of people -for example, the children in school districts. Dietitians working in social service programs use the RDA to establish criteria for foods delivered by food assistance programs. The Food and Drug Administration (FDA) uses the RDA as guidelines for the nutrition labeling of foods and the food industry uses them to develop new food products.

The RDA are not perfect. Still, a comparison of the first (1943) edition of the RDA with the current one reveals more similarities than differences. Apparently, the RDA are serving their purpose of protecting against nutrient deficiencies, for over the past several decades, deficiencies have not been reported in groups of people who were receiving the RDA. Clearly, the safety margins used in setting the nutrient RDA cover "practically all" people.

Other recommendations work similarly to the RDA. For example, like the RDA, the Food and Agriculture Organization / World Health Organization (FAO/WHO) recommendations are considered sufficient for the maintenance of health in nearly all people. However, they differ from the RDA because they serve populations worldwide and are based on different judgment factors. For example, the FAO/WHO recommendations consider that people worldwide are generally smaller and more active than people in the United States. Nevertheless, the recommendations of various nations and agencies all fall within the same range (Whitney, 1993).

I.7. Aims of Analyses of Food Consumption and Composition Data in Turkey :

In addition to the facts stated in section I.1, for a thorough analysis of food composition data, this study aims at diagnosing the current food and nutrition problems associated with socioeconomic and environmental factors in Turkey by an integral processing of food consumption and composition data.

Moreover, the relevant information emerging from this study will be contributing to appraisal of the nutrition of specified population groups, and of policies in other sectors of the society and economy, such as: agriculture, food processing and marketing, and economic development, as well as the contributions to the scientific knowledge for future food and nutrition programming.

This study is aiming at a more precise analysis of -and a basis for solutions to- the following problem areas:

1. National food and nutrition policy determination,

2. National and regional food and nutrition program planning, including food production and distribution, food aid, and nutrition education,

3. Measurement of national food production and consumption, especially subsistence production,

4. Administration and evaluation of national, regional and local food and nutrition programs,

5. Demand analysis and food market research,

6. Scientific research of several kinds bearing on food and nutrition problems and income-related problems,

7. Providing information to the public.

food items. Although, the majority of such surveys do not process and tabulate the quantity data obtained, but only provide the amount of money spent on food or the value of food consumed, in the 1994 survey of SIS, data on food quantities were also obtained.

In the survey, when data on food consumption were collected, the value and quantity of food items consumed in the household were noted by the recording method, and included food purchased or bartered, food obtained as a gift or pay, food produced at home, food gathered wild, and food eaten away from home during the reference period - which is a period of 30 days preceding the day of inquiry. In the case of home produce, the weighing method was also applied.

Therefore, the food consumption data obtained for this study represent the total quantity of food acquired by or available to the household during the reference period. In other words, they refer to the flow of food into households independently of its consumptive use and without taking into account wastage or losses of edible food.

Analysis of Turkish average nutrient intake pattern necessitated the use of data in a specific format. Therefore, SIS has provided **"confidential"** regional data according to the protocol signed (see Appendix A) -in a format including specific code assigned to the food, name of the food, units of measurement , and yearly consumption figures.

Upon receiving the data the first step was the integration of composition data to the consumption. The compositions of most of the foods were taken from the U.S. database (NDL Home Page) in the computer environment by downloading. The nutrients to be included in the study were selected on the basis of expert consultation (Pekcan, 1998). With regard to the suggestions, the number of nutrients were reduced to a sizable critical set specific to Turkish nutrition pattern. Therefore, this study includes total dietary fiber; calcium, iron, and zinc as minerals; vitamins A, E, C, thiamin, riboflavin, niacin, folate; and saturated fatty acids, unsaturated fatty acids and cholesterol.

Traditional food composition data were obtained from several sources and from regional studies performed by FAO. Compositions of other traditional food items which are not available in any of the sources were obtained by stochiometric calculations based on famous recipes. A few food items without any well known recipes, and with negligible amount of consumption were omitted from the study.

Upon integration of the consumption and composition data, the average per capita daily consumption of each nutrient was calculated. The figures resulting from these calculations -regional and country averages- were evaluated on the basis of RDA and DRV. In this study, the RDA values used for comparison purposes are the ones set by the Food and Drug Administration of the United States on December 28, 1995, which are the latest and the highest standards of allowances established. RDA values are point values determined for different age groups, sexes and special health states such as pregnancy, lactation, etc. For the purposes of this study, RDA corresponding to men of age 25 to 50 was utilized since those values are the highest and therefore can increase the reliability of comparisons.

In addition, the percentage of each source food group for any nutrient was also determined for extending the appraisal of intake - especially in case of malnutrition- comparably among regions and Turkey in general, and with respect to the "recommended" sources of nutrients.

CHAPTER III

RESULTS AND DISCUSSION

In order to be able to evaluate the *per capita* results of *average daily* intake of fiber, micronutrients, fatty acids and cholesterol for Turkish people, some statistical inferences were made. The degree of deviation of the calculated values from the RDA will constitute the basis for our discussion. Up to one standard deviation from the RDA to the right (RDA +33% of RDA) is accepted as ***safe***, whereas one standard deviation from the RDA to the left (RDA -33% of RDA) is accepted as ***adequate*** (Figure I). This approach is the general practice among nutrition scientists as to determine the lower and upper boundaries for comparison purposes (Garrison et al, 1985). In other words, the number of standard deviations from the RDA imply *safety* when they appear to be within [0,1] range, and *adequacy* when they are within the range of [-1,0] (Table III.2).

Total Dietary Fiber

Under the light of the above statements and the calculated ranges, it was observed that the per capita average daily total dietary fiber (TDF) intake of Turkish people in general was slightly below the recommended level, which implies adequate intake. Number of standard deviations

TABLE III.1. COMPARISONS OF RDA WITH REGIONAL AND TURKISH PER CAPITA AVERAGE DAILY INTAKE OF NUTRIENTS

NUTRIENT	RDA - 33% *	RDA, DRV	RDA + 33% *	TURKEY	CENTRAL ANATOLIA	MEDITER.	AEGEAN	BLACK SEA	MARMARA	S.EASTERN ANATOLIA	EASTERN ANATOLIA
TOTAL DIETARY FIBER (g)	16.67	25.00	33.33	21.37	20.54	23.71	22.12	22.15	20.58	21.35	19.40
CALCIUM (g)	0.67	1.00	1.33	0.56	0.59	0.57	0.63	0.60	0.59	0.47	0.47
IRON (mg)	12.00	18.00	24.00	15.97	15.96	13.35	16.11	17.23	16.12	15.35	14.69
ZINC (mg)	10.00	15.00	20.00	6.76	6.73	7.02	7.04	7.27	6.95	6.13	6.28
VITAMIN A (mcg RE)	583.34	875.00	1166.66	1555.91	1848.52	1755.60	2025.60	1509.29	1577.18	1055.50	1254.00
VITAMIN E (mg alpha-TE)	6.00	9.00	12.00	6.09	6.76	6.66	8.23	6.58	7.13	3.67	4.32
THIAMIN (mg)	1.00	1.50	2.00	2.15	2.14	2.17	2.17	2.34	2.13	2.13	1.97
RIBOFLAVIN (mg)	1.13	1.70	2.27	1.77	1.82	1.82	1.86	1.96	1.84	1.56	1.56
NIACIN (mg)	13.33	20.00	26.67	21.79	21.81	21.47	21.33	23.94	22.09	21.26	20.47
FOLATE (mg)	0.27	0.40	0.53	0.28	0.28	0.31	0.33	0.30	0.29	0.25	0.24
VITAMIN C (mg)	40.00	60.00	80.00	111.61	117.64	132.08	141.98	112.24	104.57	89.69	92.19
SATURATED FATTY ACIDS (g)	LESS THAN 20.00			19.35	19.49	19.19	19.11	21.52	20.45	15.42	20.28
UNSATURATED FATTY ACIDS (g)	LESS THAN 45.00			39.09	39.38	40.98	43.92	44.59	45.72	27.93	33.09
CHOLESTEROL (mg)	LESS THAN 300.00			134.48	145.24	130.34	147.04	157.78	159.40	83.79	122.72

* RDA + 33% and RDA - 33% refer to the addition and subtraction of 33% of the RDA value to the RDA itself in order to set the lower and upper boundaries.

TABLE III.2. THE DEVIATION OF CALCULATED VALUES FROM THE RDA IN TERMS OF NUMBER OF STANDARD DEVIATIONS

NUTRIENT	STAN. DEV. (33% of RDA)	TURKEY	CENTRAL ANATOLIA	MEDITER.	AEGEAN	BLACK SEA	MARMARA	S.EASTERN ANATOLIA	EASTERN ANATOLIA
TOTAL DIETARY FIBER (g)	8.33	-0.44	-0.54	-0.15	-0.35	-0.34	-0.53	-0.44	-0.67
CALCIUM (g)	0.33	-1.32	-1.23	-1.29	-1.11	-1.21	-1.23	-1.59	-1.61
IRON (mg)	6.00	-0.34	-0.34	-0.78	-0.32	-0.13	-0.31	-0.44	-0.55
ZINC (mg)	5.00	-1.65	-1.65	-1.60	-1.59	-1.55	-1.61	-1.77	-1.74
VITAMIN A (mcg RE)	291.66	2.33	3.34	3.02	3.94	2.17	2.41	0.62	1.30
VITAMIN E (mg alpha-TE)	3.00	-0.97	-0.75	-0.78	-0.26	-0.81	-0.62	-1.78	-1.56
THIAMIN (mg)	0.50	1.30	1.28	1.34	1.34	1.68	1.26	1.26	0.94
RIBOFLAVIN (mg)	0.57	0.12	0.21	0.21	0.28	0.46	0.25	-0.25	-0.25
NIACIN (mg)	6.67	0.27	0.27	0.22	0.20	0.59	0.31	0.19	0.07
FOLATE (mg)	0.13	-0.90	-0.90	-0.68	-0.53	-0.78	-0.86	-1.13	-1.20
VITAMIN C (mg)	20.00	2.58	2.88	3.60	4.10	2.61	2.23	1.48	1.61

The vitamin B complex and ascorbic acid are also protected against oxidation when vitamin E is present in the digestive tract. Fats and oils containing vitamin E are less susceptible to rancidity than those devoid of vitamin E. Vitamin E has the ability to unite with oxygen and prevent it from being converted into toxic peroxides; this leaves the red blood cells more fully supplied with the pure oxygen that the blood carries to the heart and other organs (Dunne, 1990).

Vitamin E plays an essential role in cellular respiration of all muscles, especially cardiac and skeletal. Vitamin E makes it possible for these muscles and their nerves to function with less oxygen, thereby increasing their endurance and strength. It also causes expansion of the blood vessels, permitting a fuller flow of blood to the heart. Vitamin E is a highly effective antithrombin in the bloodstream, inhibiting coagulation of blood by preventing clots from forming. It also aids in bringing nutrients to the cells, strengthening the capillary walls, and protecting the red blood cells from destruction by poisons, such as hydrogen peroxide, in the blood.

Vitamin E prevents both the pituitary and adrenal hormones from being oxidized and promotes proper functioning of linoleic acid, the unsaturated fatty acid discussed in section I.5.2. Because aging in the cells is due primarily to oxidation, vitamin E is useful in retarding this process. It is also necessary for proper focusing of the eyes in middle-aged persons. A sufficient amount of vitamin E allows greater storage and reduces the requirement for vitamin A (Dunne, 1990).

TABLE III.3 (cont.)

EASTERN ANATOLIA REGION

FOOD GROUP	FIBER	CALCIUM	IRON	ZINC	VIT. A	VIT. E	THIAMIN	RIBOFL.	NIACIN	FOLATE	VIT. C	SFA	MUFA	PUFA	CHOLES.
CEREAL & CEREAL PRODUCTS	52.7	42.5	68.4	46.8	0.1	16.4	80.3	63.0	71.0	37.9	0.0	10.6	8.1	43.6	0.1
MEAT	0.0	0.9	4.3	17.8	4.0	1.8	1.5	5.6	9.9	3.2	0.2	14.1	11.9	6.0	23.9
FISH	0.0	0.6	0.4	0.6	0.1	0.4	0.2	0.4	1.3	0.1	0.0	0.2	0.3	0.6	1.8
MILK, DAIRY PRODUCTS & EGGS	0.0	35.0	1.7	11.5	7.2	5.4	2.3	15.2	0.5	5.1	0.8	16.0	7.0	3.7	55.2
FATS & OILS	0.0	0.3	0.4	0.2	4.5	39.9	0.0	0.1	0.0	0.1	0.0	55.7	69.3	35.5	18.5
FRUITS	11.8	4.3	2.6	3.6	15.1	11.5	4.4	2.7	2.2	7.3	24.2	0.9	2.0	6.4	0.0
VEGETABLES	31.9	11.9	16.9	14.2	62.8	17.9	9.9	8.1	9.6	42.3	70.4	0.5	0.3	3.2	0.0
SUGAR & CONFECTIONARY	0.6	1.5	2.0	0.6	0.0	0.5	0.4	0.7	0.3	0.1	0.1	1.5	0.9	0.3	0.1
SALT & SPICES	0.5	0.5	0.5	0.2	2.1	0.3	0.1	0.2	0.1	0.1	0.2	0.1	0.0	0.3	0.0
READY MEALS & OTHER FOODS	1.3	0.5	0.8	0.9	4.0	5.9	0.6	0.8	1.0	0.9	3.4	0.0	0.0	0.3	0.0
BEVERAGES	1.3	2.0	1.9	3.7	0.1	0.1	0.3	3.2	4.1	2.9	0.7	0.4	0.2	0.2	0.4
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

AEGEAN REGION

FOOD GROUP	FIBER	CALCIUM	IRON	ZINC	VIT. A	VIT. E	THIAMIN	RIBOFL.	NIACIN	FOLATE	VIT. C	SFA	MUFA	PUFA	CHOLES.
CEREAL & CEREAL PRODUCTS	38.9	30.6	61.1	38.8	0.1	8.4	71.5	52.0	65.7	26.6	0.0	11.1	5.9	35.2	0.3
MEAT	0.0	0.6	3.1	10.4	1.8	0.8	1.1	4.1	8.6	1.8	0.2	5.3	3.3	3.5	15.3
FISH	0.0	0.6	0.7	0.6	0.1	0.3	0.2	0.5	1.6	0.1	0.0	0.3	0.2	0.7	1.7
MILK, DAIRY PRODUCTS & EGGS	0.0	44.2	2.8	20.0	6.5	4.2	3.9	23.8	1.3	6.8	0.8	34.2	9.1	5.2	75.7
FATS & OILS	0.0	0.1	0.7	0.3	1.1	47.1	0.0	0.0	0.0	0.0	0.0	44.3	77.5	34.9	6.6
FRUITS	22.5	6.7	5.1	7.9	26.1	22.5	8.7	4.9	5.1	13.3	38.9	2.0	2.8	13.9	0.0
VEGETABLES	35.7	13.4	21.3	16.6	62.0	14.4	13.4	10.3	11.8	48.1	57.6	0.9	0.4	4.8	0.0
SUGAR & CONFECTIONARY	0.4	1.3	1.9	0.8	0.1	0.3	0.4	1.0	0.3	0.1	0.0	1.4	0.6	0.2	0.3
SALT & SPICES	0.5	0.9	0.7	0.6	0.9	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.9	0.0
READY MEALS & OTHER FOODS	0.8	0.3	0.5	0.7	1.3	1.9	0.4	0.5	0.7	0.7	1.2	0.2	0.1	0.7	0.1
BEVERAGES	1.3	1.2	2.1	3.4	0.0	0.0	0.2	2.8	4.8	2.4	1.2	0.1	0.0	0.1	0.0
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

TABLE III.3 (cont.)

SOUTHEASTERN ANATOLIA REGION

FOOD GROUP	FIBER	CALCIUM	IRON	ZINC	VIT. A	VIT. E	THIAMIN	RIBOFL.	NIACIN	FOLATE	VIT. C	SFA	MUFA	PUFA	CHOLES.
CEREAL & CEREAL PRODUCTS	58.7	51.7	73.9	57.0	0.1	23.9	84.0	70.5	78.7	43.0	0.0	17.2	12.6	54.0	0.1
MEAT	0.0	0.7	2.8	12.7	3.4	1.5	1.3	4.4	7.5	2.1	0.1	13.5	10.4	5.7	24.1
FISH	0.0	0.2	0.2	0.5	0.1	0.7	0.2	0.3	0.6	0.1	0.0	0.3	0.4	0.7	2.5
MILK, DAIRY PRODUCTS & EGGS	0.0	25.3	1.2	9.8	5.4	4.9	1.7	11.8	0.4	4.2	0.7	14.9	6.2	2.7	60.5
FATS &OILS	0.0	0.0	0.2	0.1	0.5	34.1	0.0	0.0	0.0	0.0	0.0	52.0	68.5	30.3	12.6
FRUITS	9.8	4.1	2.0	2.6	19.6	11.2	4.2	2.6	1.9	5.6	27.8	0.7	1.0	2.8	0.0
VEGETABLES	28.7	13.4	15.5	13.5	62.0	18.6	7.7	7.1	6.9	42.1	66.8	0.6	0.4	2.8	0.0
SUGAR & CONFECTIONARY	0.1	1.2	1.3	0.2	0.0	0.1	0.2	0.3	0.2	0.0	0.1	0.4	0.3	0.1	0.2
SALT & SPICES	0.9	0.7	0.9	0.4	4.4	0.6	0.1	0.3	0.2	0.3	0.4	0.1	0.1	0.6	0.0
READY MEALS & OTHER FOODS	0.9	0.4	0.6	0.6	4.5	4.5	0.4	0.6	0.7	0.6	3.6	0.1	0.0	0.3	0.0
BEVERAGES	0.8	2.2	1.3	2.5	0.1	0.0	0.1	2.1	3.1	1.9	0.5	0.2	0.1	0.1	0.2
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

CENTRAL ANATOLIA REGION

FOOD GROUP	FIBER	CALCIUM	IRON	ZINC	VIT. A	VIT. E	THIAMIN	RIBOFL.	NIACIN	FOLATE	VIT. C	SFA	MUFA	PUFA	CHOLES.
CEREAL & CEREAL PRODUCTS	44.4	31.3	64.2	40.6	0.1	9.8	76.0	55.7	66.4	31.1	0.0	10.4	6.3	37.0	0.3
MEAT	0.0	0.8	4.0	13.7	1.7	1.1	1.3	4.5	9.3	2.2	0.2	9.1	6.1	4.4	17.7
FISH	0.0	0.7	0.6	0.9	0.1	0.2	0.2	0.5	1.8	0.1	0.0	0.3	0.3	0.8	1.9
MILK, DAIRY PRODUCTS & EGGS	0.0	39.3	2.6	17.2	5.9	4.5	3.4	21.0	1.1	6.8	0.8	28.6	8.8	5.2	71.0
FATS & OILS	0.0	0.1	0.6	0.2	1.4	44.4	0.0	0.0	0.0	0.0	0.0	47.4	74.6	35.8	8.8
FRUITS	19.0	5.7	4.1	6.2	24.7	22.1	6.5	4.0	3.9	11.8	37.9	1.5	2.3	11.4	0.0
VEGETABLES	32.2	11.5	17.2	14.1	61.2	14.1	10.7	8.5	10.2	42.3	57.3	0.7	0.3	3.8	0.0
SUGAR & CONFECTIONARY	0.7	2.3	2.7	1.1	0.1	0.5	0.6	1.1	0.4	0.3	0.0	1.6	1.0	0.3	0.3
SALT & SPICES	0.8	0.9	0.8	0.5	2.7	0.3	0.1	0.3	0.2	0.3	0.3	0.1	0.1	0.7	0.0
READY MEALS & OTHER FOODS	1.0	0.5	0.9	1.0	2.1	2.8	0.7	0.9	1.1	1.6	2.0	0.2	0.2	0.6	0.1
BEVERAGES	1.8	7.1	2.6	4.5	0.0	0.0	0.3	3.6	5.6	3.5	1.5	0.1	0.0	0.1	0.0
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

TABLE III.3 (cont.)

BLACK SEA REGION

FOOD GROUP	FIBER	CALCIUM	IRON	ZINC	VIT. A	VIT. E	THIAMIN	RIBOFL.	NIACIN	FOLATE	VIT. C	SFA	MUFA	PUFA	CHOLES.
CEREAL & CEREAL PRODUCTS	47.9	34.6	67.3	44.6	0.2	11.2	78.6	58.4	68.7	33.9	0.0	10.6	6.1	39.5	0.3
MEAT	0.0	0.7	2.8	12.1	2.8	1.2	1.0	3.9	8.1	2.4	0.2	7.6	5.1	3.7	16.5
FISH	0.0	2.5	1.7	2.7	0.2	0.5	0.5	1.4	5.4	0.5	0.0	0.7	0.5	2.0	6.0
MILK, DAIRY PRODUCTS & EGGS	0.0	41.2	2.4	16.9	7.8	4.7	3.4	21.0	1.1	6.8	0.9	26.5	7.6	4.8	64.6
FATS & OILS	0.0	0.3	0.7	0.3	3.8	55.1	0.0	0.1	0.0	0.1	0.0	51.3	75.2	37.5	12.3
FRUITS	15.1	5.3	3.4	4.5	17.3	11.5	4.9	3.3	2.6	7.9	30.9	1.4	4.7	7.9	0.0
VEGETABLES	34.8	13.1	17.8	14.9	66.1	14.9	10.8	8.3	10.1	45.1	65.9	0.6	0.3	3.8	0.0
SUGAR & CONFECTIONARY	0.3	1.0	1.6	0.6	0.1	0.3	0.3	0.9	0.2	0.1	0.0	1.1	0.4	0.2	0.2
SALT & SPICES	0.3	0.6	0.4	0.2	1.2	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.0
READY MEALS & OTHER FOODS	0.2	0.1	0.2	0.3	0.5	0.5	0.2	0.3	0.3	0.8	0.4	0.1	0.1	0.4	0.1
BEVERAGES	1.2	0.9	1.7	3.0	0.0	0.0	0.2	2.3	3.5	2.3	1.5	0.1	0.0	0.1	0.0
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

MARMARA REGION

FOOD GROUP	FIBER	CALCIUM	IRON	ZINC	VIT. A	VIT. E	THIAMIN	RIBOFL.	NIACIN	FOLATE	VIT. C	SFA	MUFA	PUFA	CHOLES.
CEREAL & CEREAL PRODUCTS	45.5	33.4	64.6	41.7	0.2	9.8	76.5	54.8	66.7	31.7	0.1	10.8	5.8	36.7	0.9
MEAT	0.0	0.8	3.8	12.9	3.6	1.2	1.4	5.1	10.3	3.1	0.3	7.6	4.6	4.5	17.7
FISH	0.0	1.8	1.6	2.6	0.2	0.8	0.6	1.1	4.0	0.5	0.1	0.8	0.7	2.0	5.3
MILK, DAIRY PRODUCTS & EGGS	0.0	41.9	2.7	18.1	7.0	4.4	3.8	23.1	1.3	7.3	0.9	29.2	7.7	5.1	68.2
FATS & OILS	0.0	0.1	0.8	0.3	1.6	56.1	0.0	0.0	0.0	0.0	0.0	48.0	78.0	39.5	7.4
FRUITS	16.6	4.9	3.9	4.5	21.8	12.4	5.6	3.5	3.2	8.1	33.6	1.2	2.3	7.4	0.0
VEGETABLES	34.8	11.7	18.1	15.0	62.4	12.6	10.9	8.2	9.4	45.6	60.6	0.6	0.3	3.5	0.0
SUGAR & CONFECTIONARY	0.5	1.0	1.6	0.7	0.1	0.3	0.4	0.9	0.2	0.1	0.0	1.4	0.6	0.2	0.3
SALT & SPICES	0.4	0.5	0.5	0.3	1.3	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.2	0.0
READY MEALS & OTHER FOODS	0.8	0.4	0.6	0.7	1.9	2.2	0.5	0.6	0.8	0.9	1.8	0.2	0.1	0.7	0.2
BEVERAGES	1.4	3.5	1.9	3.2	0.0	0.0	0.3	2.6	4.0	2.5	2.4	0.1	0.0	0.1	0.0
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

figures appear to be within [-0.15, -0.67] range (Table III.2). In addition, comparisons in Table III.1 yield that there is no significant difference among the seven regions and Turkish average. Cereals, vegetables and fruits respectively are the major calculated sources, which contribute to about 97% of the total supply of TDF, and constitute 68% of the Turkish food consumption in total (Table III.3, and Figures C.1, D.1, E.1, F.1, G.1, H.1, I.1, J.1 in the appendices). Contribution of the raw vegetables to fiber intake is about 20%, whereas 10.4% is from pulses. Although the amount of pulses consumed is much lower than raw vegetables, they are dried products and contribute significantly to final intake values. These findings are in agreement with the recommended sources of intake mentioned in section I.5.1.

Calcium

The most outstanding sources of calcium are milk, dairy products and eggs (Table III.3, and Figures C.2, D.2, E.2, F.2, G.2, H.2, I.2, J.2 in the appendices), all of which have a lower consumption in Turkey (12% of the total consumption), confirmed by the calculated intakes slightly below the adequate level for the Turkish average and the regional findings. Regional findings of Eastern and Southeastern Anatolia particularly yield lower results than the country average and other regions (Tables III.1 and III.2), where the consumption of milk, dairy products, and eggs are accordingly lower, with an observable shift to cereals as substitutes (Table III.3).

Specifically, as a calcium-rich food item, eggs constitute 3.38% of the total contribution of "milk, dairy products and eggs" to calcium intake. This means that 1.31% of calcium is taken from eggs in terms of Turkish averages.

The amount of calcium that is taken from water, especially different natural springs is indeterminate, and it is suspected that some more calcium is supplied to Turkish diet from these sources (Köksal, 1977).

Iron

Turkish average and regional intakes of iron are within the adequate range, slightly below the recommended level (Tables III.1 and III.2). Iron is primarily taken from cereals (Table III.3, and Figures C.3, D.3, E.3, F.3, G.3, H.3, I.3, J.3 in the appendices), whereas the recommended sources of iron are foods of animal origin (liver, oysters, heart, lean meat and tongue). Consumption of cereal and cereal products constitute 29% of the total, whereas meat and fish together sum up to 4% (Table III.3). Iron content of these two food groups are comparable in general, except the fact that ***excessive*** iron is included in ***leavened cereal products***, which are consumed the most all around Turkey. These phenomena explain why on average 66% of iron is gained from cereals and cereal products.

However, due to lower GI tract absorption levels of cereal-based iron intake in comparison to the high absorption when iron is taken from foods of animal origin, a shift towards these foods can be recommended for Turkish diet for an increase in post-intake absorption levels. In addition, increased intake of vitamin C is also recommended in order to increase iron absorption in the GI tract.

Pulses, by themselves contribute to about 6% of iron intake on average, which is about one half the total contribution of vegetables (Figures in Table III.3 include pulses within vegetables).

Ready meals' contribution to iron intake is due to the inclusion of leavening agents, olives and meat meals in the group (see Appendix K).

Beverages demonstrate considerable contribution to iron intake due to excessive consumption of tea and coffee.

Zinc

One problem of Turkey in terms of nutrition is zinc intake, which is below the adequate level (Tables III.1 and III.2), where all the regional findings are around the country average.

Just like iron, zinc is primarily taken from cereals (Table III.3, and Figures C.4, D.4, E.4, F.4, G.4, H.4, I.4, J.4 in the appendices). The facts that zinc is generally embedded in the bran of the cereals, and grain husk is usually sifted before consumption, and the lower absorption level of zinc from cereal origin in the small intestines, reveal that cereal-based zinc consumption should be replaced with foods of animal origin, in order to be able to increase zinc intake in general and post-intake absorption levels in Turkish dietary pattern.

Meat, milk, dairy products and eggs contain about two times more zinc than the cereals. (Table III.3). Moreover, about one half the contribution of vegetables to zinc intake is from pulses, another significant zinc source. Thus, an increase in the consumption of these food groups can contribute significantly to zinc intake.

Fortunately, vitamin C consumption is quite high all around Turkey (Table III.1), which inreases the absorption of zinc and other minerals in the GI tract.

Vitamin A

Vitamin A intake is far above the recommended level in all the regions of Turkey (Tables III.1 and III.2), even exceeding RDA plus one standard deviation, however not to the extent that it can be considered toxic. There may be slight losses due to improper drying of vegetables and fruits, which are the major sources, however this will not reduce actual intake to a critical level. Still, it must be kept in mind that zinc deficiency is expected to reduce the release of vitamin A from liver. The intake of vitamin A is from the approppriate sources (Table III.3, and Figures C.5, D.5, E.5, F.5, G.5, H.5, I.5, J.5 in the appendices).

About 63% of vitamin A comes from vegetables, where carrots and peppers are the dominant sources.

The highest contribution of spices to vitamin A intake is in Southeastern Anatolia, followed by the Mediterranean region as a result of excessive red pepper consumption. This is due to the unique eating habits of residents of these regions.

Vitamin E

In terms of vitamin E consumption, except for the Eastern and Southeast Anatolia regions, the calculated average intake levels are within the adequate range (Tables III.1 and III.2). In the above stated two regions, the level of intake is below the acceptable level which may be a result of lower consumption of fats and fruits in these regions in comparison to other regions (Table III.3, and Figures C.6, D.6, E.6, F.6, G.6, H.6, I.6, J.6 in the appendices).

Ready meals contribute to vitamin E intake due to the inclusion of tomato paste in this group, and its consumption in high quantities.

Thiamin and Riboflavin

Thiamin intake in terms of the country average and the regional findings reveals values slightly above the safety level, that is they are above the RDA plus one standard deviation (Tables III.1 and III.2). Likewise, riboflavin intake is above RDA in all the regions except Eastern and Southeast Anatolia, even where the levels are slightly below RDA and within the adequate range (Tables III.1 and III.2). The susceptibility of riboflavin to light will slightly decrease the final intake, but not to a critical extent. The findings are consistent with the fact that the most significant sources of B vitamins are cereals (Table III.3, and Figures C.7, D.7, E.7,

F.7, G.7, H.7, I.7, J.7, C.8, D.8, E.8, F.8, G.8, H.8, I.8, J.8 in the appendices).

Niacin

Niacin results are almost constant all around Turkey, slightly above RDA level (Tables III.1 and III.2), which is confirmed by the fact that almost 70% of niacin is taken from cereals, and cereals and cereal products are the highest in consumption throughout Turkey (Table III.3, and Figures C.9, D.9, E.9, F.9, G.9, H.9, I.9, J.9 in the appendices).

Folate

The newest standard established for folate is almost double the previous one. All the regional results and the country average reveal that Turkish folate intake on average is slightly higher than RDA plus one standard deviation with respect to the previous standard. When the newest standard is considered, almost all the regions fall into the adequate range (Tables III.1and III.2). Eastern and Southeast Anatolia regions slightly deviate to the left of this range. Nevertheless, it can be concluded that folate intake in all regions is adequate. In addition, the sources of intake for folate display the expected pattern (Table III.3, and Figures C.10, D.10, E.10, F.10, G.10, H.10, I.10, J.10 in the appendices). Pulses contribute to about one half the vegetables' addition to folate intake.

Vitamin C

Intake of vitamin C is well beyond RDA plus two standard deviations (RDA +67% of RDA) in general for Turkey (Tables III.1 and III.2). Even this level is far from being toxic. Besides, it may be expected that some of this vitamin C will be lost during drying and cooking. Since, Turkish eating habits include heating and serving a meal a few times, this may result in more losses. Even then, the figures are not expected to fall beneath recommended levels. One advantage of high vitamin C intake is that it increases the absorption of minerals in the GI tract, relieving the low intakes of calcium, iron and zinc. Therefore, the Turkish average intake of vitamin C can be considered high enough to be safe. In addition, vitamin C is taken from the appropriate sources (Table III.3, and Figures C.11, D.11, E.11, F.11, G.11, H.11, I.11, J.11 in the appendices).

More than 62% of vitamin C comes from vegetables, whereas fruits contribute to about 32% (Table III.3). This is evident in that average vitamin C content of vegetables and fruits are about 17 mg and 12 mg, respectively. In addition, the percentage consumption of the two food groups are 24% for vegetables, and 15% for fruits.

Contribution of ready meals is high due to intense tomato and red pepper paste consumption, whereas beverages' addition is a result of fruit juice consumption.

Fatty Acids and Cholesterol

The Daily Reference Values (DRV) for Saturated and Unsaturated Fatty Acids (SFA and UFA) and Cholesterol conversely determine the maximum intake levels. Therefore, the figures resulting from the calculations are expected to be at or below the given levels, as is the case for almost all regions and the country average, where the values exceeding DRV are not statistically significant to be considered a deviation (Tables III.1and III.2). SFA and UFA results tend to be quite close to DRV, whereas Cholesterol levels are far below. Therefore, it can be concluded that Turkish fat and cholesterol intake is safe and from the approppriate sources (Table III.3, and Figures C.12, D.12, E.12, F.12, G.12, H.12, I.12, J.12, C.13, D.13, E.13, F.13, G.13, H.13, I.13, J.13, C.14, D.14, E.14, F.14, G.14, H.14, I.14, J.14, C.15, D.15, E.15, F.15, G.15, H.15, I.15, J.15 in the appendices).

Ready meals appear in the final scene due to the inclusion of *olives* –a very rich source of UFA- in this group.

CHAPTER IV

CONCLUSION

A thorough examination of the results reveals that Turkish average daily intake of total dietary fiber, vitamin E, and iron are within the *adequate* range of consumption which corresponds to the lower limit of 66.7% of RDA.

Calcium and zinc display a countrywide "below adequate" pattern, however, calcium is supposed to be supplemented by natural springs. Zinc deficiency can only be overcome by a shift of the current cereal based sources toward zinc rich food items.

Vitamin E and folate deficiencies are only observed in the East and Southeast Anatolia Regions due to imbalances in the intake with regard to the sources of the nutrients.

Vitamin A, vitamin C and thiamin display fortunate results, that the intakes of these two micronutrients are *over* the *safety* region (the upper limit of RDA+33% of RDA), but not to the extent of toxicity. Only in Southeast Anatolia, the figures are within the safety range. At this point, losses in vitamin C due to thermal processing should be taken into consideration.

Riboflavin and niacin intakes also appear to be in the *safety* range, except that riboflavin intake of East and Southeast Anatolia regions are only in the *adequate* range.

All fatty acid and cholesterol intakes are below the Daily Reference Values, that is on the safer side of consumption.

RECOMMENDATIONS

The results of this study provide a significant overview of Turkish average daily intake of certain nutrients in that they are based on a National Household Budget Survey data. Other prospective outcomes are also possible through the findings of this study and the followers, such as policy making, commerce and epidemiological-diagnostic purposes.

Turkey has to build up her own food composition database, at least primarily for traditional foods in the short run. For this purpose, the cooperation of universities should be coordinated and institutionalized. The continuous *follow-up* and *refreshment* of any prospective database would be a final asset. These attempts should be accompanied with the determination of actual Turkish Recommended Dietary Allowances and Daily Reference Values.

In the final scene, a thorough *Food Monitoring System* is strongly recommended. This system of information would provide the society on the whole with invaluable data for various other purposes, be it only for itself. The system should also guide the collection of necessary data, forcing regular and frequent surveys for determining time series behavior of food consumption and composition patterns.

The stated consequences of deficiency of nutritive components in the first chapter at individual level may result in the malnutrition of the society on the whole. This fact must also be thoroughly investigated in Turkey by performing several studies, including this study as a starting point. The nutrition planner should attempt to diagnose malnutrition's multiple causality fully and, to the extent possible, address these causes jointly through a multifaceted plan for intervention, both regional and nationwide. This plan has to include a policy on ***nutrition education***, considering the entire population to prevent future inadequacy of nutrients, and for the improvement of Turkish dietary pattern in general.

Initialization of these recommended studies requires government attention. The proposed route of study should absolutely take place in the next five years' development plans. Establishment of a Special Experts Commission by the State Planning Organization would be a good start.

APPENDIX A

PROTOCOL SIGNED WITH STATE INSTITUTE OF STATISTICS

SÖZLEŞME

TARAFLAR

MADDE 1- Bu sözleşme T.C. Orta Doğu Teknik Üniversitesi Gıda Mühendisliği Bölümü öğretim üyesi ve "Avrupa'da Gıda Tüketimi ve Kompozisyonu Verilerinin Kalite ve Uygunluğunun Geliştirilmesi (COST'99)" projesi sorumlusu Prof.Dr.Suat UNGAN ile Devlet İstatistik Enstitüsü Başkanlığı (DIE) arasında yapılmıştır. İşbu sözleşme iki sayfadan ibarettir.

HİZMET SÖZLEŞMESİNİN KONUSU

MADDE 2- DIE'nin 1994 Hanehalkı Tüketim Harcamaları Anketi'nin ekteki değişkenlerine ait tüketim harcaması verilerinin Prof.Dr.Suat UNGAN'a disket ortamında verilmesi.

MADDE 3- DIE'den alınan veriler "Avrupa'da Gıda Tüketimi ve Kompozisyonu Verilerinin Kalite ve Uygunluğunun Geliştirilmesi (COST99) adlı proje kapsamında kullanılacaktır. Verilerin kullanıcı tarafından başka amaçla kullanılması, başkasına verilmesi, satılması DIE'nin iznine tabidir.

TARAFLARIN YÜKÜMLÜLÜKLERİ

MADDE 4- DIE, 1994 Hanehalkı Tüketim Harcamaları Anketi'nin ekte yer alan bilgilerini sözleşmenin imzalanmasından sonra Prof.Dr.Suat UNGAN'a disket ortamında verecektir.

MADDE 5- Bu hizmet karşılığında COST99 projesi kapsamında gıda tüketimi, kompozisyonu, beslenme vb. konularda oluşturulacak tüm veri tabanlarından DIE de yararlanacak, bu konuda daha önce hazırlanmış ve hazırlanacak rapor makale, yayın DIE'ne gönderilecektir.

BİLDİRİM YÜKÜMLÜLÜĞÜ

MADDE 6- Sözleşme gereği yapılacak tüm bildirimler tarafların aşağıda belirtilen adreslerine taahhütlü mektupla gönderilecektir.

Prof.Dr.Suat UNGAN ODTÜ Gıda Mühendisliği Bölümü Öğretim Üyesi 06531, ANKARA	Devlet İstatistik Enstitüsü Başkanlığı Döner Sermaye İşletmesi Necatibey Cad. No:114 06100 Yücetepe/ANKARA

İHTİLAFLAR VE UYGULANACAK HÜKÜMLER

MADDE 7- İhtilaf halinde Ankara Mahkemeleri ve İcra Daireleri yetkilidir. Hizmet sözleşmesinde hüküm bulunmayan hallerde genel hukuk hükümleri uygulanır.

MADDE 8- İşbu sözleşme 8 maddeden ibaret olup 29/4/1997 tarihinde tanzim ve imza edilmiştir. Bu sözleşme imza tarihinde yürürlüğe girer.

Mehmet Sıddık ENSARİ Devlet İstatistik Enstitüsü Başkanı	Prof.Dr.Suat UNGAN ODTÜ Gıda Mühendisliği Bölümü Öğretim Üyesi

APPENDIX B (cont.)

		FIBER (g)	CALCIUM (mg)	IRON (mg)	ZINC (mg)	VIT. A (mcg RE)	VIT. E (mg alpha TE)	THIAMIN (mg)	RIBOFL. (mg)	NIACIN (mg)	FOLATE (mg)	VIT. C (mg)	SFA (g)	MUFA (g)	PUFA (g)	CHOLES. (mg)
KARIŞIK KURUYEMİŞ																
BADEM 3.8%	~ALMONDS,DRY RSTD,UNBLANCHED,W/SALT~	13.70	282.00	3.80	4.90	0.00	5.55	0.13	0.60	2.82	63.80	0.70	4.89	33.50	10.83	0.00
FINDIK 9.3%	~FILBERTS OR HAZELNUTS,DRY RSTD,UNBLANCH~	0.00	195.00	3.39	2.49	0.00	0.00	0.21	0.21	2.77	74.50	1.00	4.87	51.96	6.35	0.00
LEBLEBİ 16.3%	~CHICKPEAS (GARBANZO BNS,BENGAL GM),MATURE~	17.40	105.00	6.24	3.43	67.00	0.82	0.48	0.21	1.54	556.60	4.00	0.63	1.36	2.69	0.00
B.LEBLEBİ 25.7%	~ROASTED CHICKPEAS~	17.40	105.00	6.24	3.43	67.00	0.82	0.48	0.21	1.54	556.60	4.00	0.63	1.36	2.69	0.00
FISTIK 18.8%	~PEANUTS,ALL TYPES,DRY-ROASTED,W/SALT~	8.00	54.00	2.26	3.31	0.00	7.41	0.44	0.10	13.53	145.30	0.00	6.89	24.64	15.69	0.00
A.FISTIĞI 5.1%	~PISTACHIO NUTS,DRY RSTD,WO/SALT~	10.80	70.00	3.17	1.36	238.00	5.21	0.42	0.25	1.41	59.10	7.30	6.69	35.66	7.99	0.00
KABAK ÇEKİRDEĞİ 21%	~PUMPKIN&SQUASH SEEDS,WHL,RSTD,WO/SALT~	3.90	55.00	3.31	10.30	62.00	0.00	0.03	0.05	0.29	9.00	0.30	3.67	6.03	8.84	0.00
TOPLAM	RESULTS	**10.70**	**98.22**	**4.36**	**4.71**	**53.30**	**2.21**	**0.34**	**0.17**	**3.69**	**275.35**	**2.23**	**3.31**	**14.39**	**7.35**	**0.00**
KESTANE ŞEKERİ																
KESTANE HAŞLANMIŞ 21.2%	~CHESTNUTS,EUROPEAN,BLD&STMD~	0.00	46.00	1.73	0.25	17.00	0.00	0.15	0.10	0.73	38.40	26.70	0.26	0.48	0.55	0.00
TOZ ŞEKER 14.9%	~SUGARS,GRANULATED~	0.00	1.00	0.06	0.03	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VANİLYA 0.2%	~VANILLA EXTRACT~	0.00	11.00	0.12	0.11	0.00	0.00	0.01	0.10	0.43	0.00	0.00	0.01	0.01	0.00	0.00
SU 63.7%	~WATER,BOTTLED,PERRIER~	0.00	14.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOPLAM	RESULTS	**0.00**	**18.84**	**0.38**	**0.06**	**3.60**	**0.00**	**0.03**	**0.03**	**0.16**	**8.14**	**5.66**	**0.06**	**0.10**	**0.12**	**0.00**
KIYMALI PİDE																
PİDE 59%	~BREAD,ITALIAN~	2.70	78.00	2.94	0.86	0.00	0.28	0.47	0.29	4.38	30.00	0.00	0.86	0.81	1.39	0.00
PİŞMİŞ KIYMA 41%	~VEAL,GROUND,CKD,BRLD~	0.00	17.00	0.99	3.87	0.00	0.15	0.07	0.27	8.03	11.00	0.00	3.04	2.84	0.55	103.00
TOPLAM	RESULTS	**1.59**	**52.99**	**2.14**	**2.09**	**0.00**	**0.22**	**0.31**	**0.28**	**5.88**	**22.21**	**0.00**	**1.75**	**1.64**	**1.05**	**42.23**
KÖFTE BAHARI																
KİMYON 20%	~CUMIN SEED~	10.50	930.71	66.36	4.80	1270.00	1.03	0.63	0.33	4.58	10.00	7.71	1.54	14.04	3.28	0.00
ACIBİBER 30%	~PEPPER,RED OR CAYENNE~	27.20	148.37	7.80	2.48	41610.00	4.80	0.33	0.92	8.70	106.00	76.44	3.26	2.75	8.37	0.00
KİNİN 25%	~PEPPER,RED OR CAYENNE~	27.20	148.37	7.80	2.48	41610.00	4.80	0.33	0.92	8.70	106.00	76.44	3.26	2.75	8.37	0.00
TARÇIN 2%	~CINNAMON,GROUND~	54.30	1228.48	38.07	1.97	260.00	0.01	0.08	0.14	1.30	29.00	28.46	0.65	0.48	0.53	0.00
KARABİBER 3%	~PEPPER,BLACK~	26.50	436.64	28.86	1.42	190.00	1.03	0.11	0.24	1.14	10.00	21.00	0.98	1.01	1.13	0.00
NANE 5%	~PEPPERMINT,DRIED~	33.76	1025.49	21.44	4.68	17927.16	1.43	0.35	1.12	7.20	481.10	134.20	1.04	0.14	2.14	0.00
KEKİK 5%	~THYME,GROUND~	37.00	1889.50	123.60	6.18	3800.00	1.69	0.51	0.40	4.94	274.00	50.00	2.73	0.47	1.19	0.00
TATLI BİBER 10%	~PEPPER,RED OR CAYENNE~	27.20	148.37	7.80	2.48	41610.00	4.80	0.33	0.92	8.70	106.00	76.44	3.26	2.75	8.37	0.00
TOPLAM	RESULTS	**25.20**	**466.00**	**27.22**	**3.20**	**28397.76**	**3.51**	**0.39**	**0.75**	**7.24**	**109.63**	**61.64**	**2.66**	**4.67**	**6.31**	**0.00**
LEBLEBİ ŞEKERİ																
LEBLEBİ 90%	~CHICKPEAS (GARBANZO BNS,BENGAL GM),MATURE~	17.40	105.00	6.24	3.43	67.00	0.82	0.48	0.21	1.54	556.60	4.00	0.63	1.36	2.69	0.00
ŞEKER 10%	~CANDIES,HARD~	0.00	3.00	0.30	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
TOPLAM	RESULTS	**15.66**	**94.80**	**5.65**	**3.09**	**60.30**	**0.74**	**0.43**	**0.19**	**1.39**	**500.94**	**3.60**	**0.56**	**1.22**	**2.42**	**0.00**
MİDYE DOLMA																
MİDYE PİŞMİŞ 34.3%	~MUSSEL,BLUE,CKD,MOIST HEAT~	0.00	33.00	6.72	2.67	304.00	0.00	0.30	0.42	3.00	75.60	13.60	0.85	1.01	1.21	56.00
SOĞAN 20%	~ONIONS,CKD,BLD,DRND,WO/SALT~	1.40	22.00	0.24	0.21	0.00	0.13	0.04	0.02	0.17	15.00	5.20	0.03	0.03	0.07	0.00
PİRİNÇ 23%	~RICE,WHITE,MEDIUM-GRAIN,CKD,UNENR~	0.00	3.00	0.20	0.42	0.00	0.00	0.02	0.02	0.40	2.00	0.00	0.06	0.07	0.06	0.00
DOMATES 19.7%	~TOMATOES,RED,RIPE,RAW,YEAR RND AVERAGE~	1.10	5.00	0.45	0.09	623.00	0.38	0.06	0.05	0.63	15.00	19.10	0.05	0.05	0.14	0.00
ÇAM FISTIĞI 0.58%	~PINE NUTS,PINYON,DRIED~	10.70	8.00	3.06	4.28	29.00	0.00	1.24	0.22	4.37	57.80	2.00	9.36	22.94	25.67	0.00
KUŞ ÜZÜMÜ 0.58%	~CURRANTS,RED&WHITE,RAW~	4.30	33.00	1.00	0.23	120.00	0.10	0.04	0.05	0.10	8.00	41.00	0.02	0.03	0.09	0.00
TARÇIN 0.12%	~CINNAMON,GROUND~	54.30	1228.48	38.07	1.97	260.00	0.01	0.08	0.14	1.30	29.00	28.46	0.65	0.48	0.53	0.00
KARABİBER 0.12%	~PEPPER,BLACK~	26.50	436.64	28.86	1.42	190.00	1.03	0.11	0.24	1.14	10.00	21.00	0.98	1.01	1.13	0.00
TOZ ŞEKER 0.70%	~SUGARS,GRANULATED~	0.00	1.00	0.06	0.03	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TUZ 0.87%	~SALT,TABLE~	0.00	24.00	0.33	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOPLAM	RESULTS	**0.68**	**19.85**	**2.59**	**1.10**	**228.41**	**0.10**	**0.14**	**0.16**	**1.31**	**32.77**	**9.78**	**0.38**	**0.51**	**0.62**	**19.21**

APPENDIX B (cont.)

		FIBER (g)	CALCIUM (mg)	IRON (mg)	ZINC (mg)	VIT. A (mcg RE)	VIT. E (mg alpha TE)	THIAMIN (mg)	RIBOFL. (mg)	NIACIN (mg)	FOLATE (mg)	VIT. C (mg)	SFA (g)	MUFA (g)	PUFA (g)	CHOLES. (mg)
PATATES KÖFTESİ																
PATATES HAŞLANMIŞ 59.2%	~POTATOES,BLD,CKD IN SKN,FLESH,WO/SALT~	1.80	5.00	0.31	0.30	0.00	0.05	0.11	0.02	1.44	10.00	13.00	0.03	0.00	0.04	0.00
KAŞAR 8.9%	~CHEESE,CHEDDAR~	0.00	721.30	0.68	3.11	1059.00	0.36	0.03	0.38	0.08	18.20	0.00	21.09	9.39	0.94	104.90
YEMEKLİK MARGARİN 7.4%	~SHORTENING,HOUSEHOLD,LARD&VEG OIL~	0.00	0.00	0.00	0.00	0.00	1.21	0.00	0.00	0.00	0.00	0.00	40.30	44.40	10.90	56.00
YUMURTA 17.7%	~EGG,WHOLE,RAW,FRESH~	0.00	49.00	1.44	1.10	635.00	1.05	0.06	0.51	0.07	47.00	0.00	3.10	3.81	1.36	425.00
UN 5.9%	~WHEAT FLR,WHITE,ALL-PURPOSE,ENR,BLEACHED~	2.70	15.00	4.64	0.70	0.00	0.06	0.79	0.49	5.90	26.00	0.00	0.16	0.09	0.41	0.00
TUZ 0.9%	~SALT,TABLE~	0.00	24.00	0.33	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOPLAM	RESULTS	**1.22**	**76.93**	**0.78**	**0.69**	**206.65**	**0.34**	**0.12**	**0.16**	**1.22**	**17.39**	**7.70**	**6.43**	**4.80**	**1.18**	**88.71**
PESTİL																
DUT 70%	~MULBERRIES,RAW~	1.70	39.00	1.85	0.12	25.00	0.45	0.03	0.10	0.62	6.00	36.40	0.03	0.04	0.21	0.00
UN 30%	~WHEAT FLR,WHITE,ALL-PURPOSE,ENR,BLEACHED~	2.70	15.00	4.64	0.70	0.00	0.06	0.79	0.49	5.90	26.00	0.00	0.16	0.09	0.41	0.00
TOPLAM		2.00	31.80	2.69	0.29	17.50	0.33	0.26	0.22	2.21	12.00	25.48	0.07	0.05	0.27	0.00
RUS SALATASI																
HAVUÇ HAŞLANMIŞ 14.2%	~CARROTS,CKD,BLD,DRND,WO/SALT~	3.30	31.00	0.62	0.30	24554.00	0.42	0.03	0.06	0.51	13.90	2.30	0.03	0.01	0.09	0.00
PATATES HAŞLANMIŞ 16.6%	~POTATOES,BLD,CKD IN SKN,FLESH,WO/SALT~	1.80	5.00	0.31	0.30	0.00	0.05	0.11	0.02	1.44	10.00	13.00	0.03	0.00	0.04	0.00
YUMURTA HAŞLANMIŞ 7.1%	~EGG,WHL,CKD,HARD-BOILED~	0.00	50.00	1.19	1.05	560.00	1.05	0.07	0.51	0.06	44.00	0.00	3.27	4.08	1.41	424.00
LİMON 7.1%	~LEMONS,RAW,WITHOUT PEEL~	2.80	26.00	0.60	0.06	29.00	0.24	0.04	0.02	0.10	10.60	53.00	0.04	0.01	0.09	0.00
KIRMIZI TURP 7.1%	~RADISHES,RAW~	1.60	21.00	0.29	0.30	8.00	0.00	0.01	0.05	0.30	27.00	22.80	0.03	0.02	0.05	0.00
SALATALIK TURŞUSU 14.2%	~PICKLE,CUCUMBER,SOUR~	1.20	0.00	0.40	0.02	145.00	0.16	0.00	0.01	0.00	0.71	1.00	0.05	0.00	0.08	0.00
HAŞLANMIŞ BEZELYE 14.2%	~PEAS,GRN,CKD,BLD,DRND,WO/SALT~	5.50	27.00	1.54	1.19	597.00	0.39	0.26	0.15	2.02	63.30	14.20	0.04	0.02	0.10	0.00
TUZ 1.1%	~SALT,TABLE~	0.00	24.00	0.33	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
KARABİBER 0.4%	~PEPPER,BLACK~	26.50	436.64	28.86	1.42	190.00	1.03	0.11	0.24	1.14	10.00	21.00	0.98	1.01	1.13	0.00
MAYONEZ 17.8%	~SALAD DRSNG,MAYO TYPE,REG,W/SALT~	0.00	14.00	0.20	0.18	220.00	4.00	0.01	0.02	0.00	6.28	0.00	4.90	9.00	18.00	26.00
TOPLAM	RESULTS	**2.14**	**20.47**	**0.72**	**0.40**	**3674.34**	**0.95**	**0.07**	**0.08**	**0.64**	**19.69**	**10.13**	**1.14**	**1.90**	**3.36**	**34.73**
ŞEKERPARE (PİŞMEMİŞ)																
UN 80%	~WHEAT FLR,WHITE,ALL-PURPOSE,ENR,BLEACHED~	2.70	15.00	4.64	0.70	0.00	0.06	0.79	0.49	5.90	26.00	0.00	0.16	0.09	0.41	0.00
ŞEKER 5%	~SUGARS,GRANULATED~	0.00	1.00	0.06	0.03	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MARGARİN 5%	~SHORTENING,HOUSEHOLD,LARD&VEG OIL~	0.00	0.00	0.00	0.00	0.00	1.21	0.00	0.00	0.00	0.00	0.00	40.30	44.40	10.90	56.00
K. TOZU 2%	~LEAVENING AGENTS,BAKING PDR,DOUBLE-ACTING~	0.20	5876.00	11.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
YUMURTA 8%	~EGG,WHOLE,RAW,FRESH~	0.00	49.00	1.44	1.10	635.00	1.05	0.06	0.51	0.07	47.00	0.00	3.10	3.81	1.36	425.00
TOPLAM	RESULTS	**2.16**	**133.49**	**4.05**	**0.65**	**50.80**	**0.19**	**0.63**	**0.44**	**4.73**	**24.56**	**0.00**	**2.39**	**2.59**	**0.98**	**36.80**
ŞEKERPARE (PİŞMİŞ)																
SU 30.30%	~WATER,BOTTLED,PERRIER~	0.00	14.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ŞEKER 24.24%	~SUGARS,GRANULATED~	0.00	1.00	0.06	0.03	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ŞEKERPARE 45.45%		2.16	133.49	4.05	0.65	50.80	0.19	0.63	0.44	4.73	24.56	0.00	2.39	2.59	0.98	36.80
TOPLAM	RESULTS	**0.98**	**65.16**	**1.86**	**0.30**	**23.09**	**0.09**	**0.29**	**0.20**	**2.15**	**11.16**	**0.00**	**1.08**	**1.18**	**0.45**	**16.73**
TARATOR																
CEVİZ İÇİ 41.7 %	~WALNUTS,ENG OR PERSIAN,DRIED~	4.80	94.00	2.44	2.73	124.00	2.62	0.38	0.15	1.04	66.00	3.20	5.59	14.18	39.13	0.00
EKMEK 41.7%	~BREAD,ITALIAN~	2.70	78.00	2.94	0.86	0.00	0.28	0.47	0.29	4.38	30.00	0.00	0.86	0.81	1.39	0.00
SARIMSAK 4.2 %	~GARLIC,RAW~	2.10	181.00	1.70	1.16	0.00	0.01	0.20	0.11	0.70	3.10	31.20	0.09	0.01	0.25	0.00
LİMON 12.5 %	~LEMONS,RAW,WITHOUT PEEL~	2.80	26.00	0.60	0.06	29.00	0.24	0.04	0.02	0.10	10.60	53.00	0.04	0.01	0.09	0.00
TOPLAM	RESULTS	3.57	82.58	2.39	1.55	55.33	1.24	0.37	0.19	2.30	41.49	9.27	2.69	6.25	16.92	0.00

APPENDIX C

BLACK SEA REGION

CONTRIBUTION OF EACH FOOD GROUP TO INTAKE OF DIFFERENT NUTRIENTS AS PERCENTAGE OF TOTAL SUPPLY

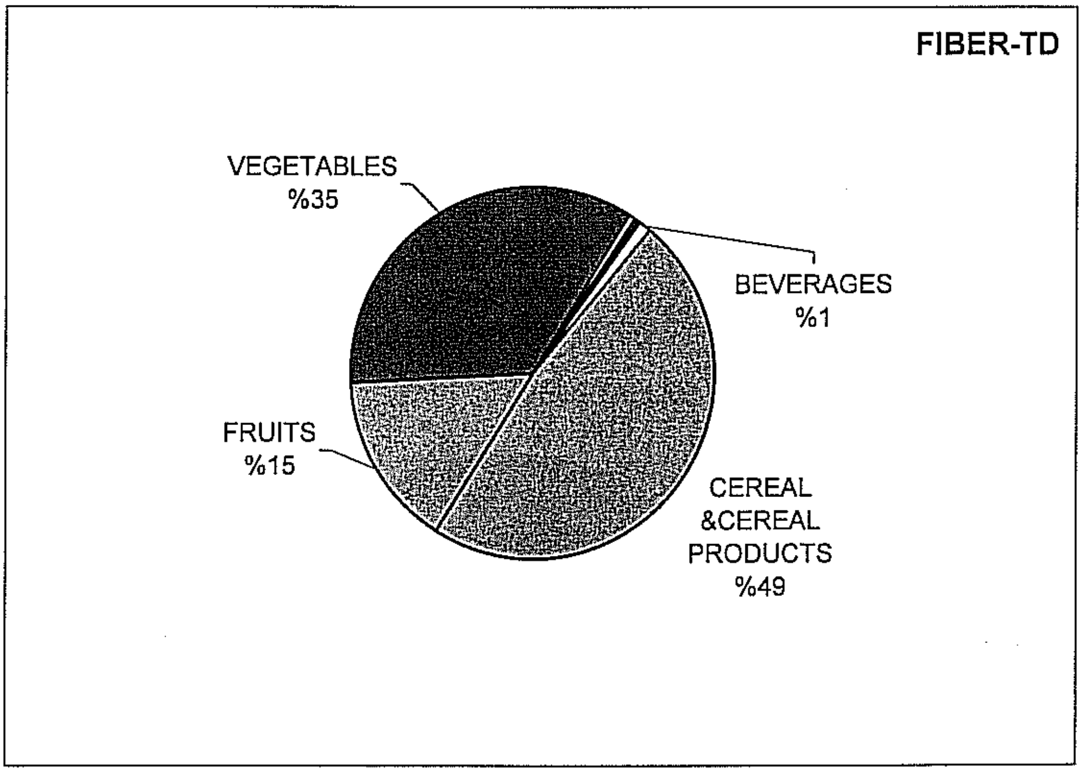


Figure C.1. Contribution of each food group to total dietary fiber intake as percentage of total supply

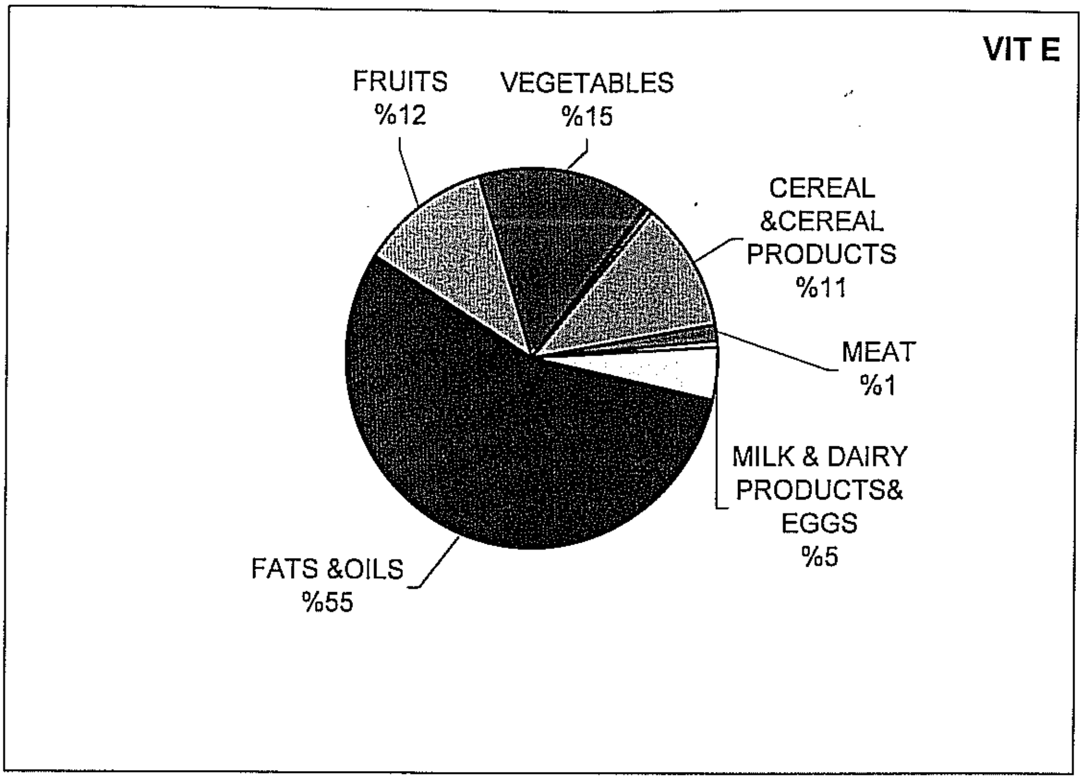


Figure C.6. Contribution of each food group to vitamin E intake as percentage of total supply

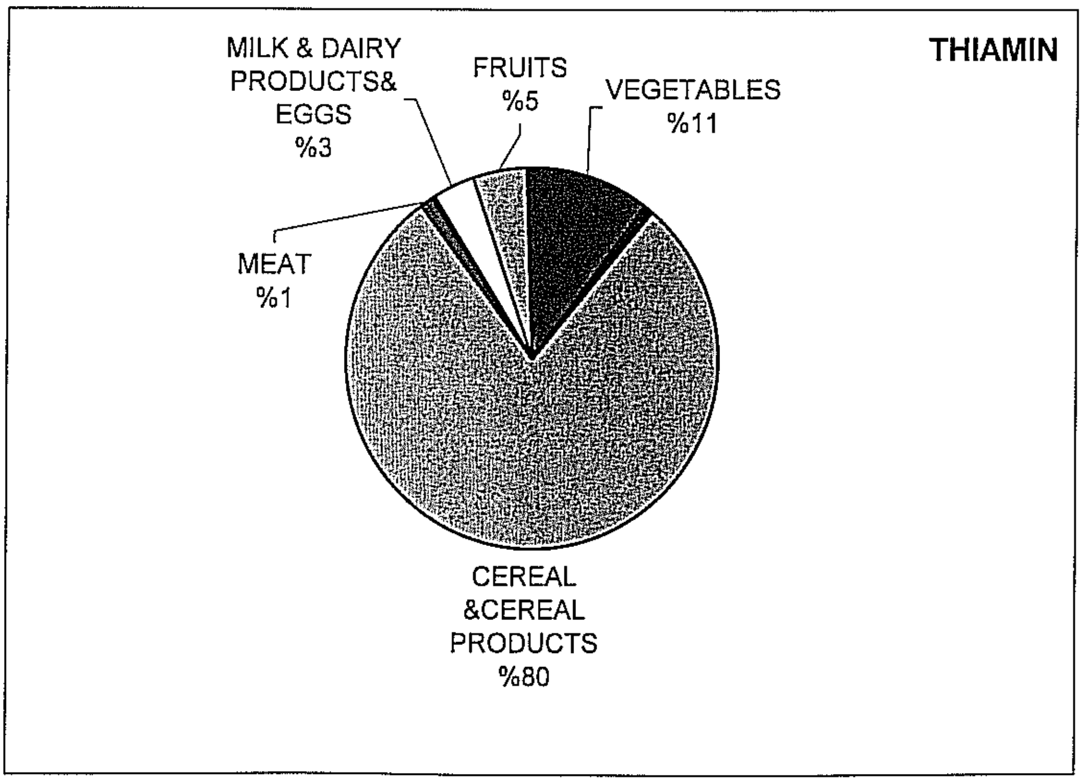


Figure C.7. Contribution of each food group to thiamin intake as percentage of total supply

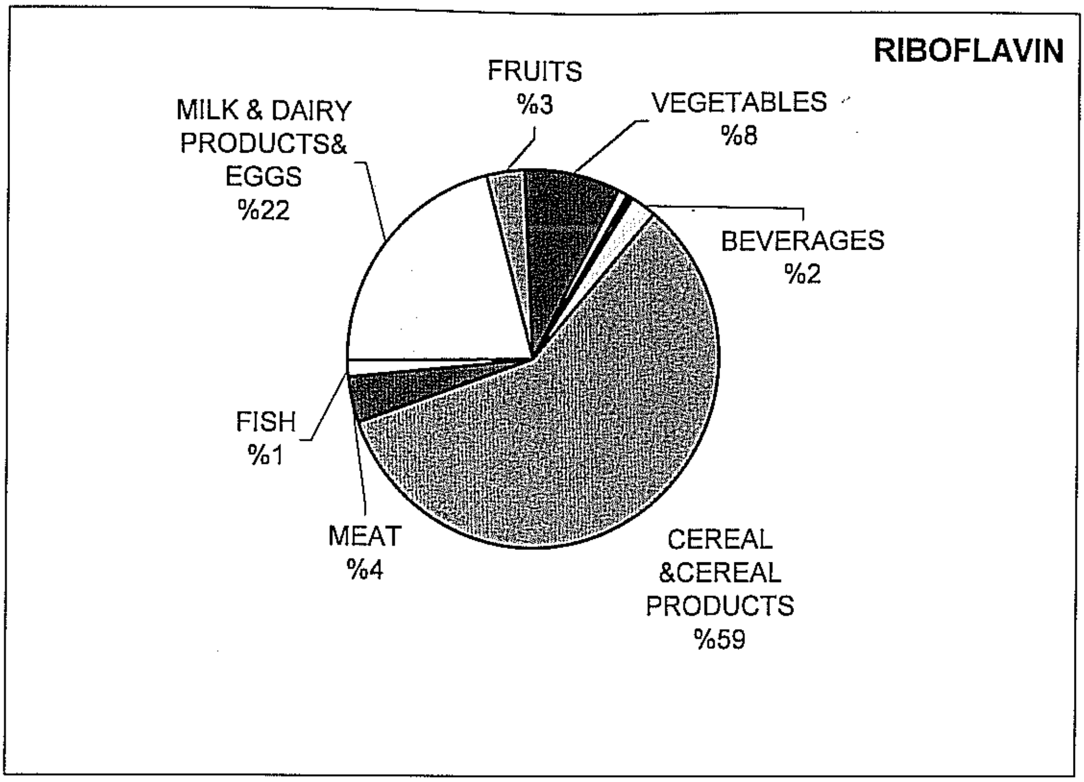


Figure C.8. Contribution of each food group to riboflavin intake as percentage of total supply

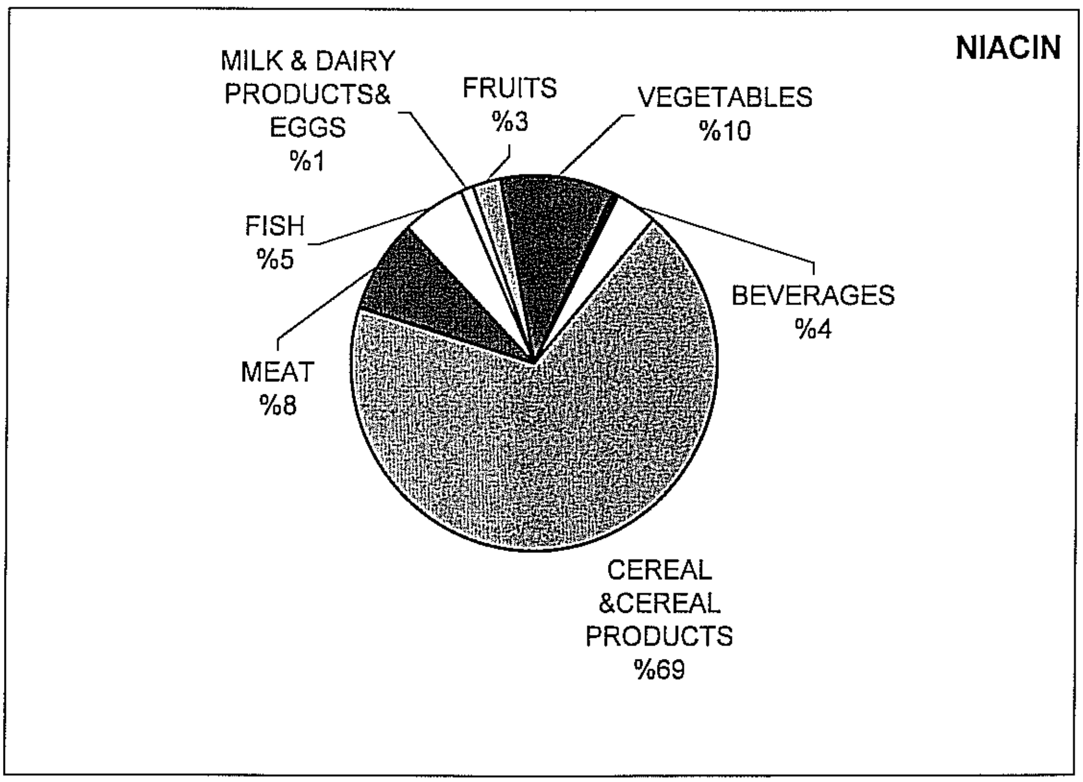


Figure C.9. Contribution of each food group to niacin intake as percentage of total supply

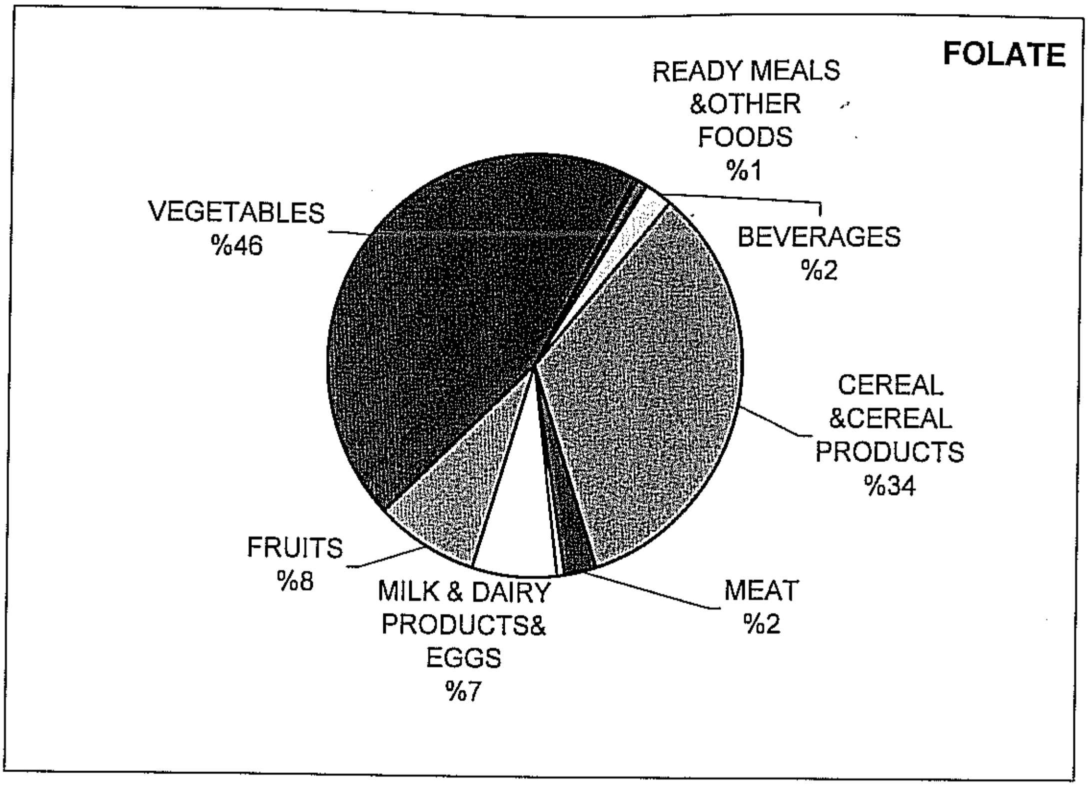


Figure C.10. Contribution of each food group to folate intake as percentage of total supply

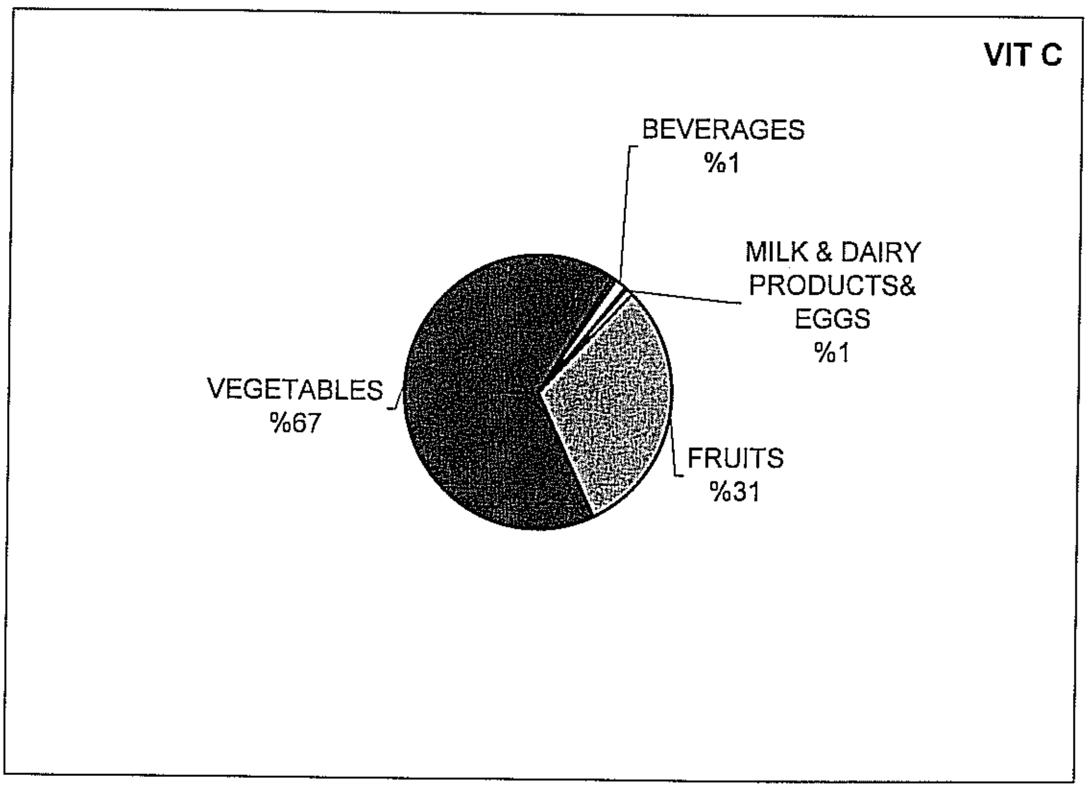


Figure C.11.Contribution of each food group to vitamin C intake as percentage of total supply

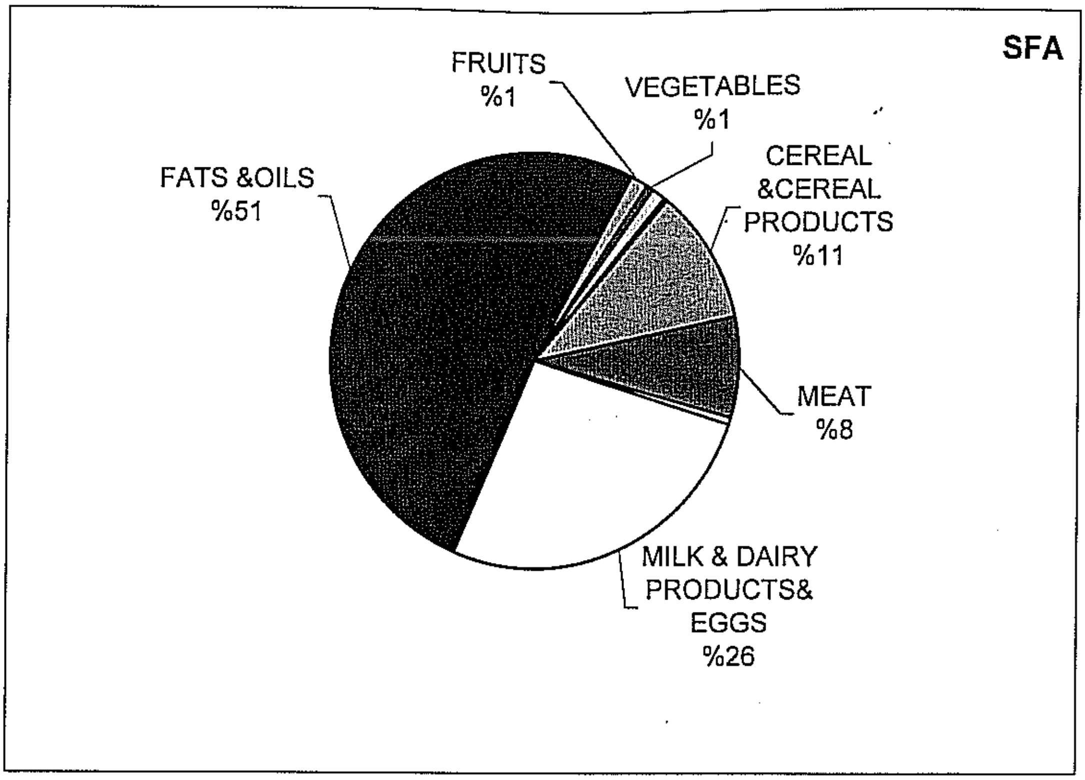


Figure C.12. Contribution of each food group to saturated fatty acid intake as percentage of total supply

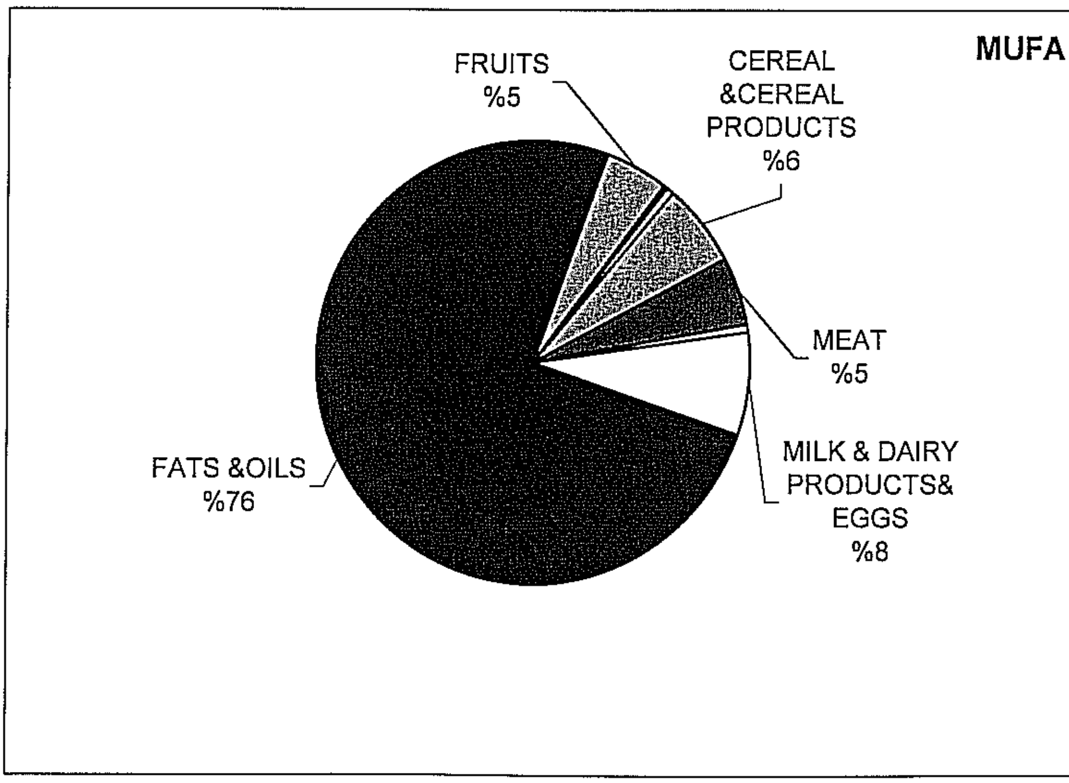


Figure C.13. Contribution of each food group to monounsaturated fatty acid intake as percentage of total supply

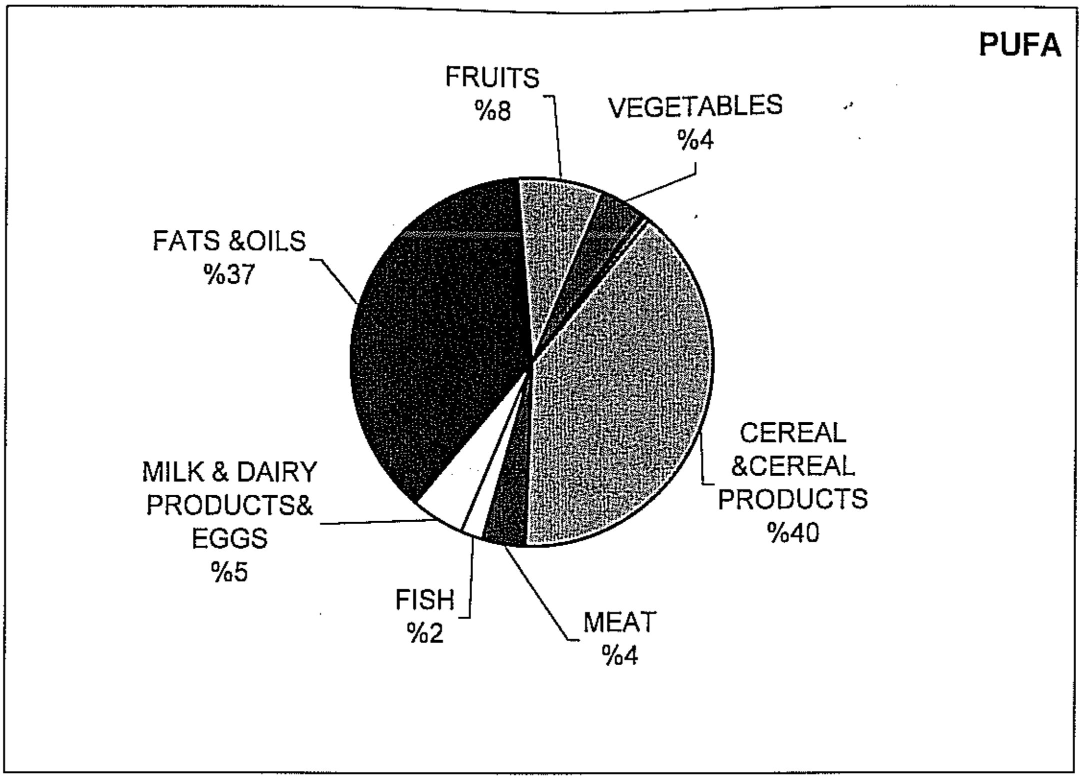


Figure C.14. Contribution of each food group to polyunsaturated fatty acid intake as percentage of total supply

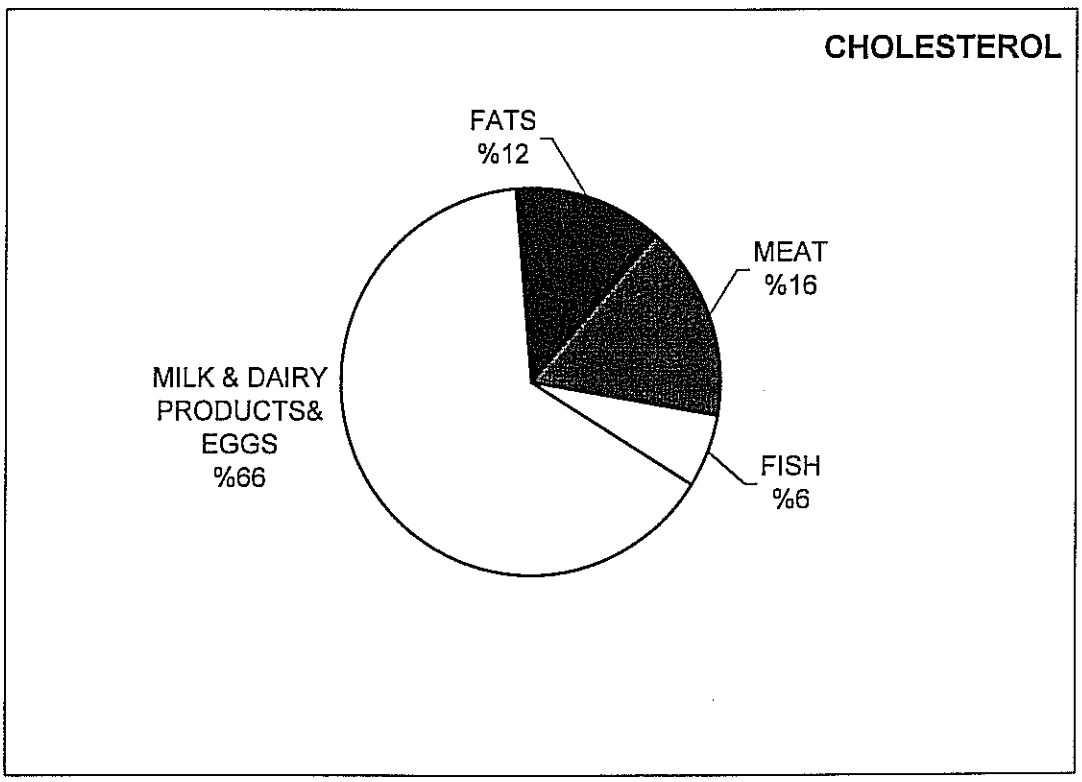


Figure C.15. Contribution of each food group to cholesterol intake as percentage of total supply

APPENDIX D

CENTRAL ANATOLIA REGION

CONTRIBUTION OF EACH FOOD GROUP TO INTAKE OF DIFFERENT NUTRIENTS AS PERCENTAGE OF TOTAL SUPPLY

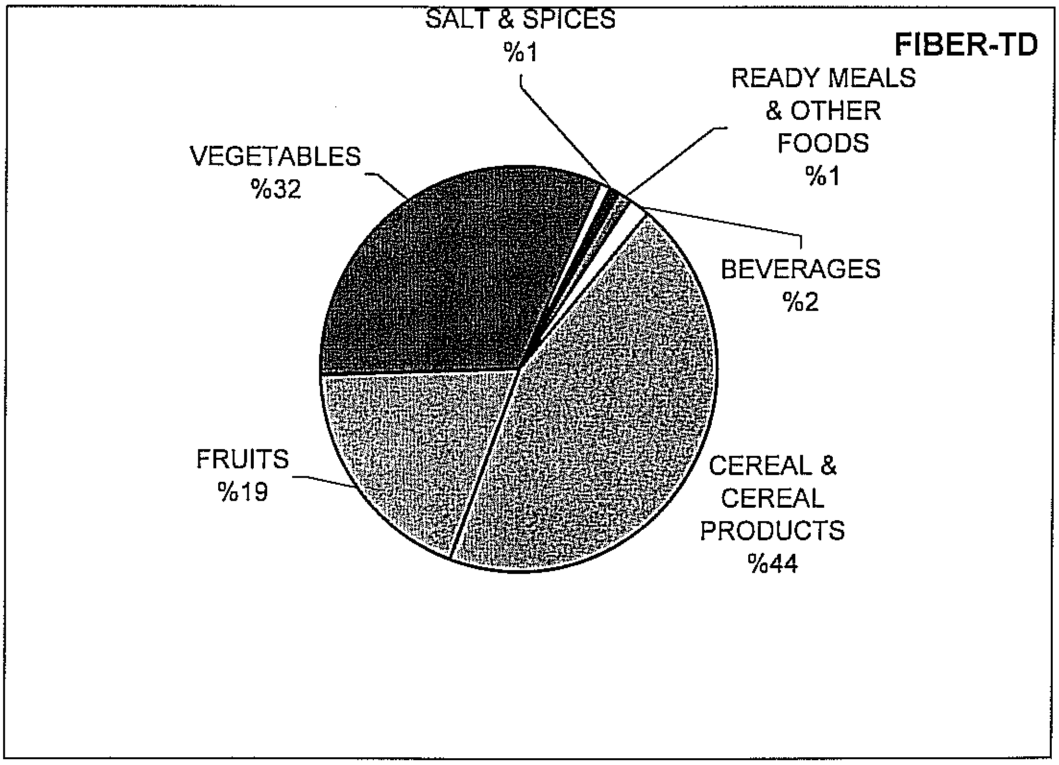


Figure D.1. Contribution of each food group to total dietary fiber intake as percentage of total supply

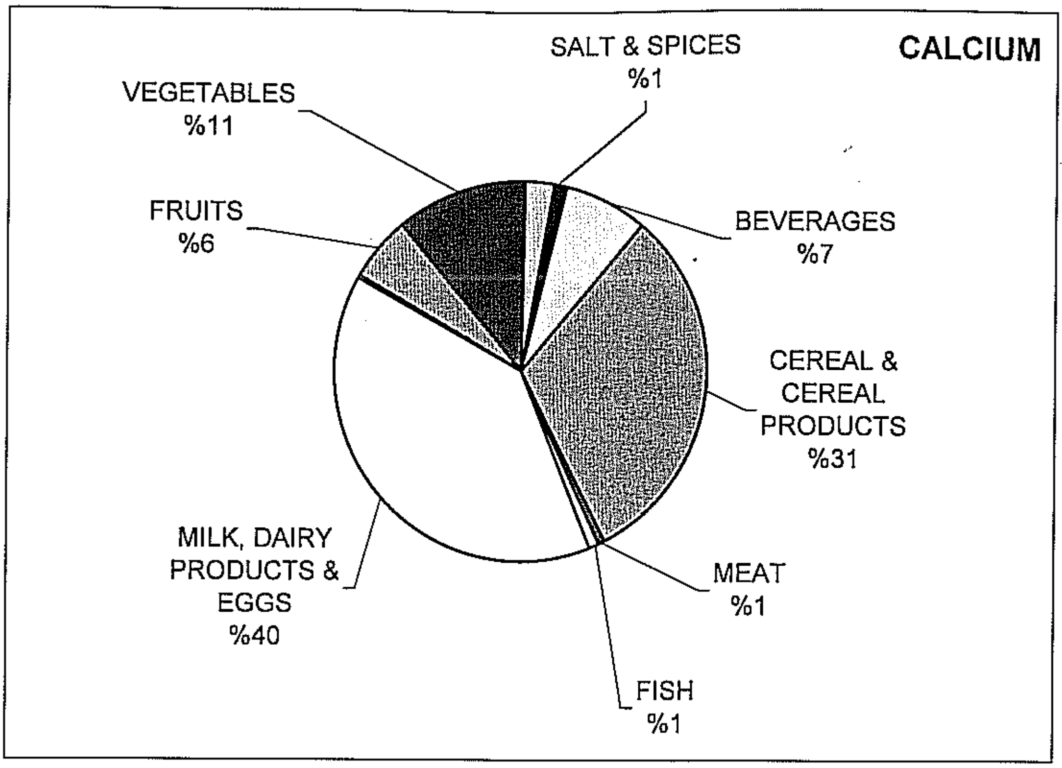


Figure D.2. Contribution of each food group to calcium intake as percentage of total supply

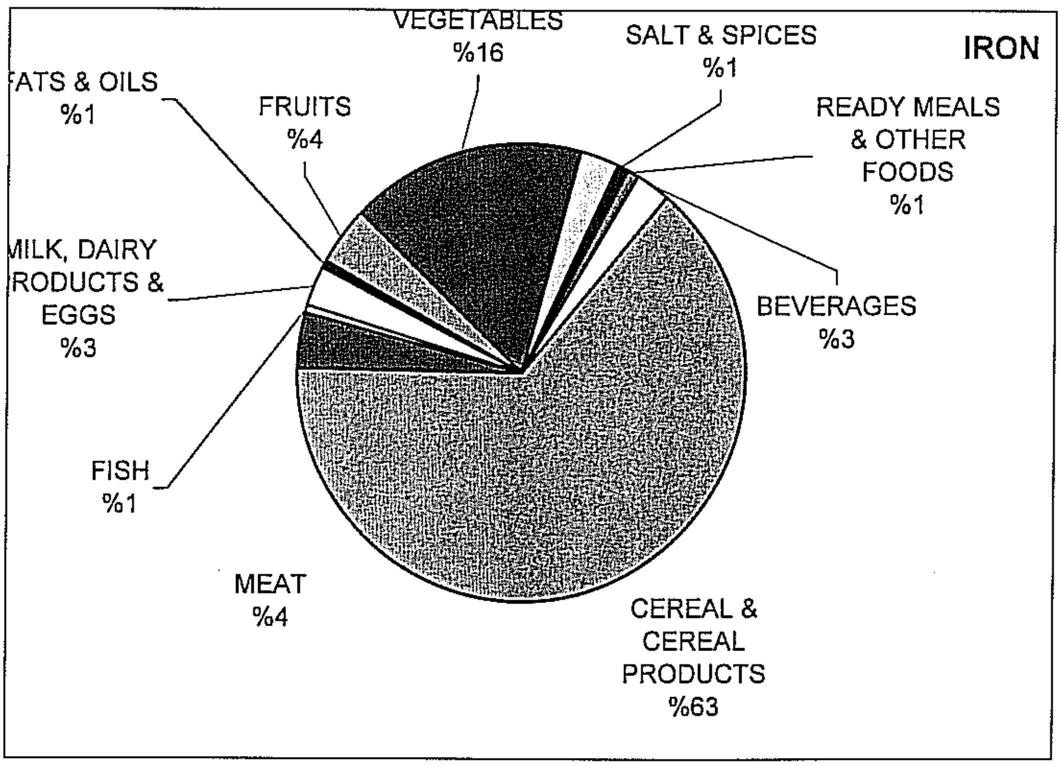


Figure D.3. Contribution of each food group to iron intake as percentage of total supply

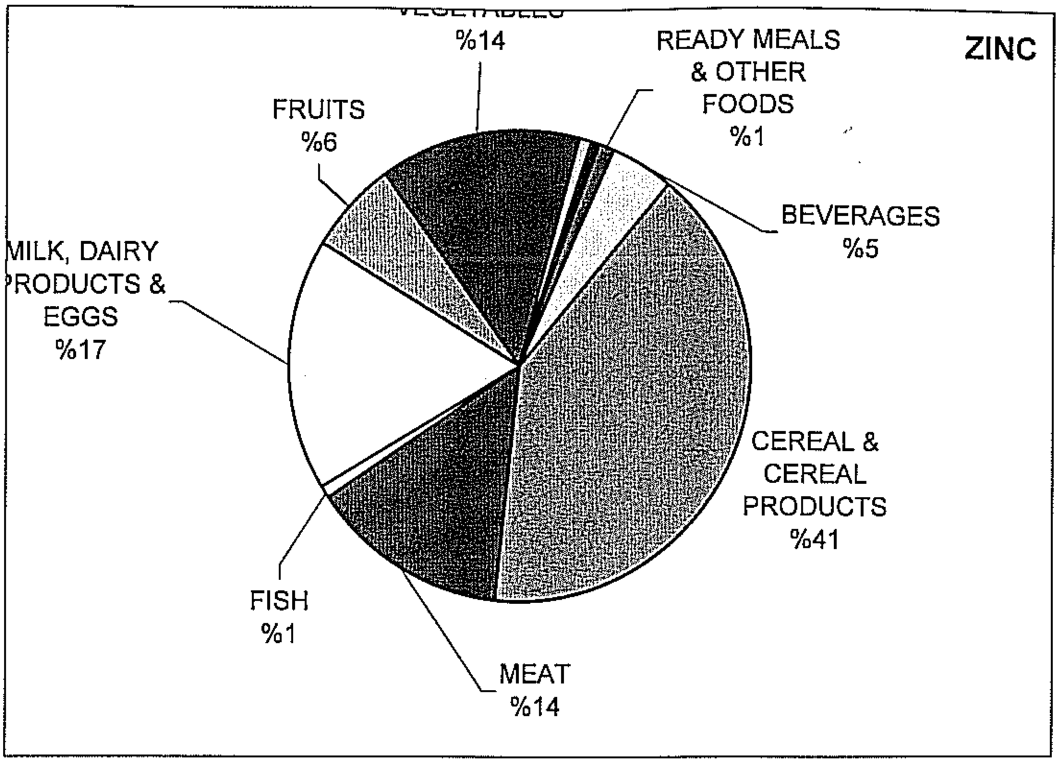


Figure D.4. Contribution of each food group to zinc intake as percentage of total supply

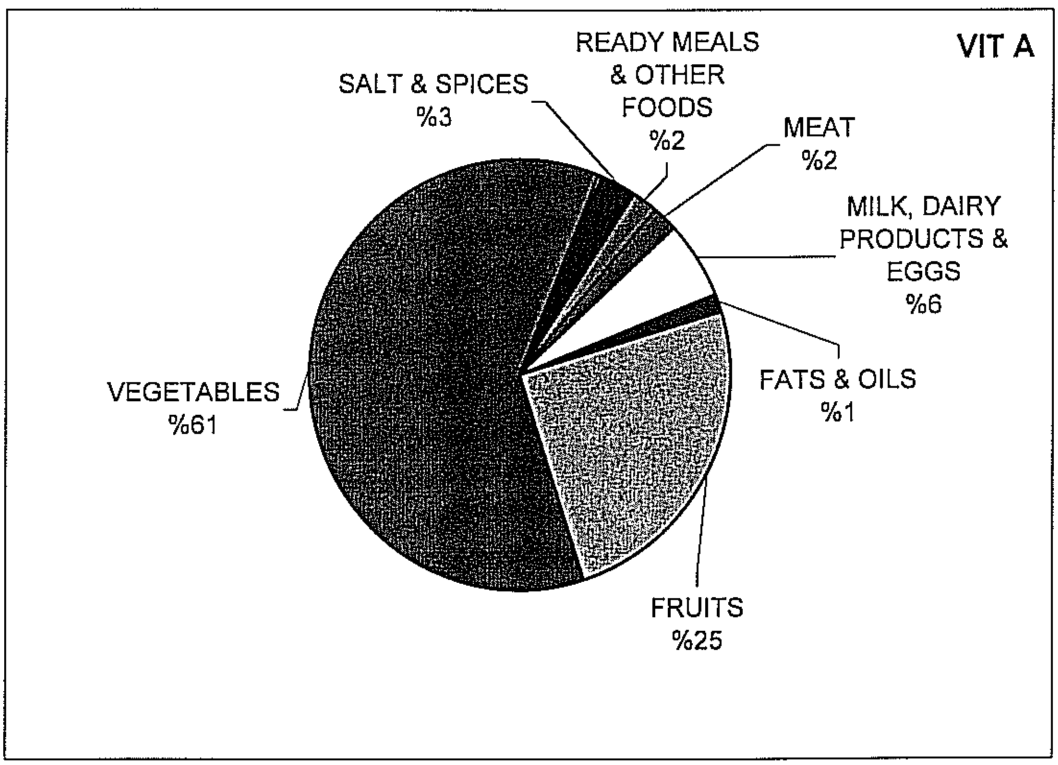


Figure D.5. Contribution of each food group to vitamin A intake as percentage of total supply

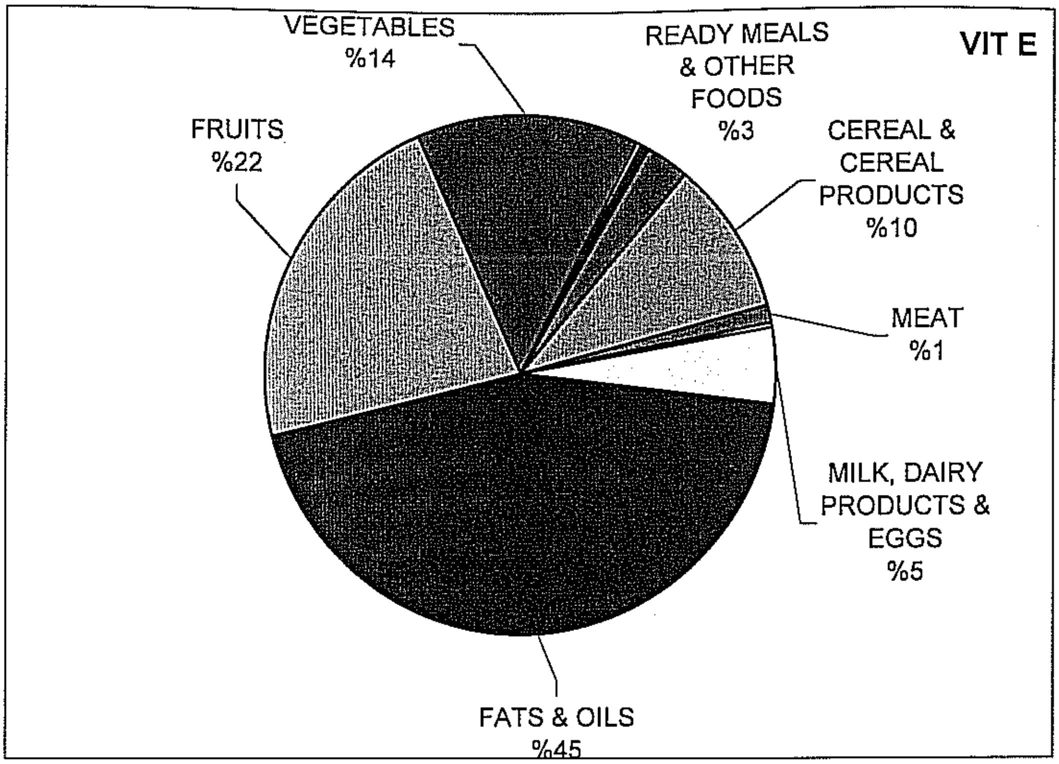


Figure D.6. Contribution of each food group to vitamin E intake as percentage of total supply

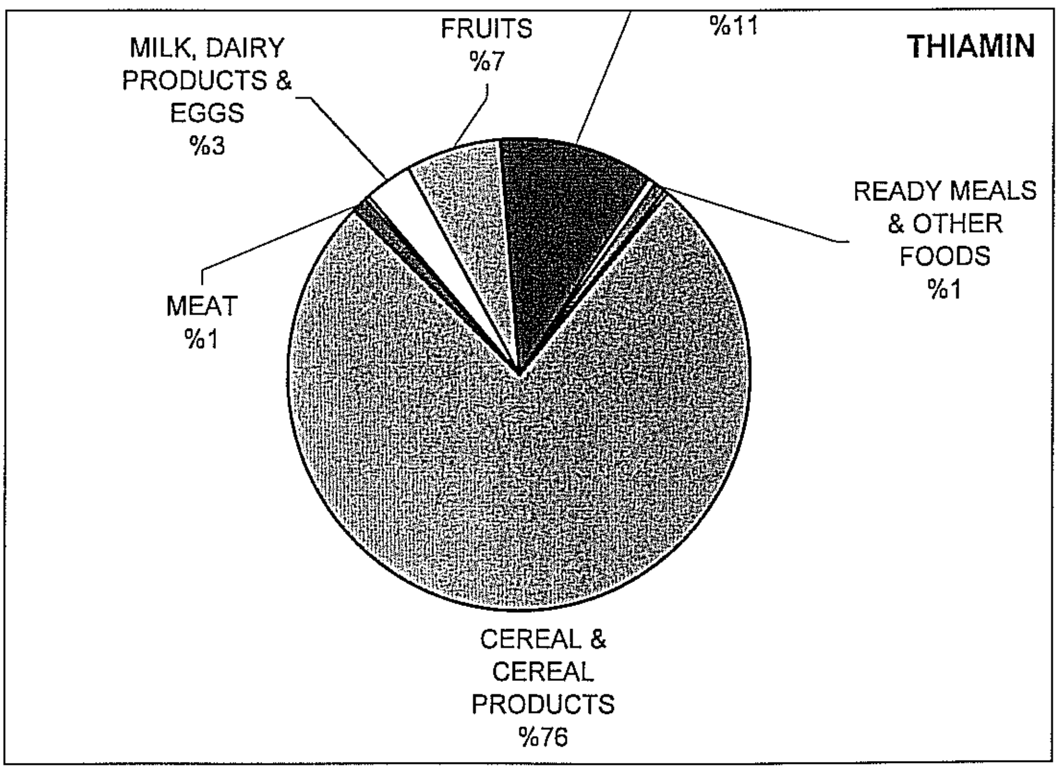


Figure D.7. Contribution of each food group to thiamin intake as percentage of total supply

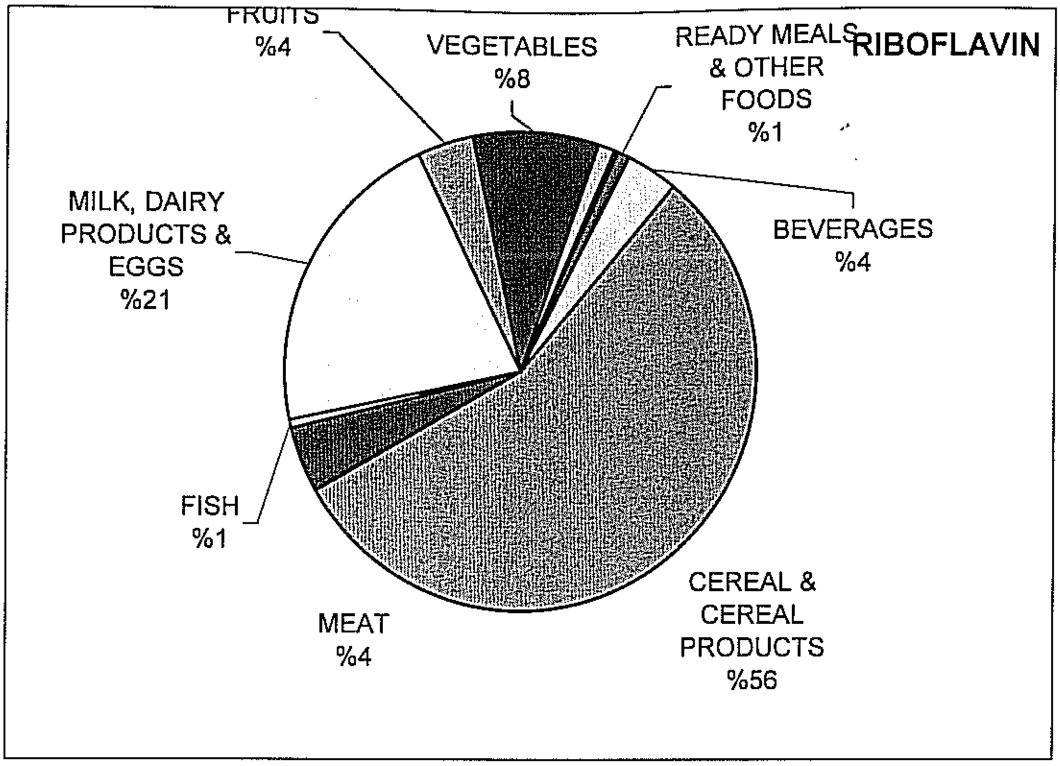


Figure D.8. Contribution of each food group to riboflavin intake as percentage of total supply

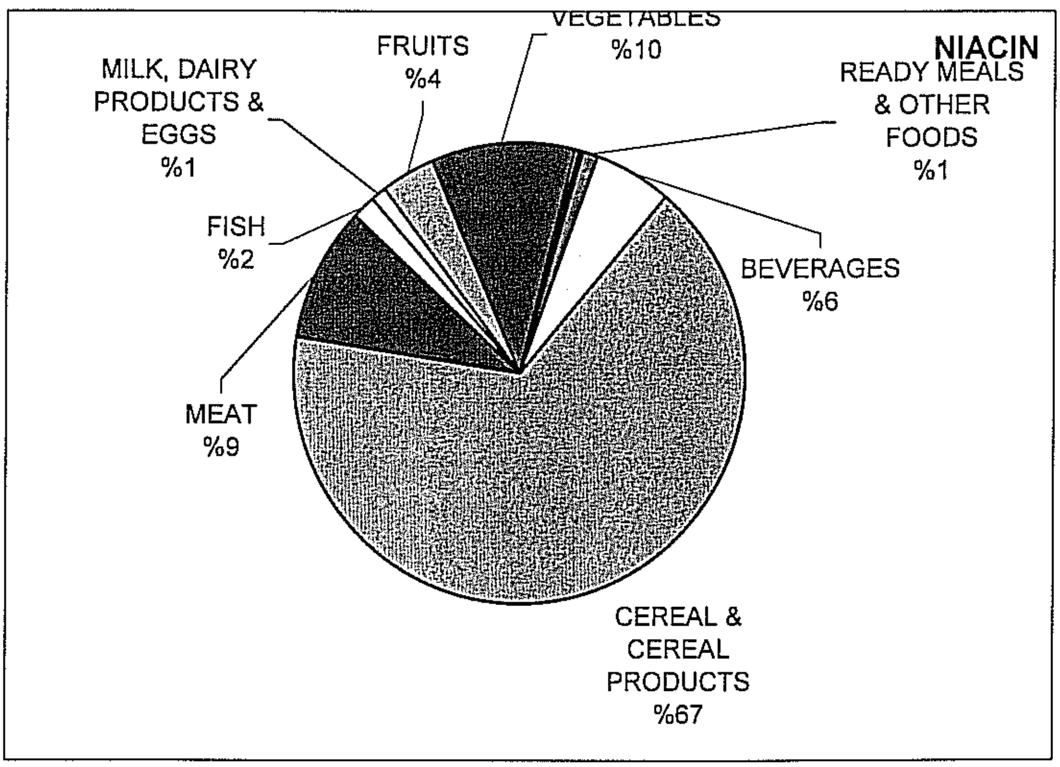


Figure D.9. Contribution of each food group to niacin intake as percentage of total supply

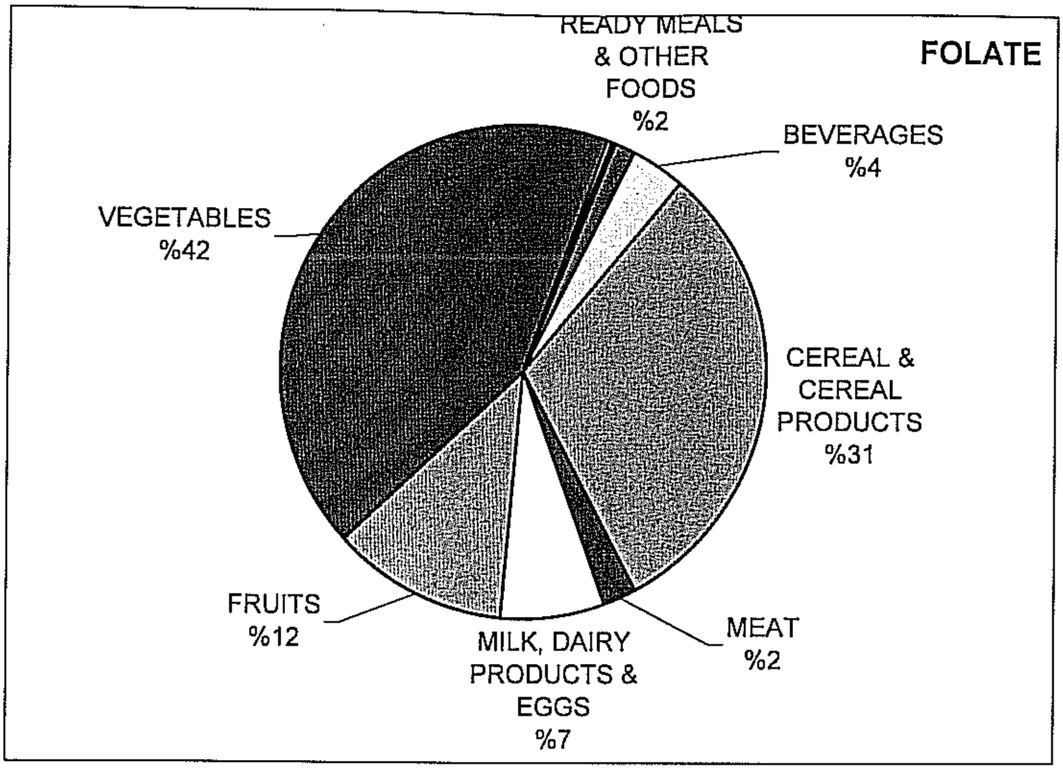


Figure D.10. Contribution of each food group to folate intake as percentage of total supply

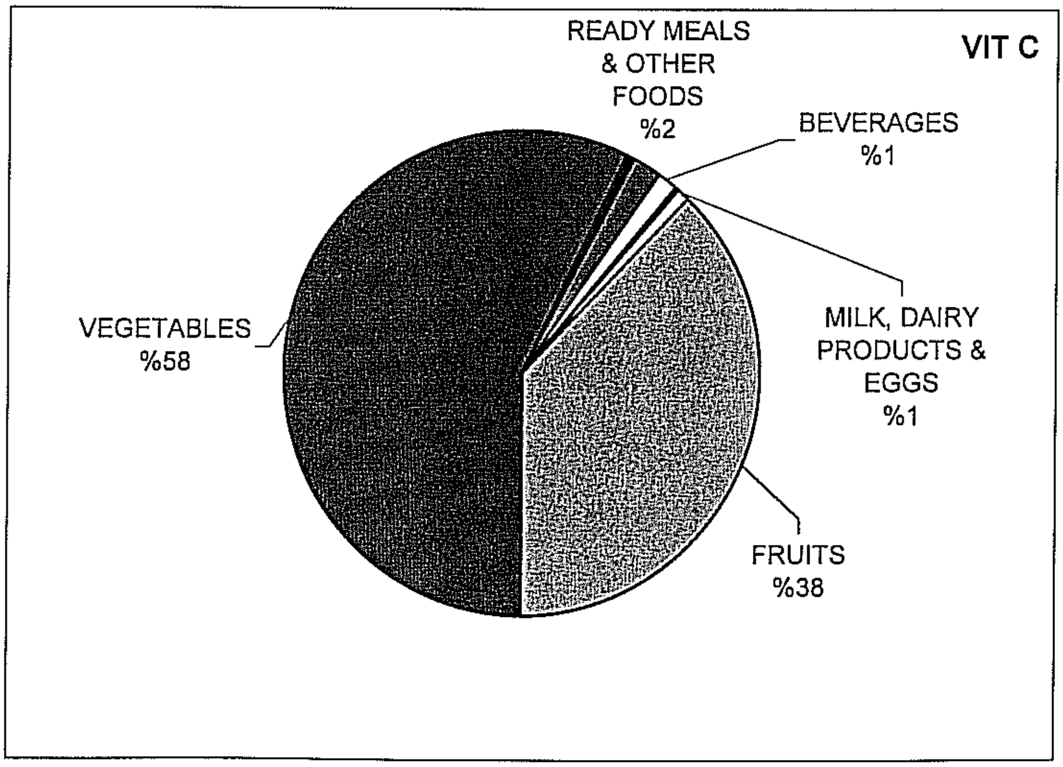


Figure D.11.Contribution of each food group to vitamin C intake as percentage of total supply

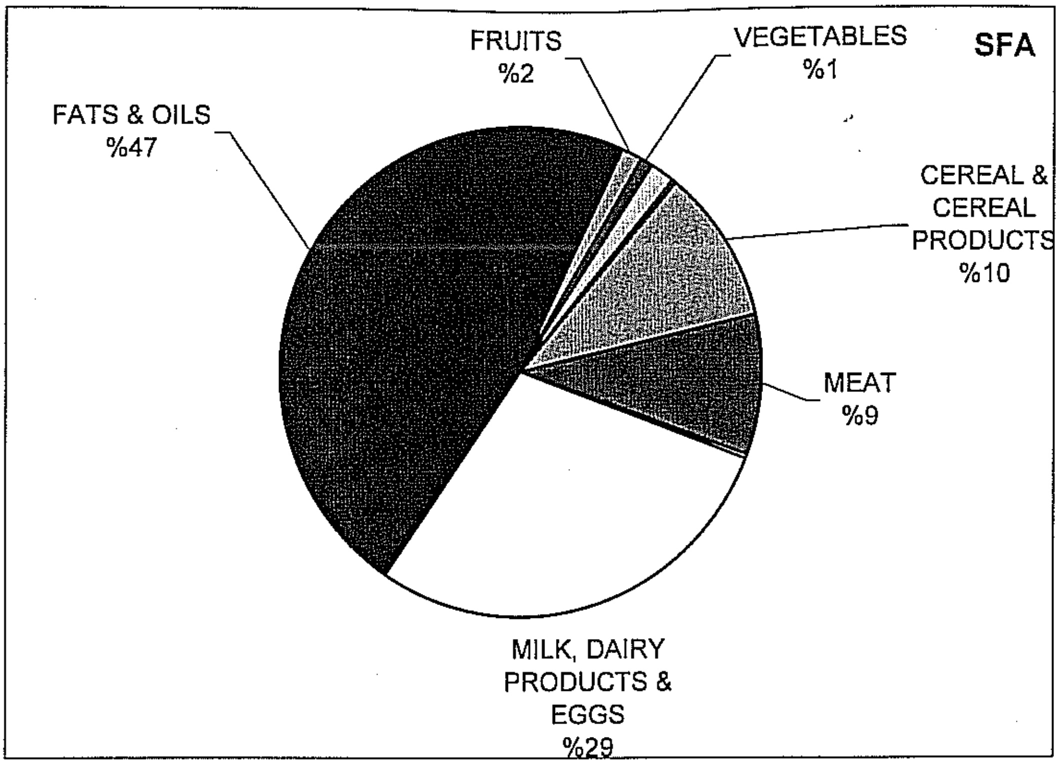


Figure D.12. Contribution of each food group to saturated fatty acid intake as percentage of total supply

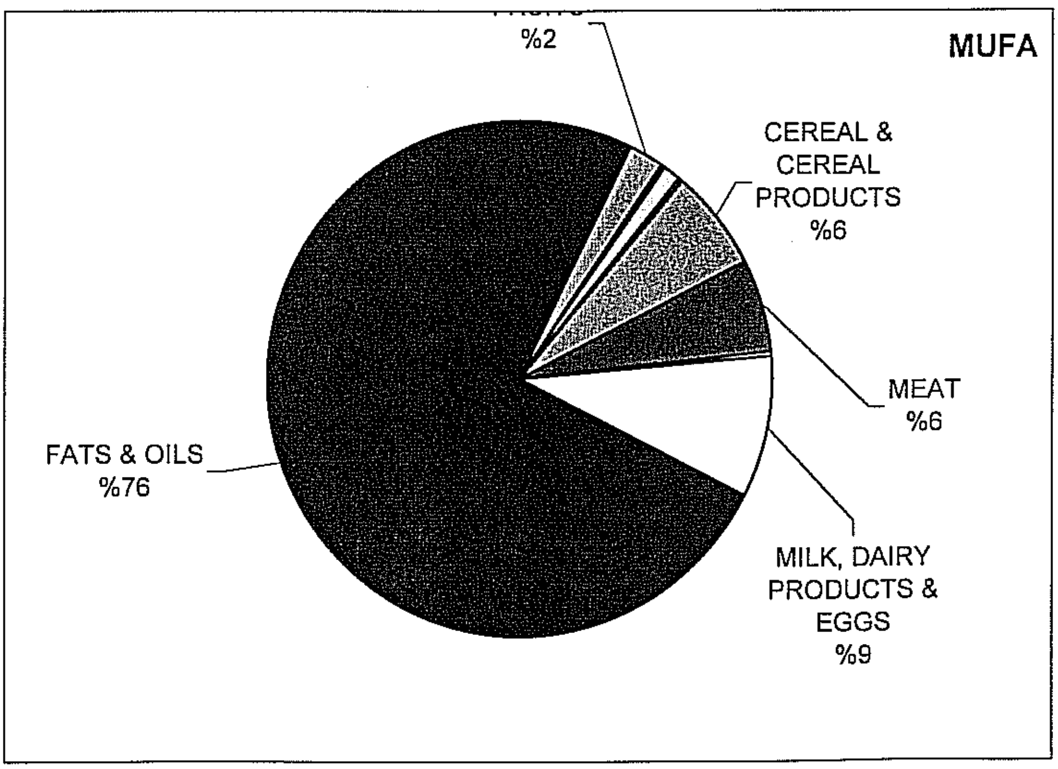


Figure D.13. Contribution of each food group to monounsaturated fatty acid intake as percentage of total supply

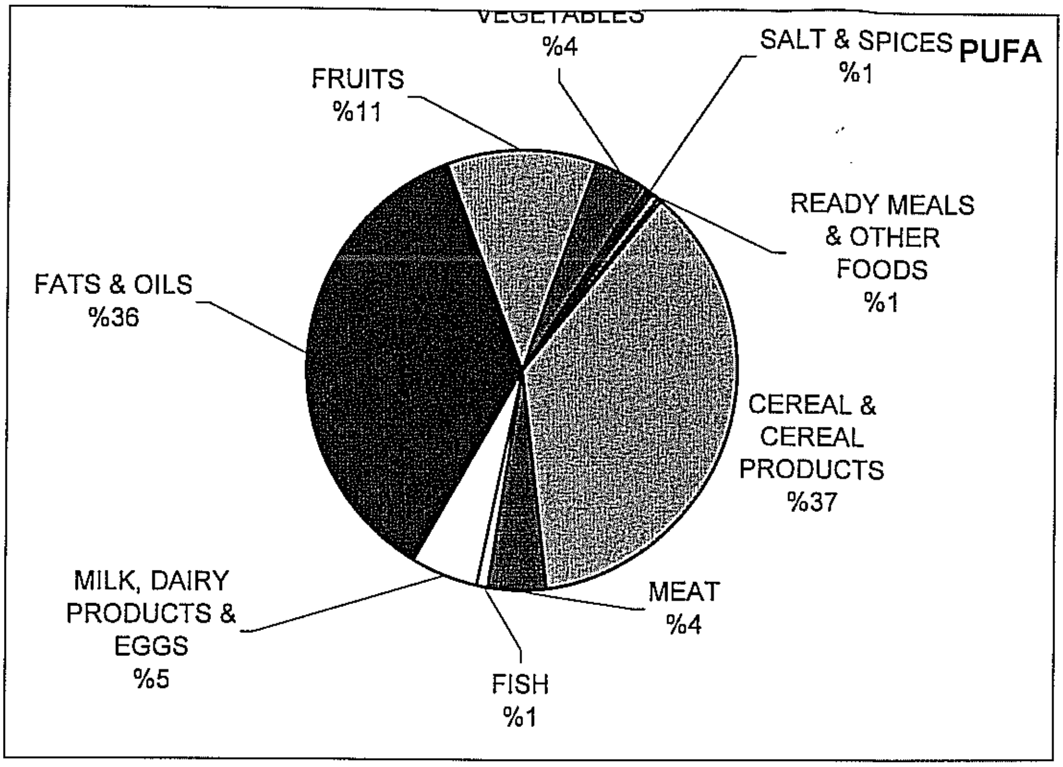


Figure D.14. Contribution of each food group to polyunsaturated fatty acid intake as percentage of total supply

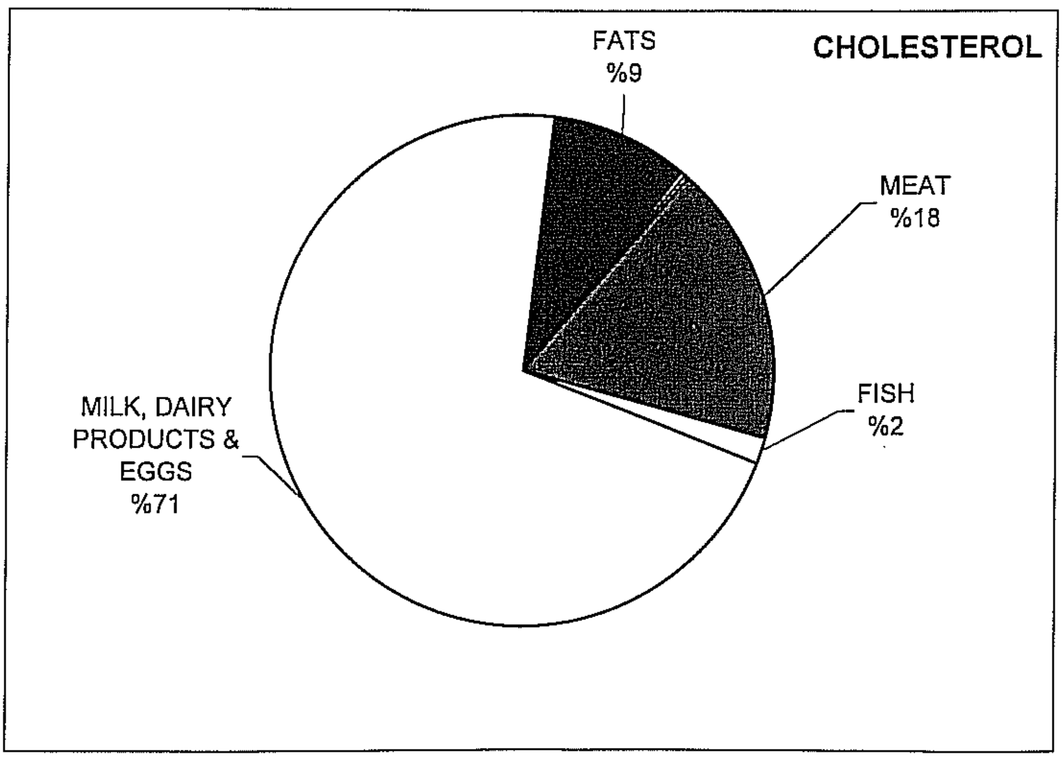


Figure D.15. Contribution of each food group to cholesterol intake as percentage of total supply

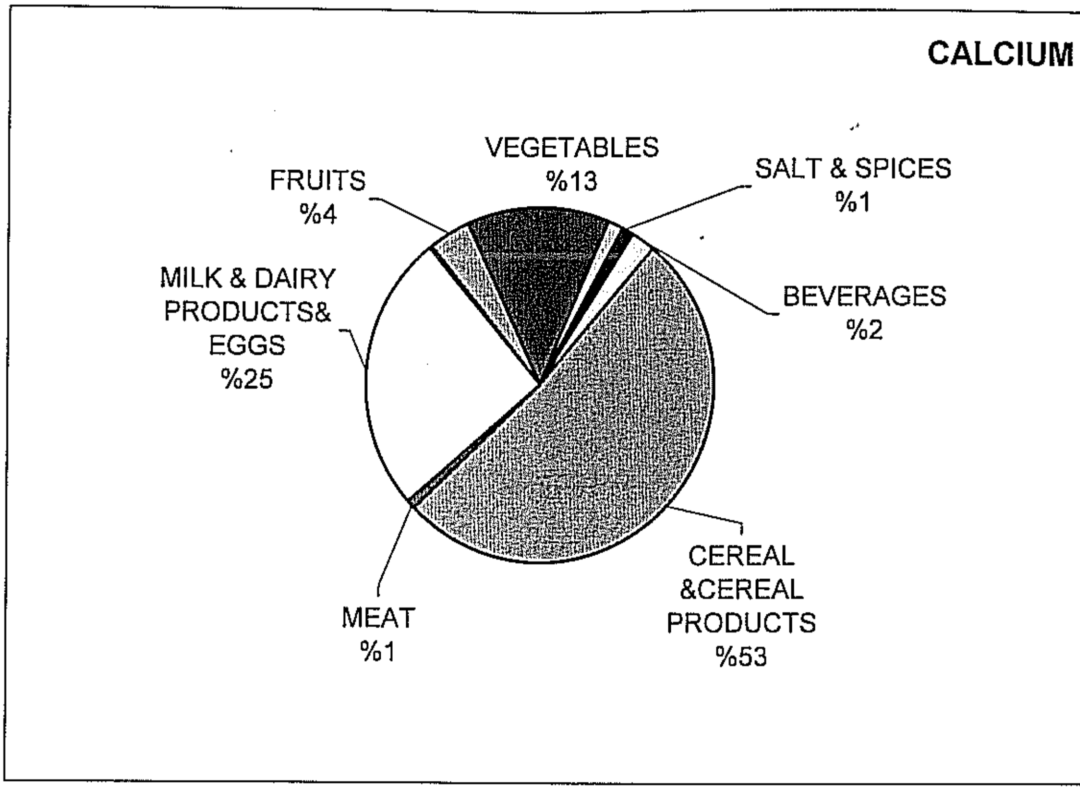


Figure E.2. Contribution of each food group to calcium intake as percentage of total supply

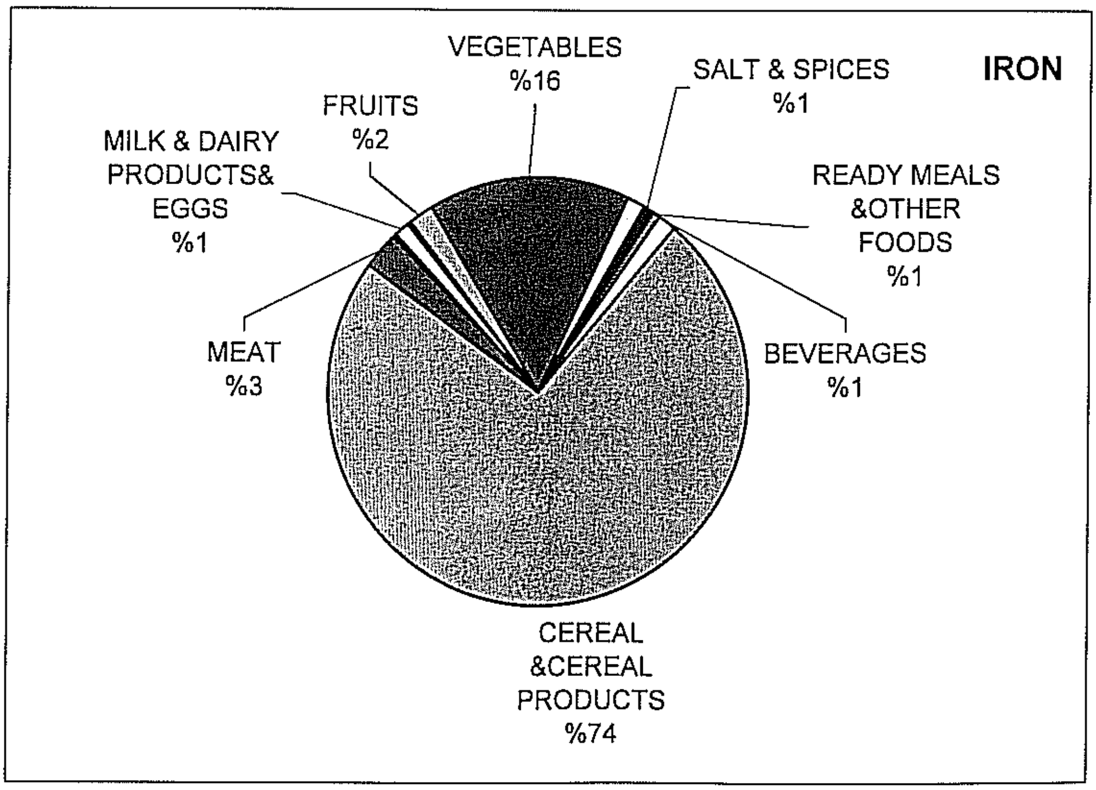


Figure E.3. Contribution of each food group to iron intake as percentage of total supply

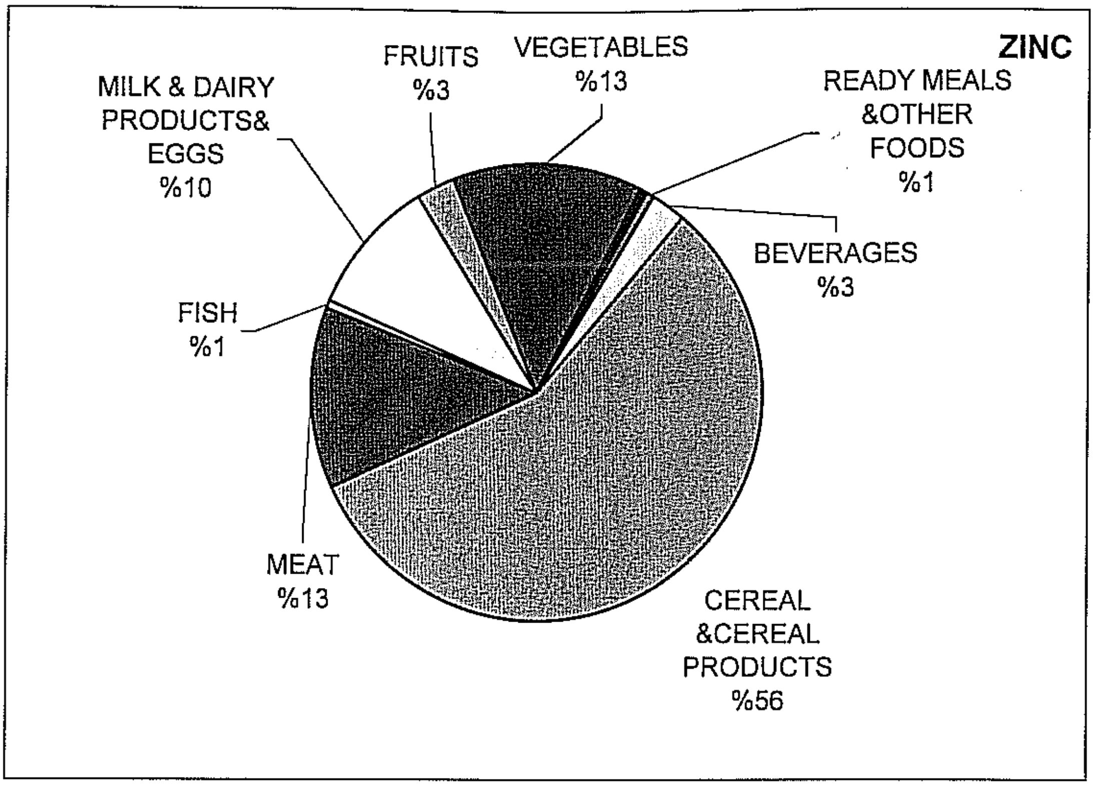


Figure E.4. Contribution of each food group to zinc intake as percentage of total supply

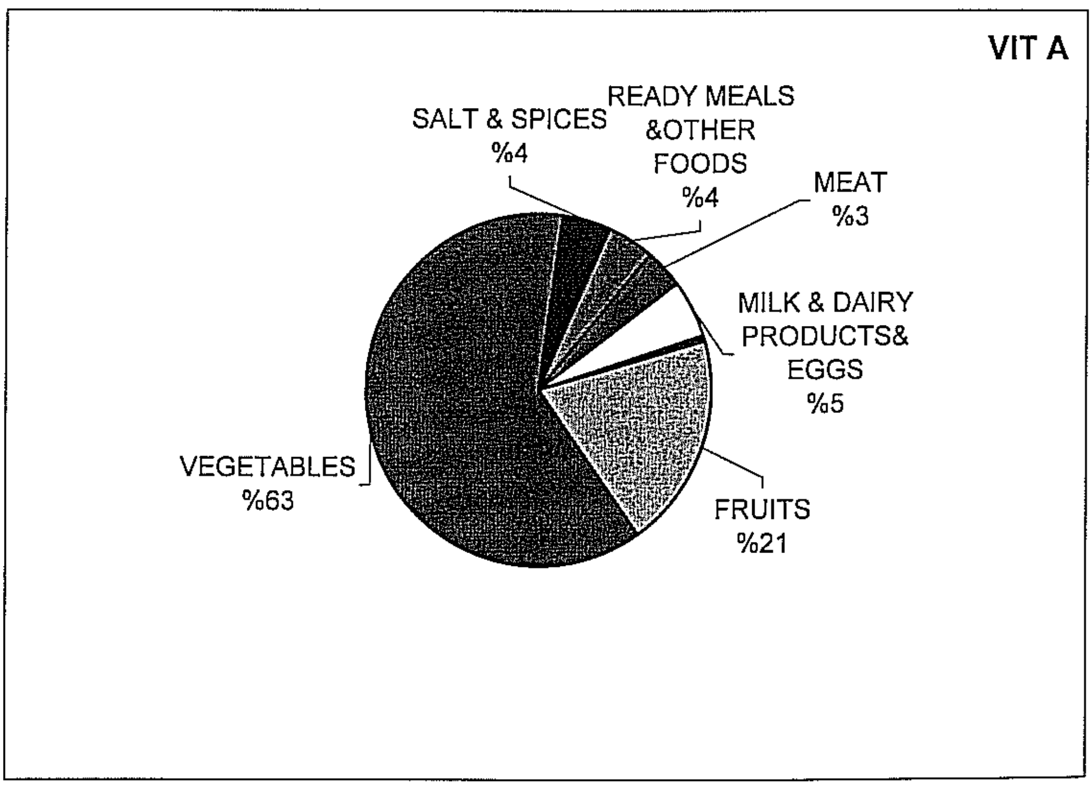


Figure E.5. Contribution of each food group to vitamin A intake as percentage of total supply

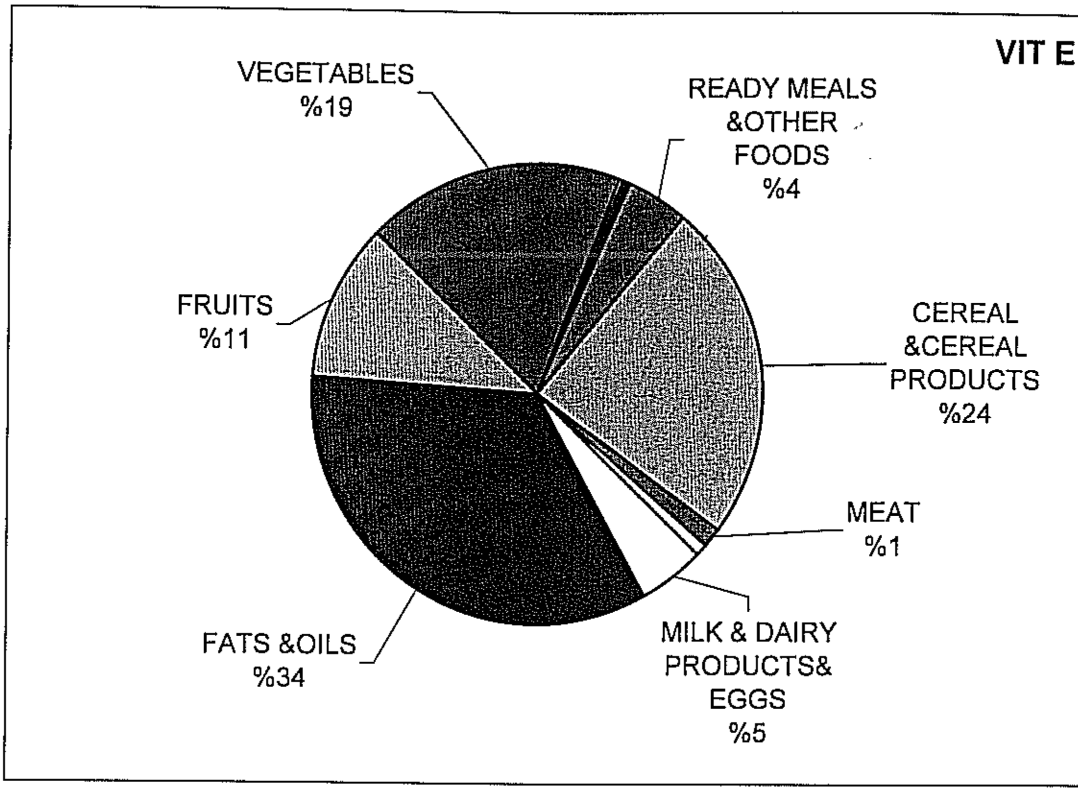


Figure E.6. Contribution of each food group to vitamin E intake as percentage of total supply

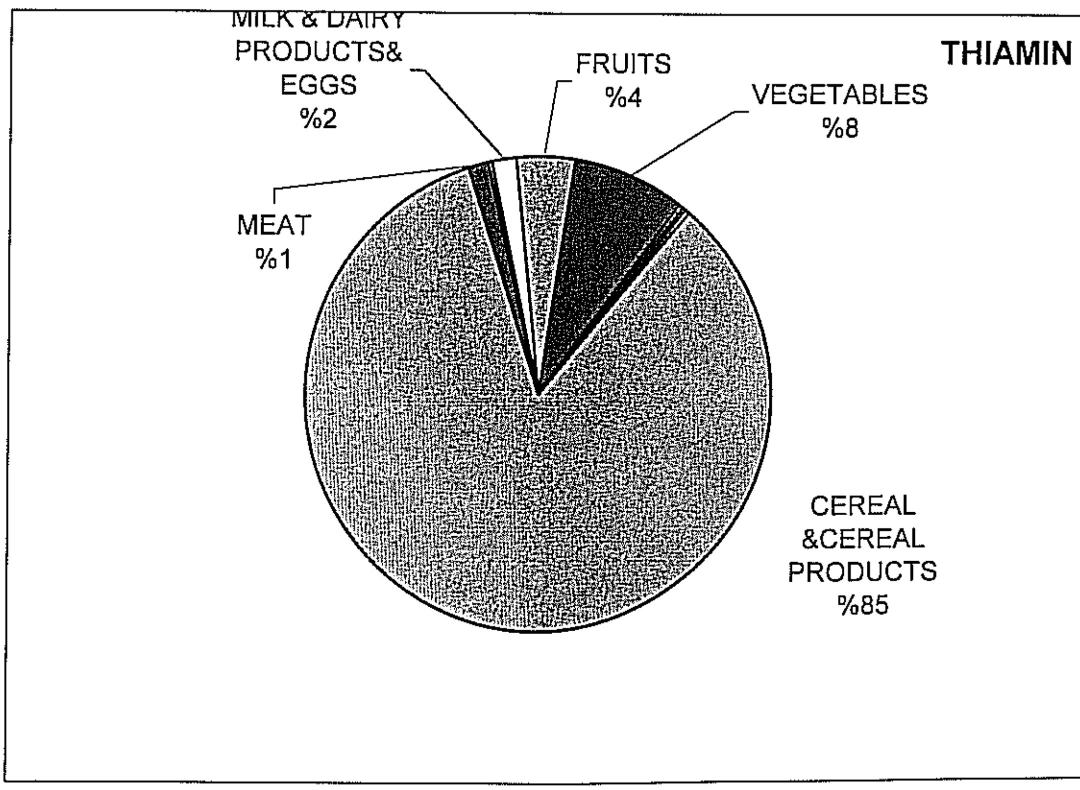


Figure E.7. Contribution of each food group to thiamin intake as percentage of total supply

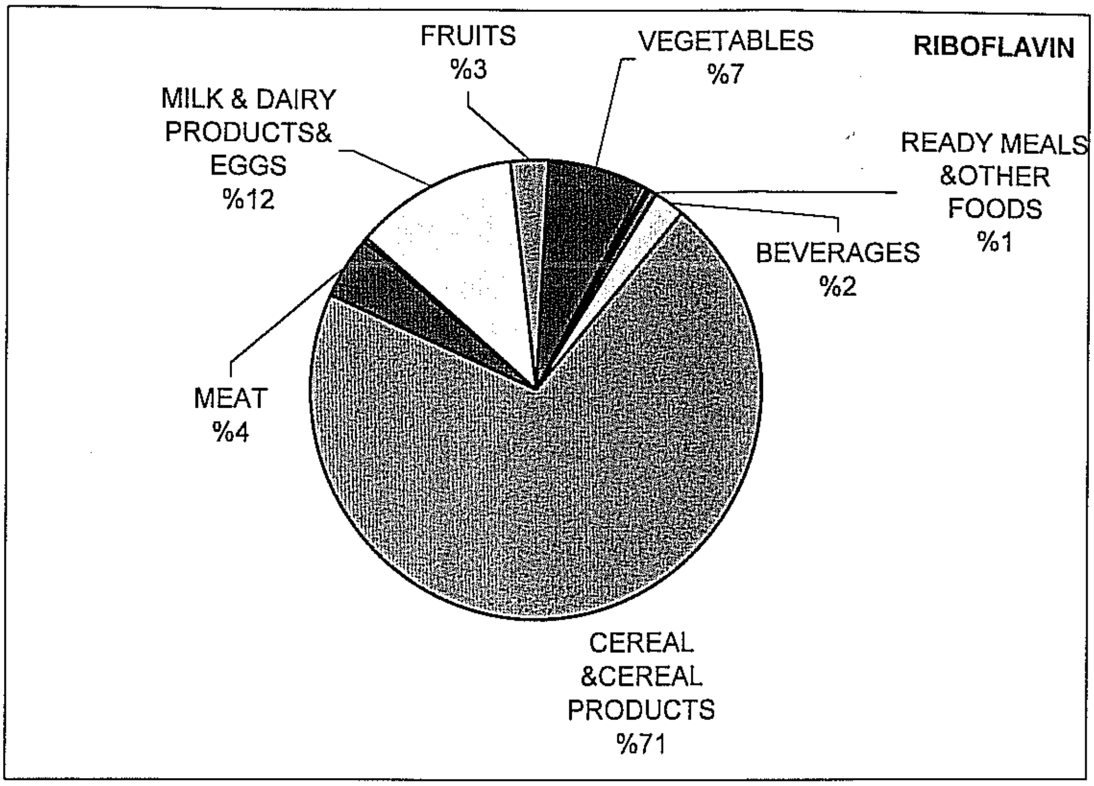


Figure E.8. Contribution of each food group to riboflavin intake as percentage of total supply

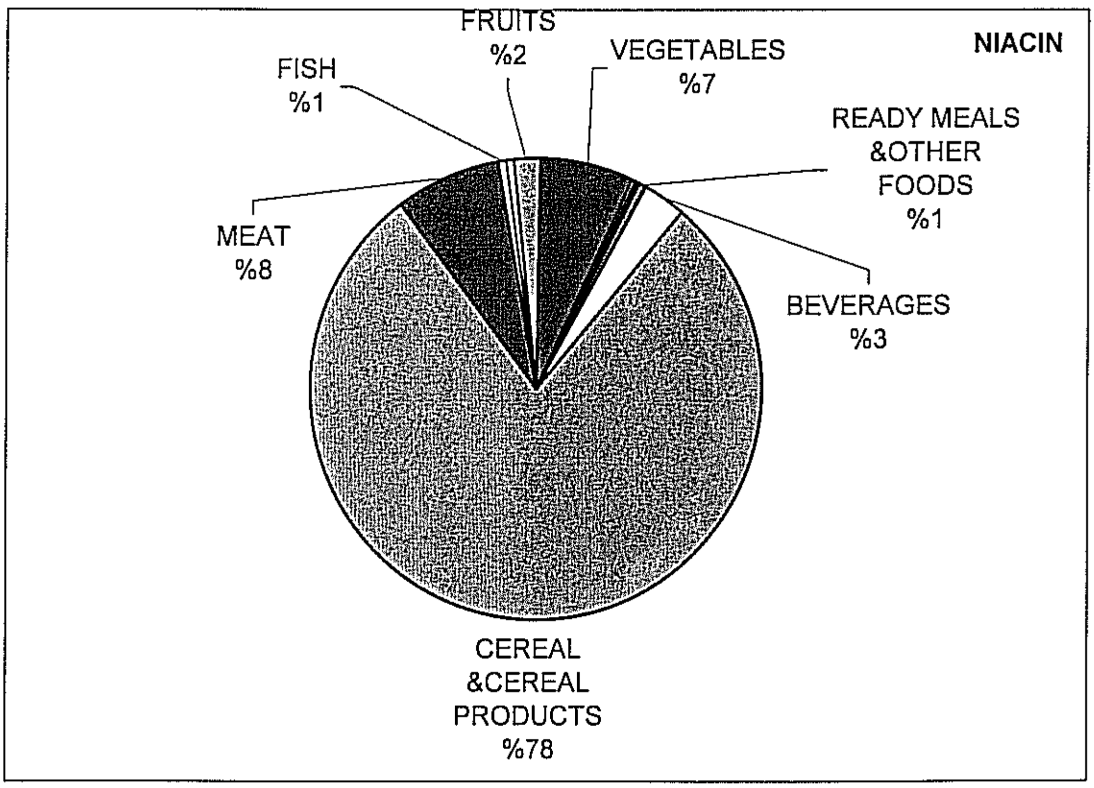


Figure E.9. Contribution of each food group to niacin intake as percentage of total supply

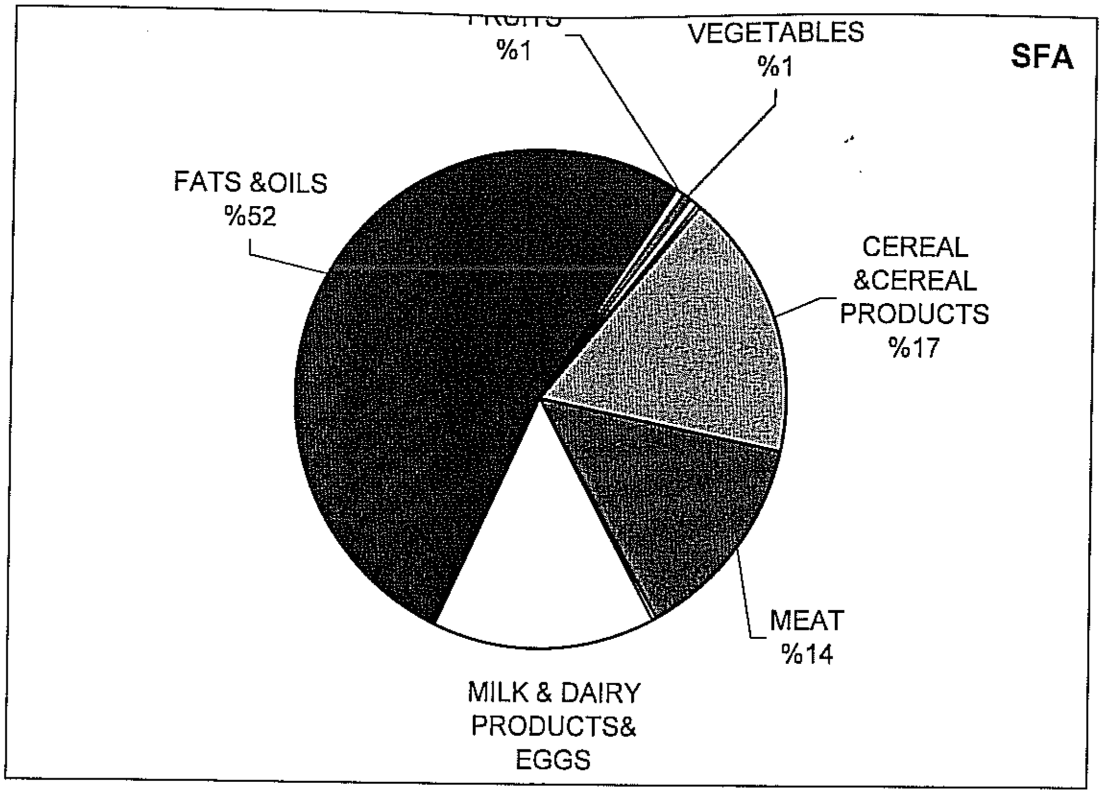


Figure E.12. Contribution of each food group to saturated fatty acid intake as percentage of total supply

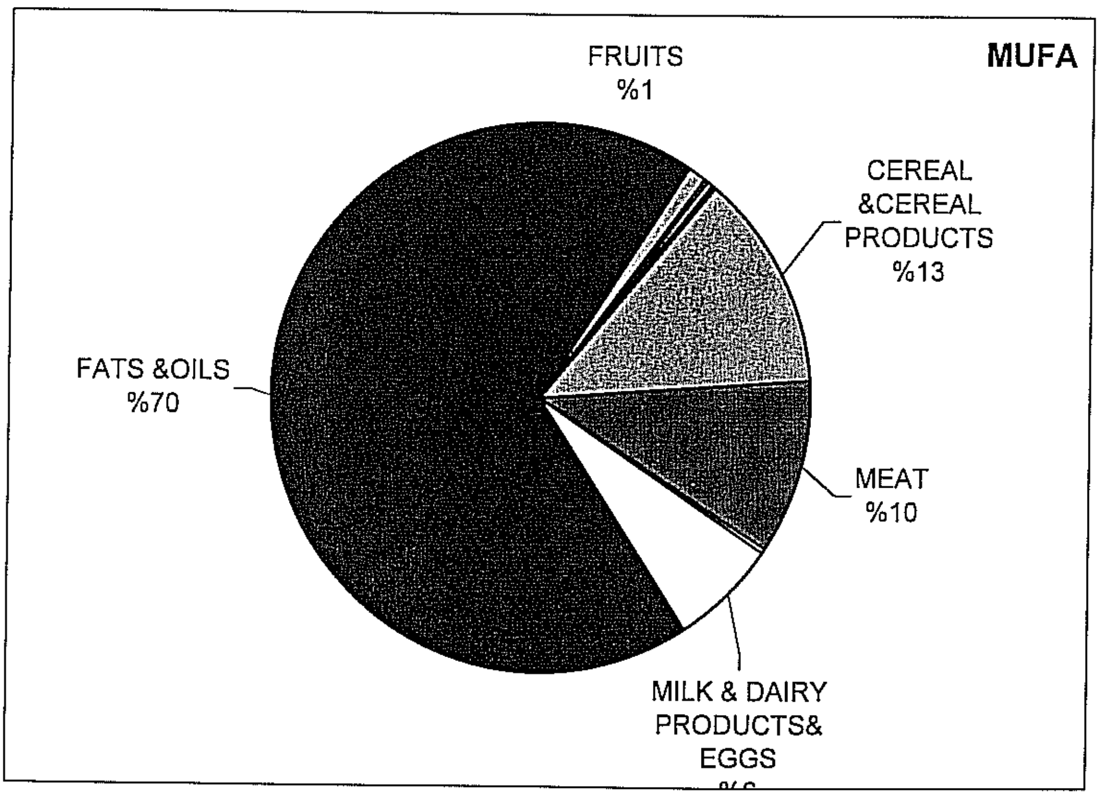


Figure E.13. Contribution of each food group to monounsaturated fatty acid intake as percentage of total supply

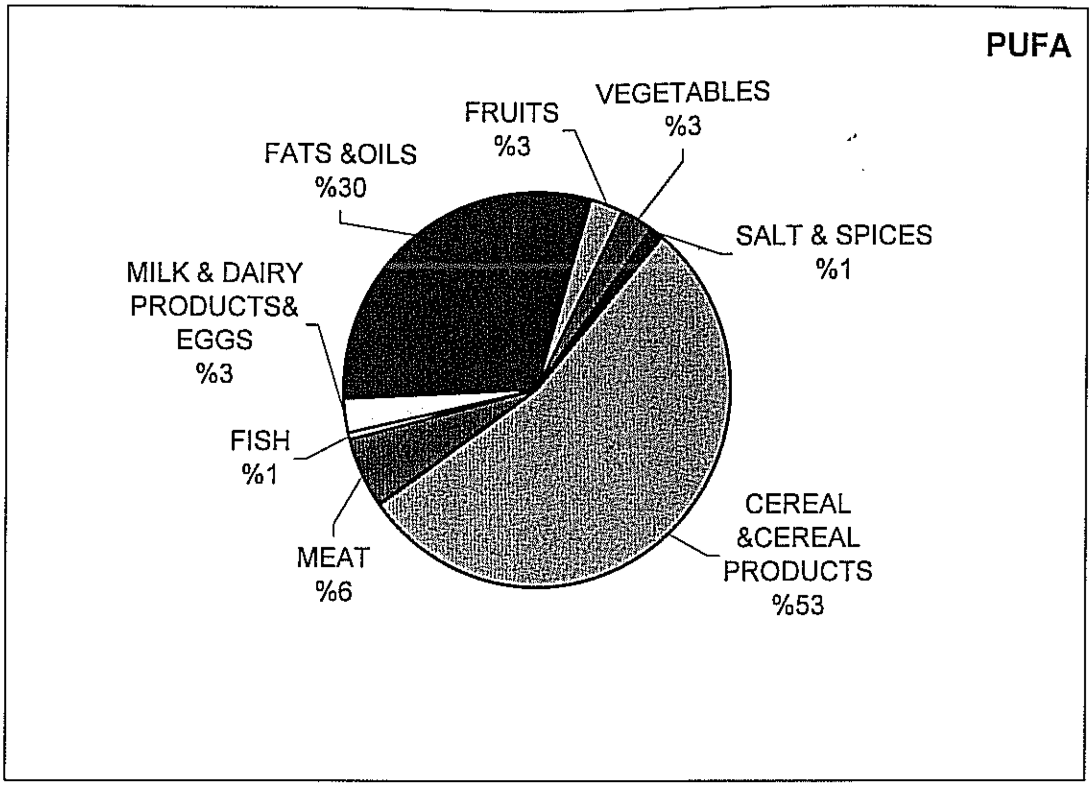


Figure E.14. Contribution of each food group to polyunsaturated fatty acid intake as percentage of total supply

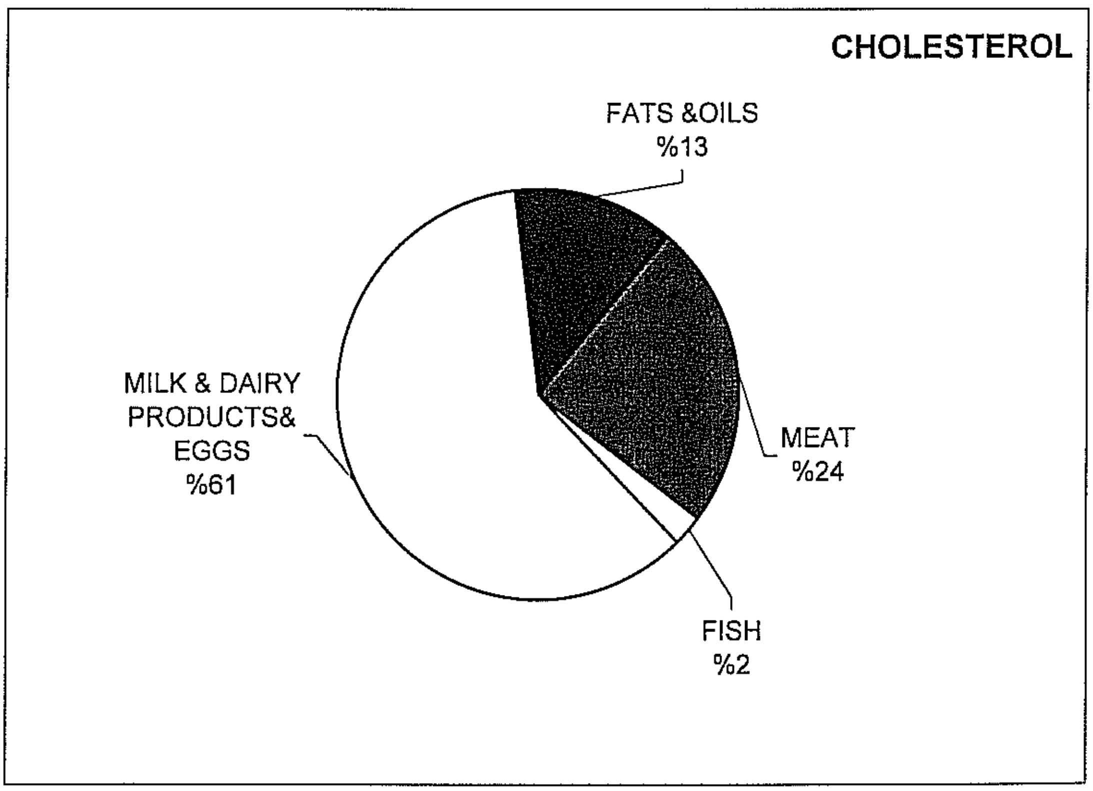


Figure E.15. Contribution of each food group to cholesterol intake as percentage of total supply

APPENDIX F

AEGEAN REGION

CONTRIBUTION OF EACH FOOD GROUP TO INTAKE OF DIFFERENT NUTRIENTS AS PERCENTAGE OF TOTAL SUPPLY

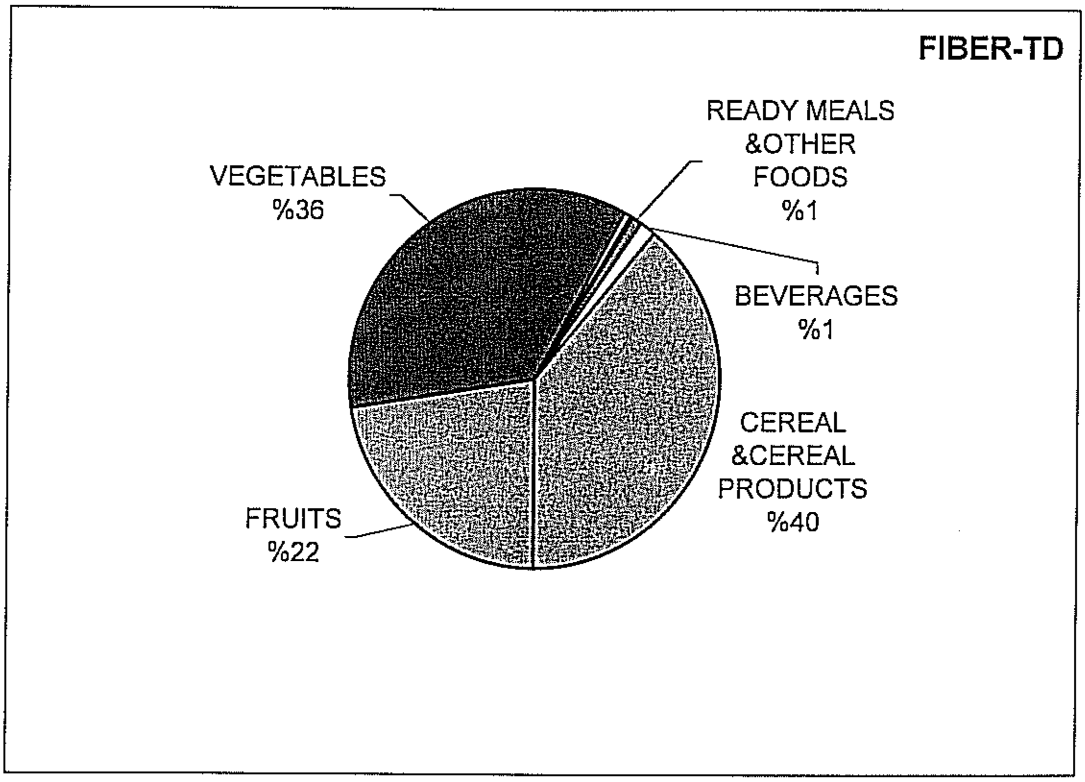


Figure F.1. Contribution of each food group to total dietary fiber intake as percentage of total supply

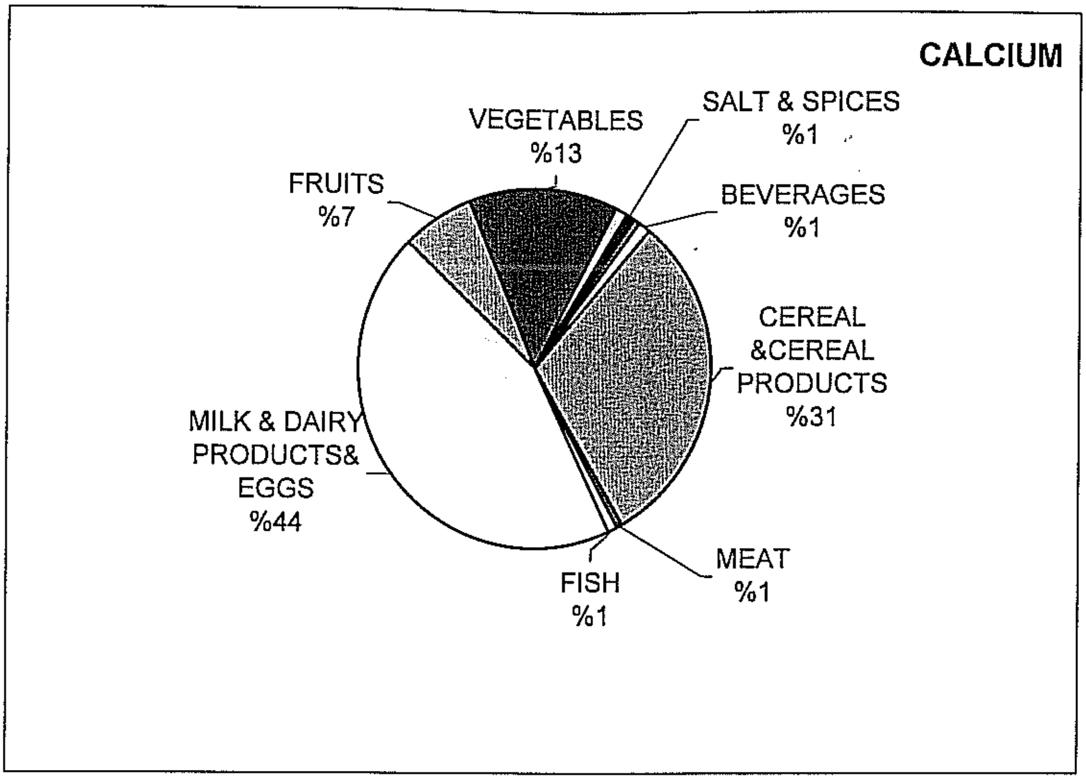


Figure F.2. Contribution of each food group to calcium intake as percentage of total supply

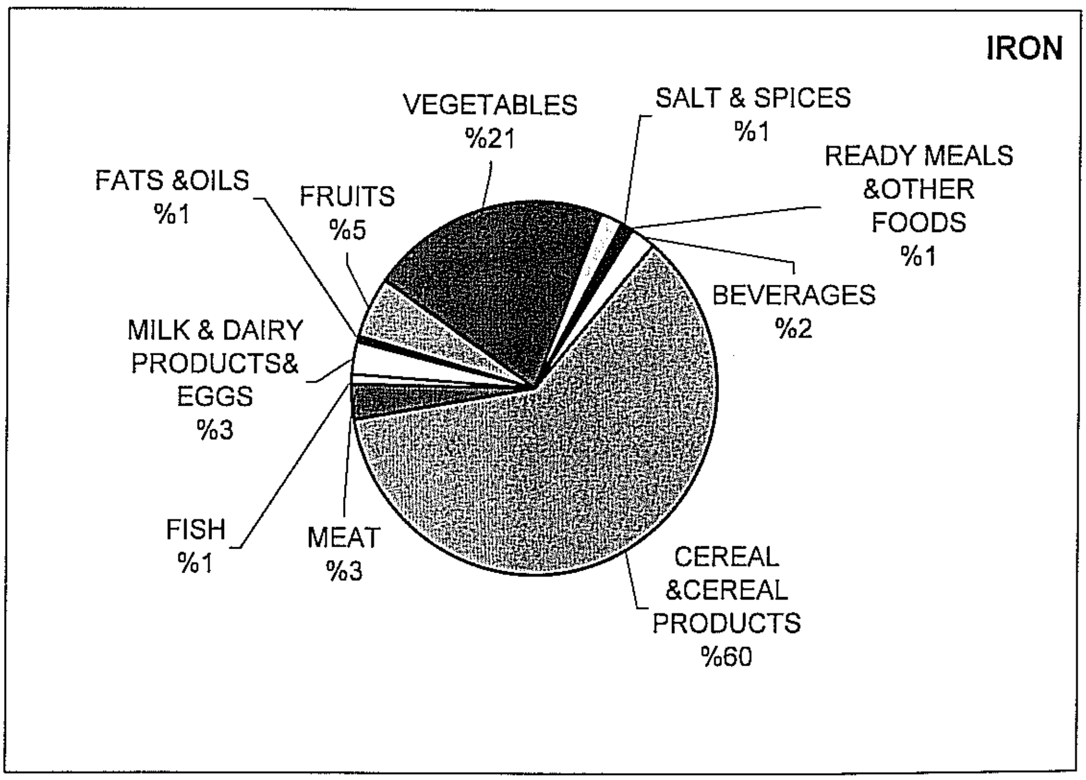


Figure F.3. Contribution of each food group to iron intake as percentage of total supply

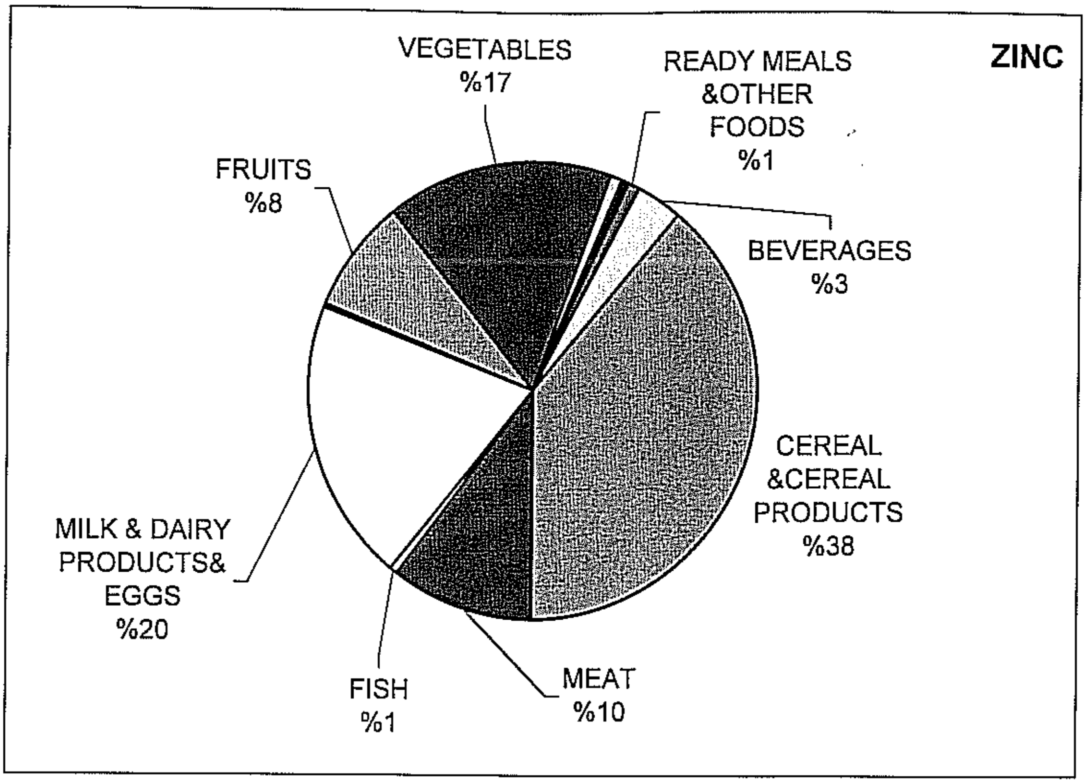


Figure F.4. Contribution of each food group to zinc intake as percentage of total supply

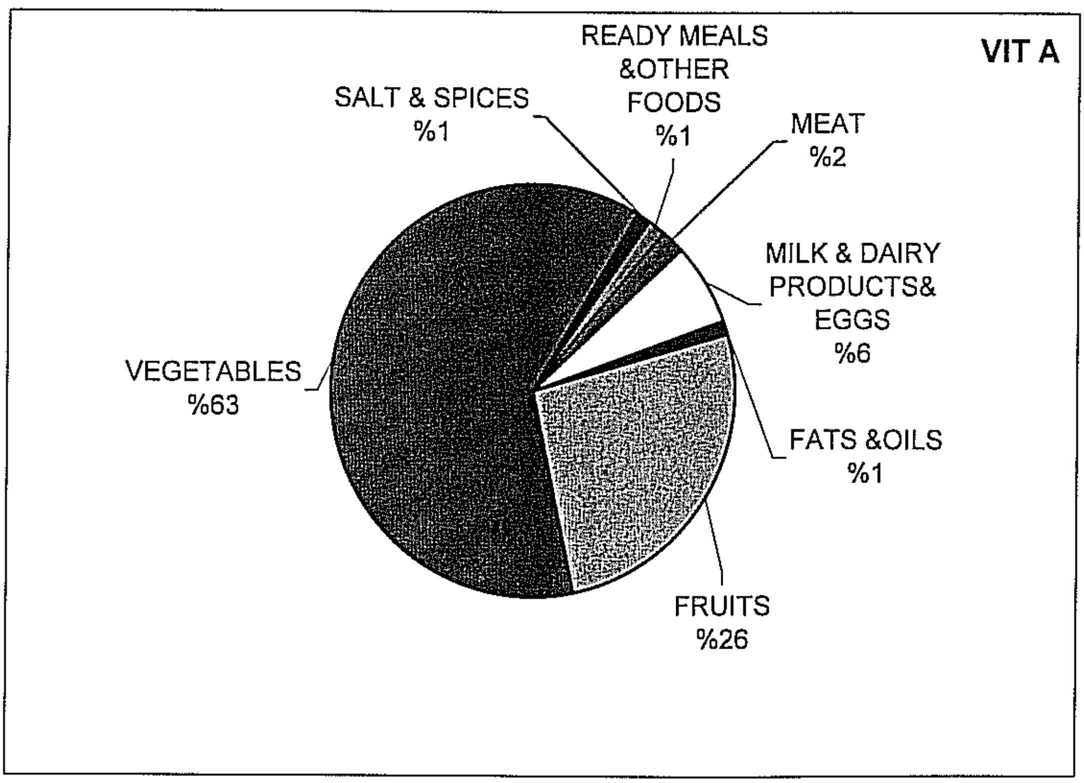


Figure F.5. Contribution of each food group to vitamin A intake as percentage of total supply

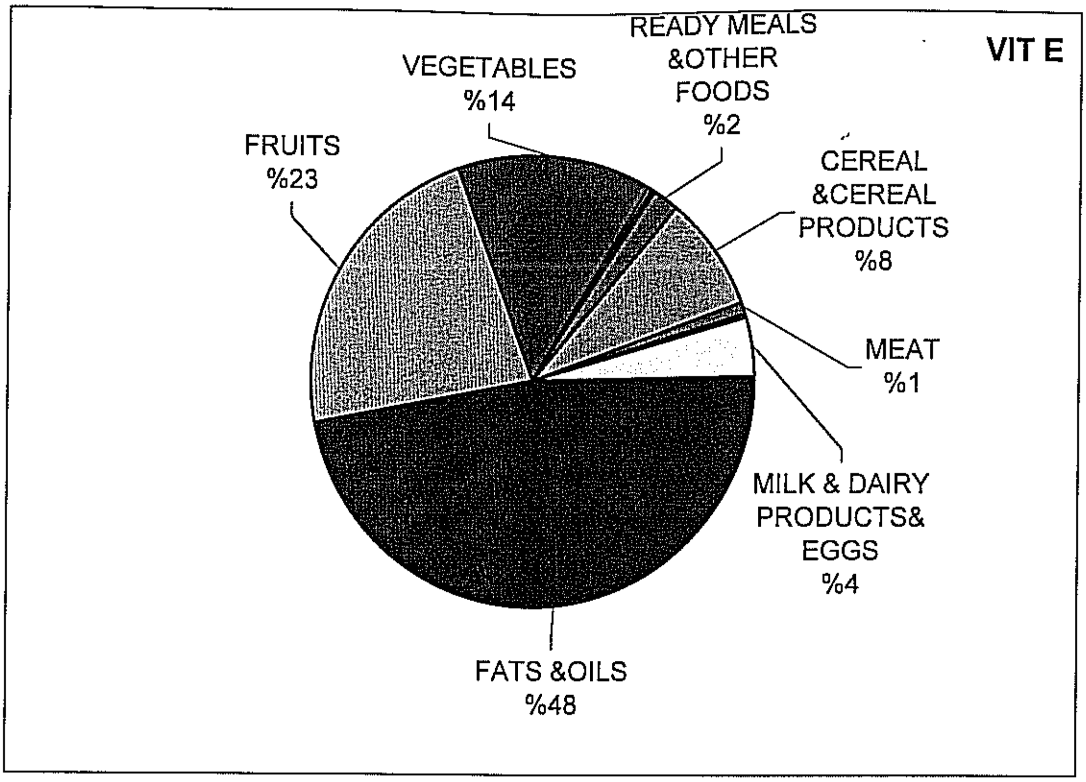


Figure F.6. Contribution of each food group to vitamin E intake as percentage of total supply

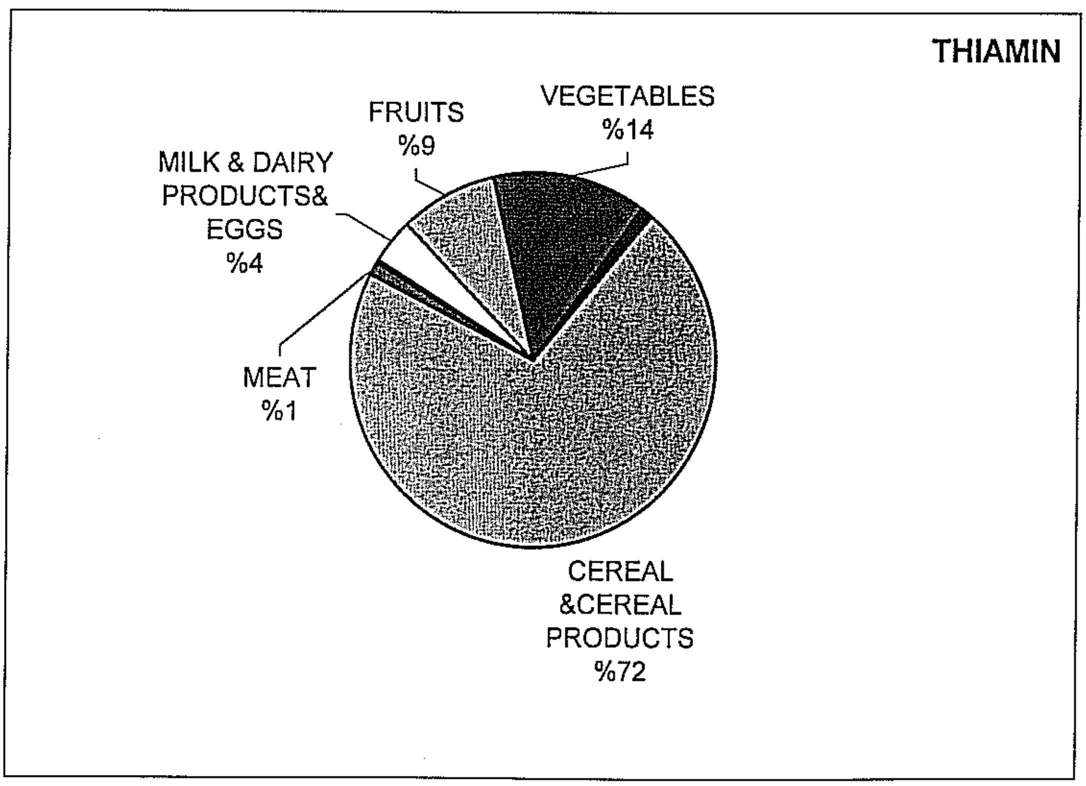


Figure F.7. Contribution of each food group to thiamin intake as percentage of total supply

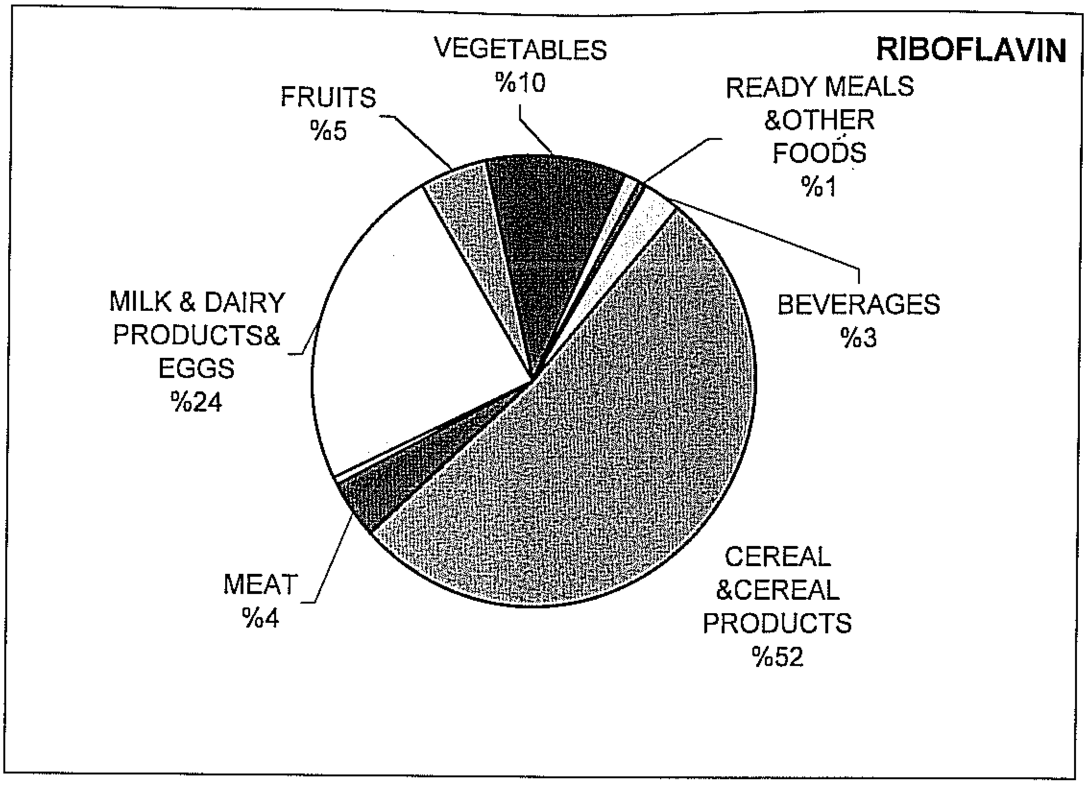


Figure F.8. Contribution of each food group to riboflavin intake as percentage of total supply

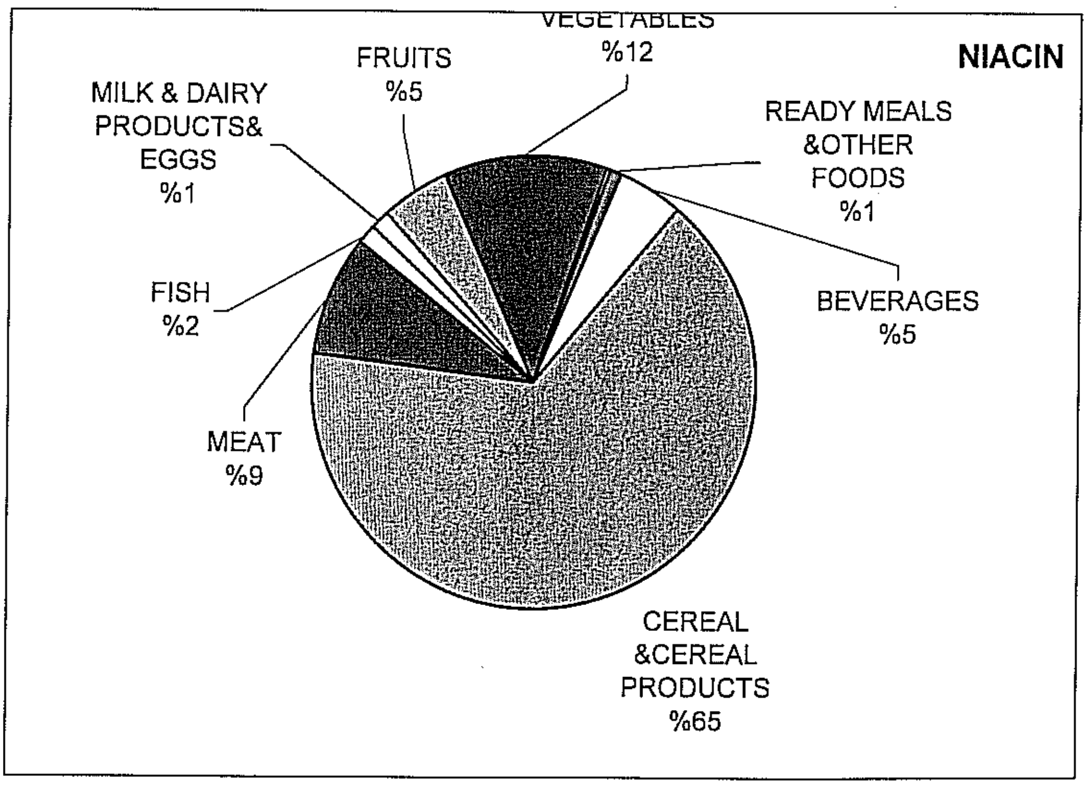


Figure F.9. Contribution of each food group to niacin intake as percentage of total supply

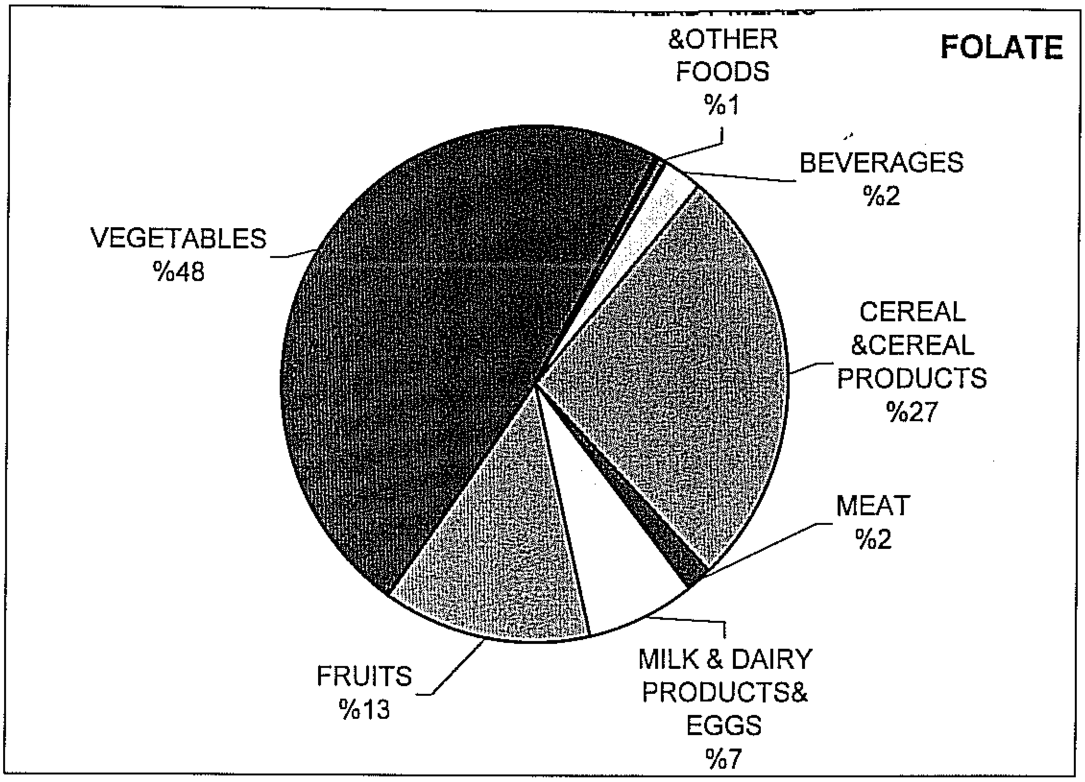


Figure F.10. Contribution of each food group to folate intake as percentage of total supply

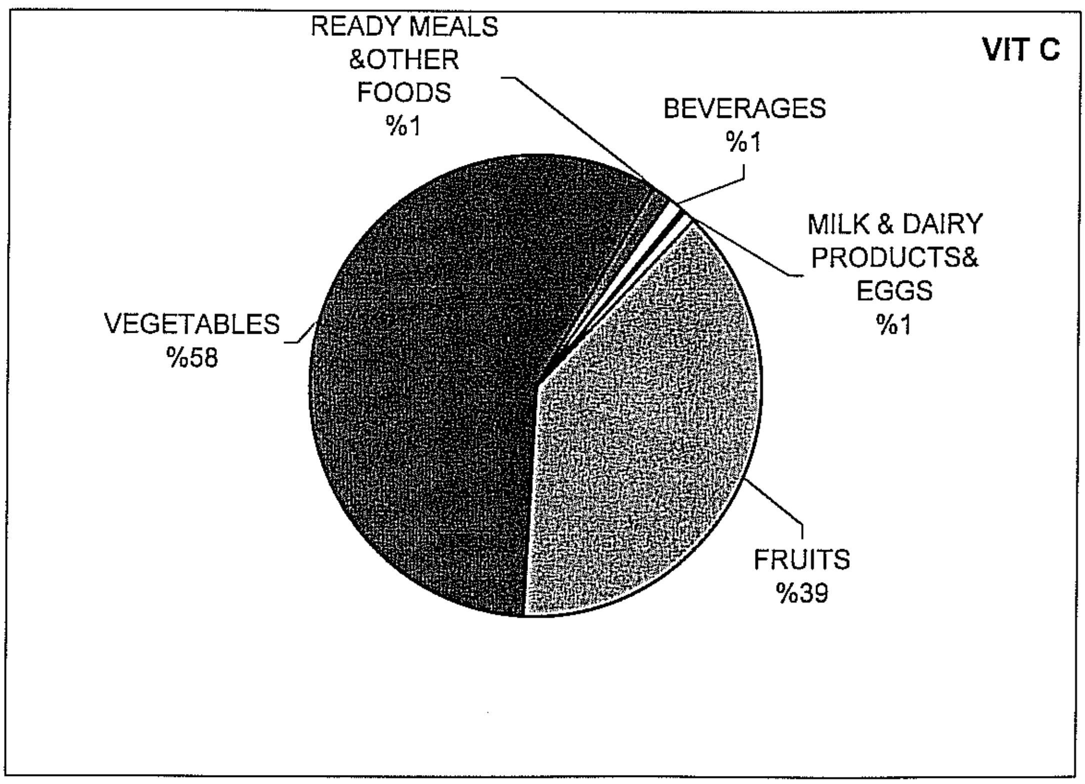


Figure F.11.Contribution of each food group to vitamin C intake as percentage of total supply

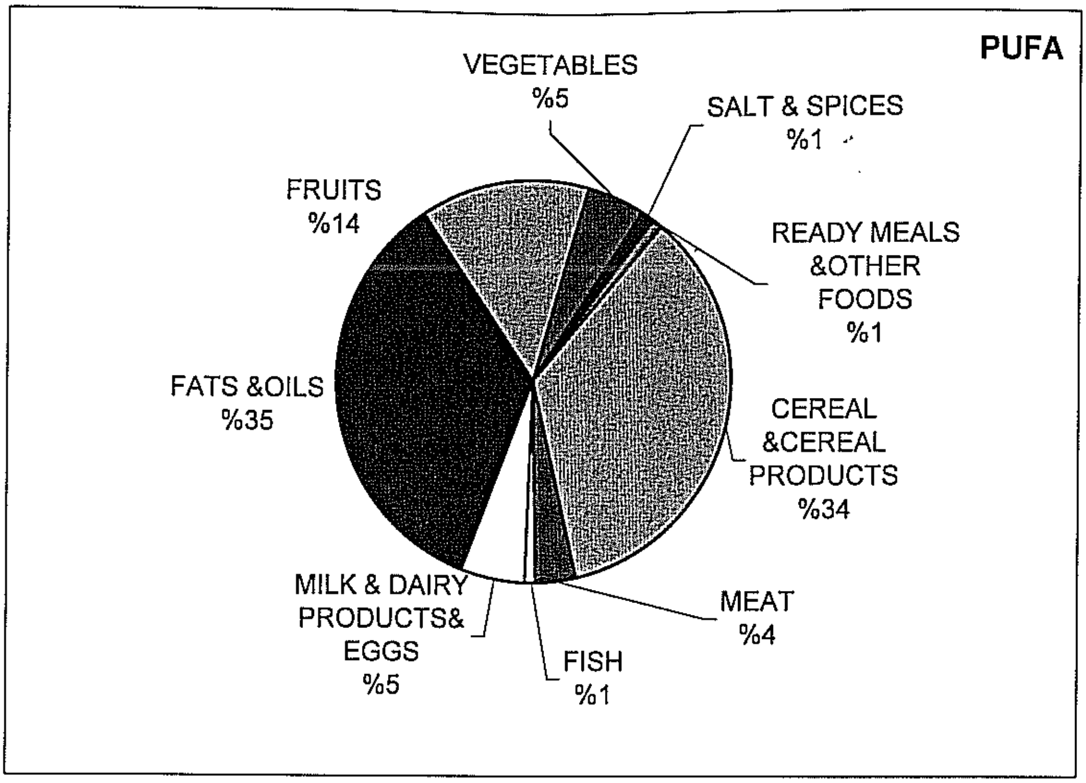


Figure F.14. Contribution of each food group to polyunsaturated fatty acid intake as percentage of total supply

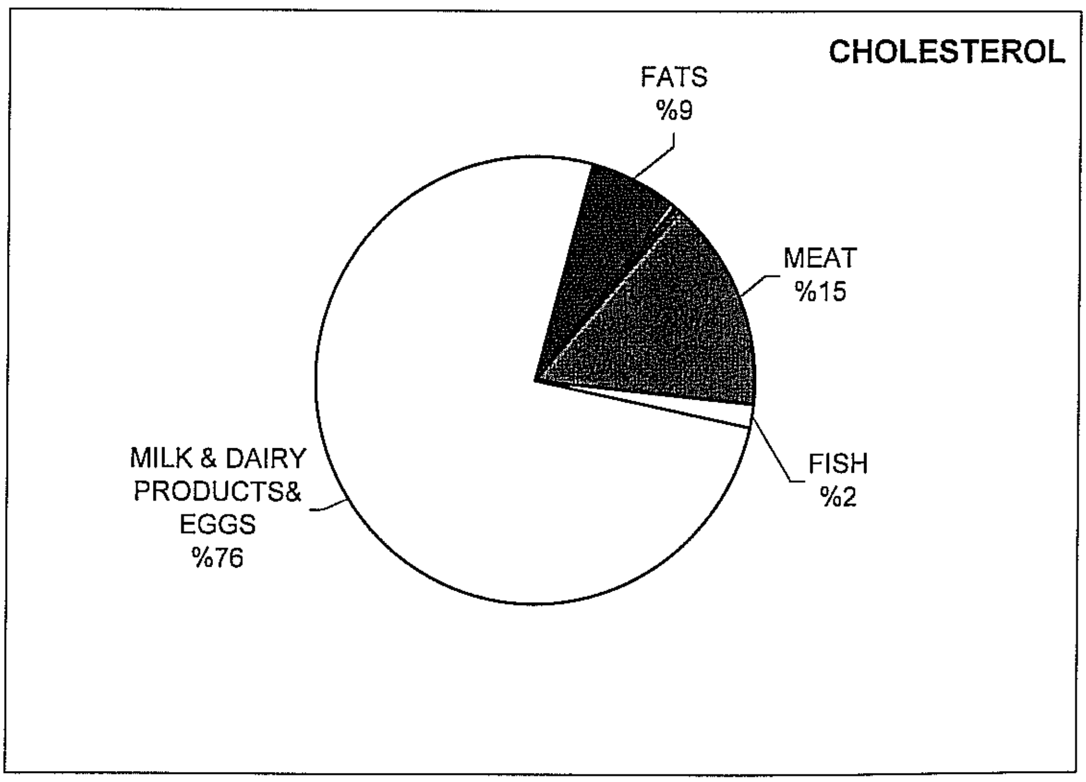


Figure F.15. Contribution of each food group to cholesterol intake as percentage of total supply

APPENDIX G

EASTERN ANATOLIA REGION

CONTRIBUTION OF EACH FOOD GROUP TO INTAKE OF DIFFERENT NUTRIENTS AS PERCENTAGE OF TOTAL SUPPLY

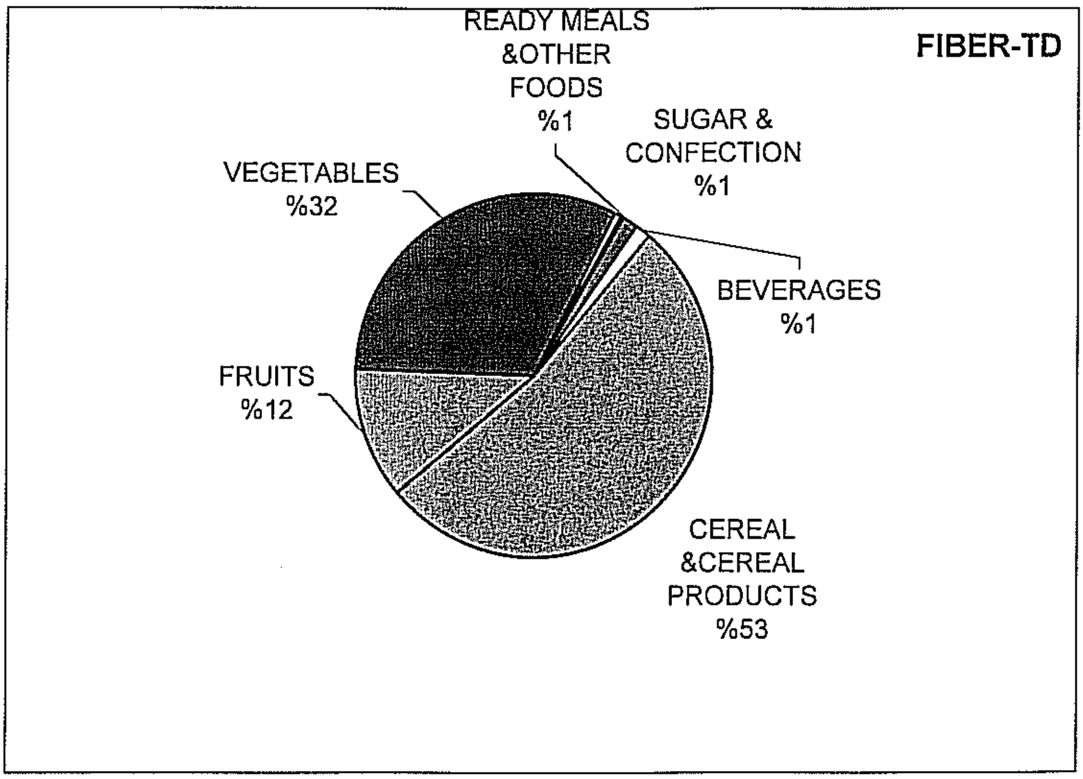


Figure G.1. Contribution of each food group to total dietary fiber intake as percentage of total supply

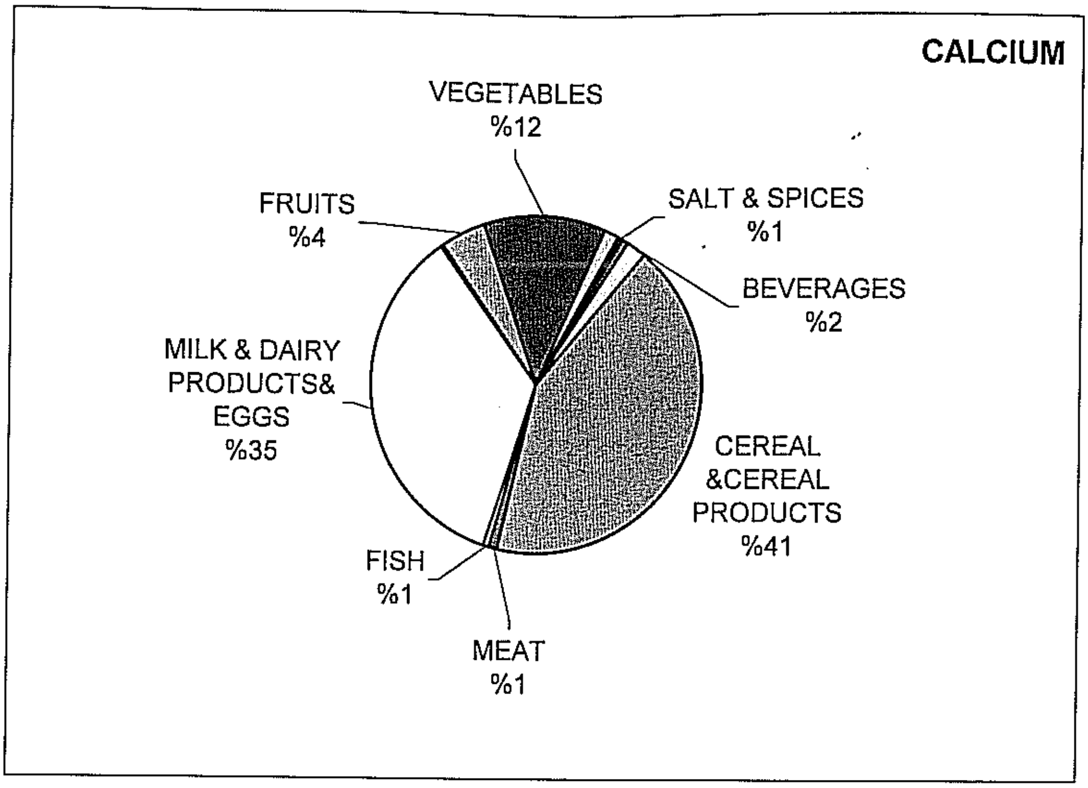


Figure G.2. Contribution of each food group to calcium intake as percentage of total supply

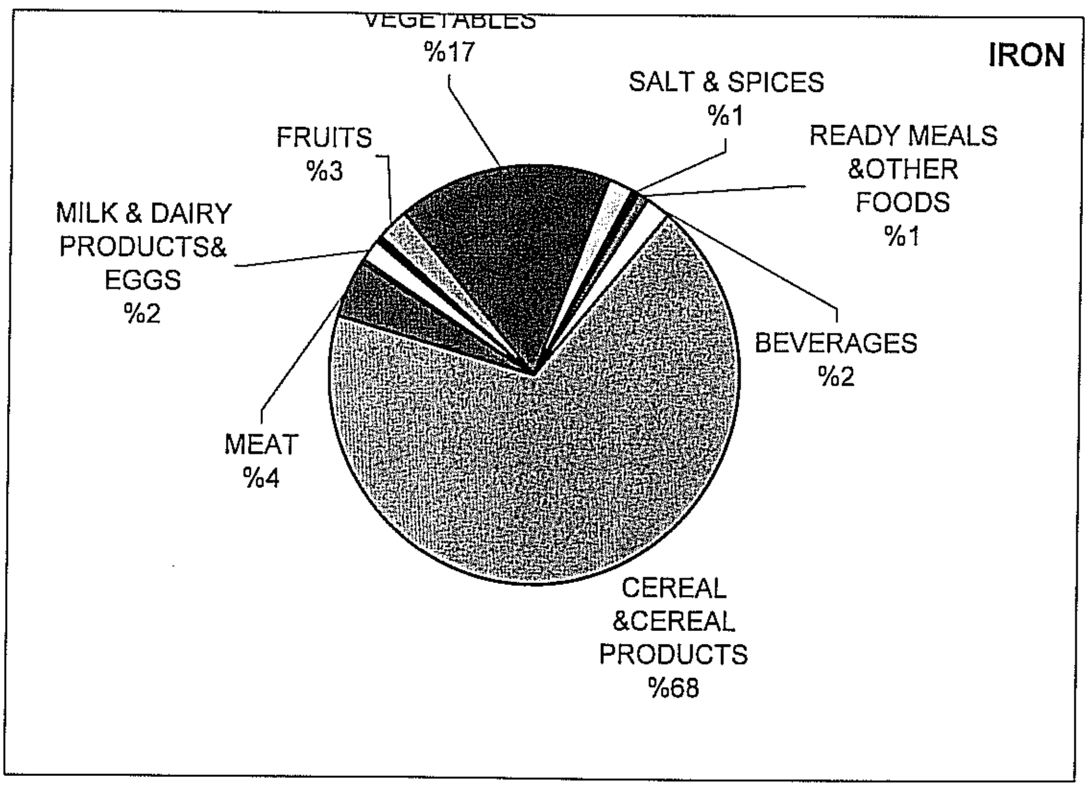


Figure G.3. Contribution of each food group to iron intake as percentage of total supply

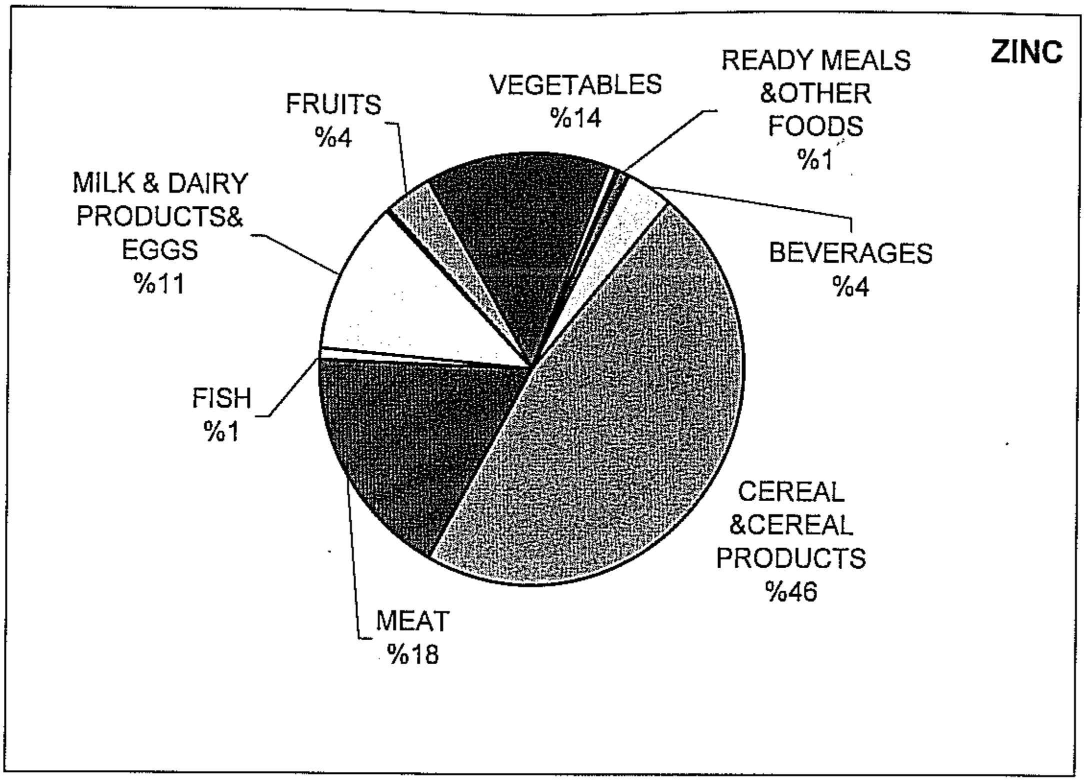


Figure G.4. Contribution of each food group to zinc intake as percentage of total supply

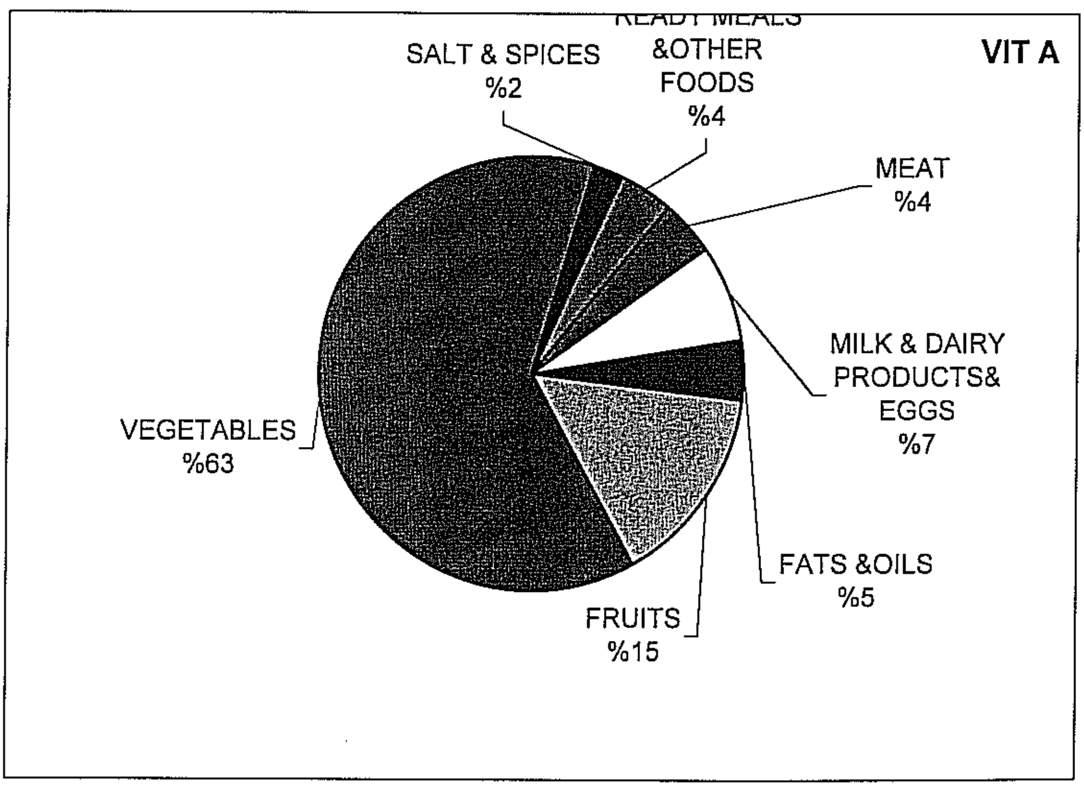


Figure G.5. Contribution of each food group to vitamin A intake as percentage of total supply

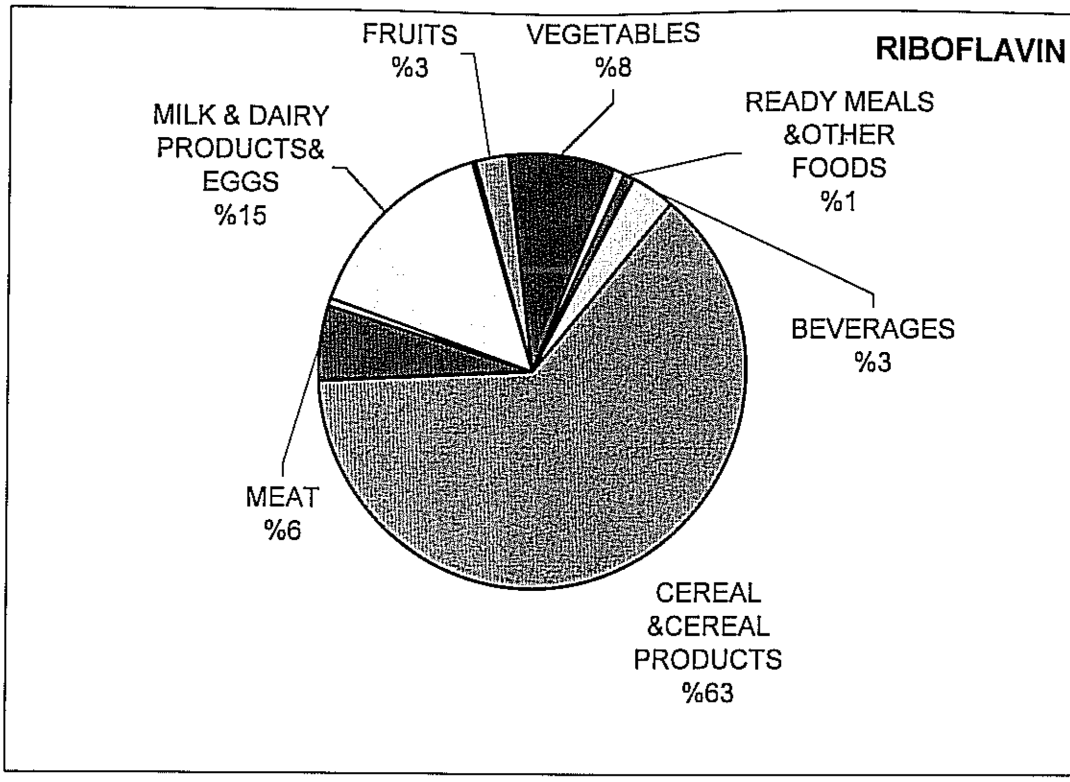


Figure G.8. Contribution of each food group to riboflavin intake as percentage of total supply

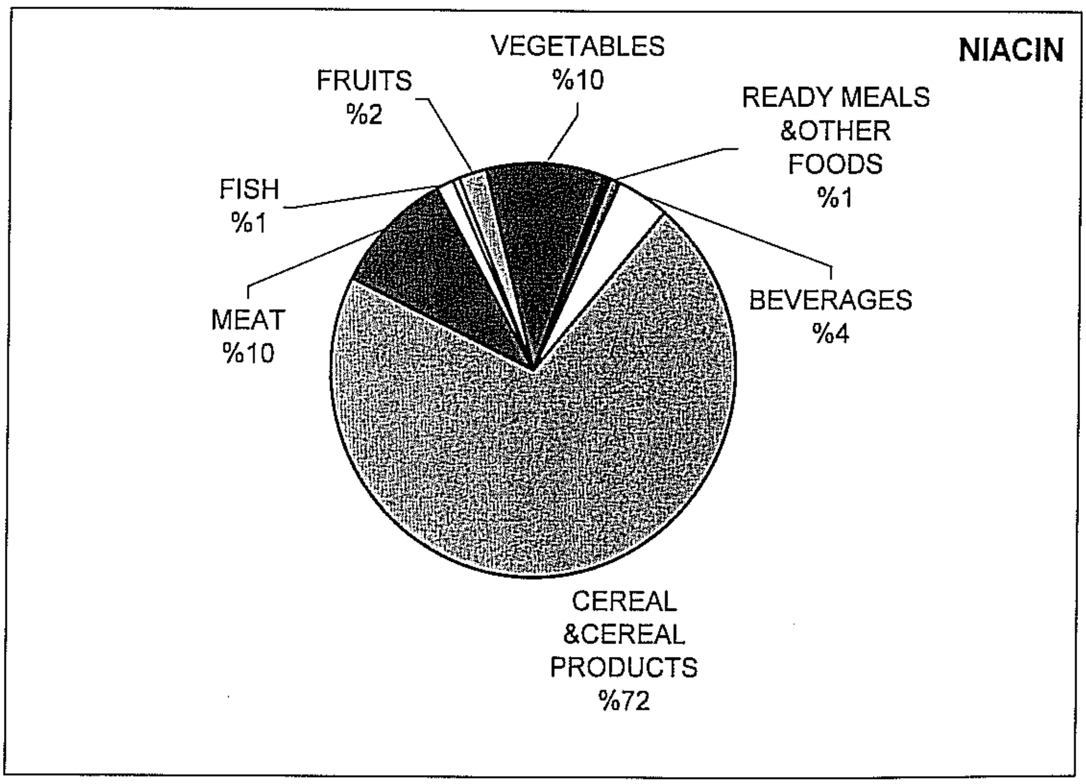


Figure G.9. Contribution of each food group to niacin intake as percentage of total supply

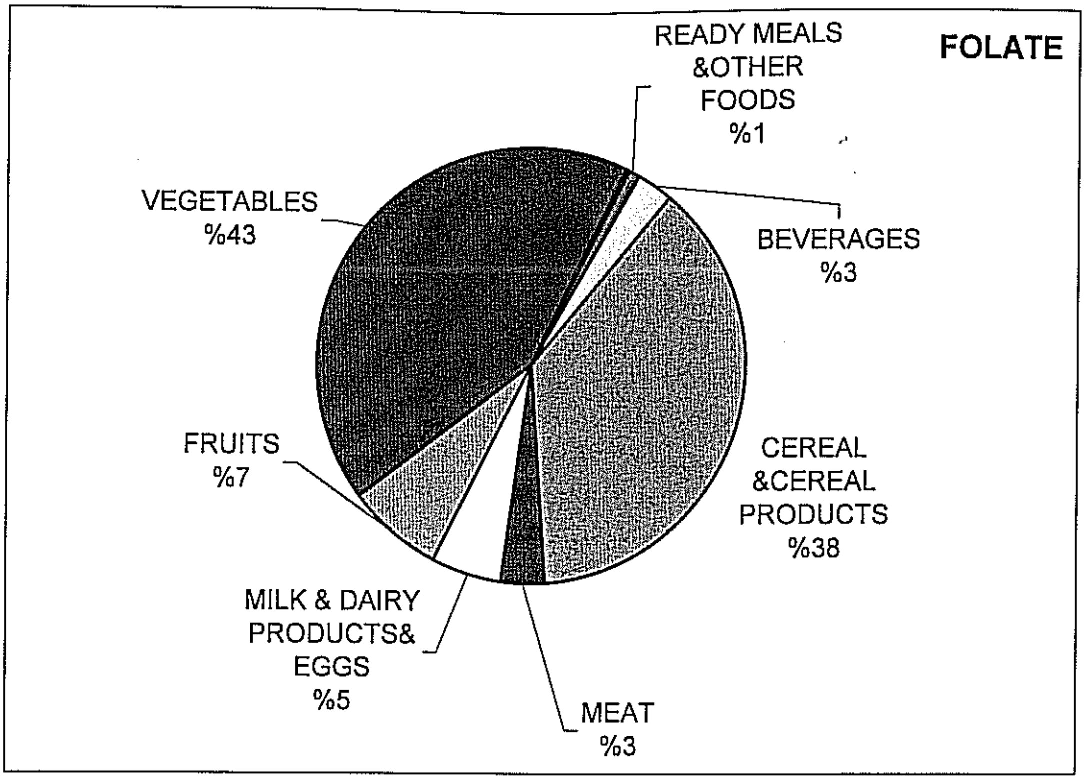


Figure G.10. Contribution of each food group to folate intake as percentage of total supply

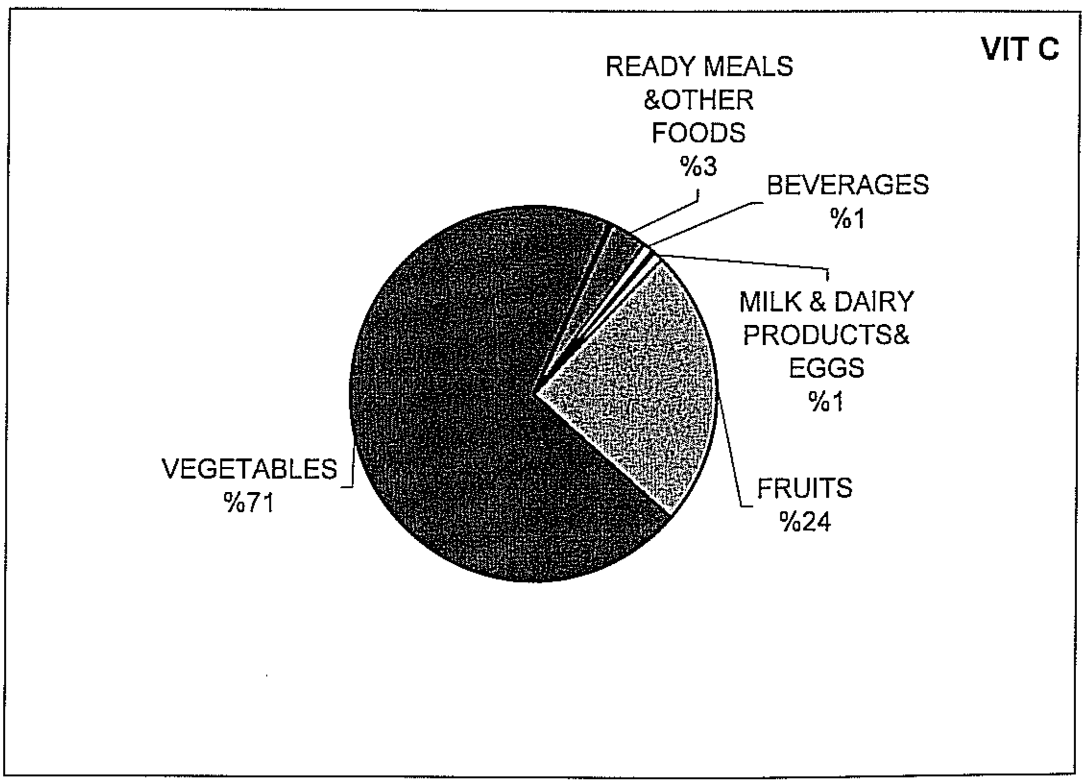


Figure G.11.Contribution of each food group to vitamin C intake as percentage of total supply

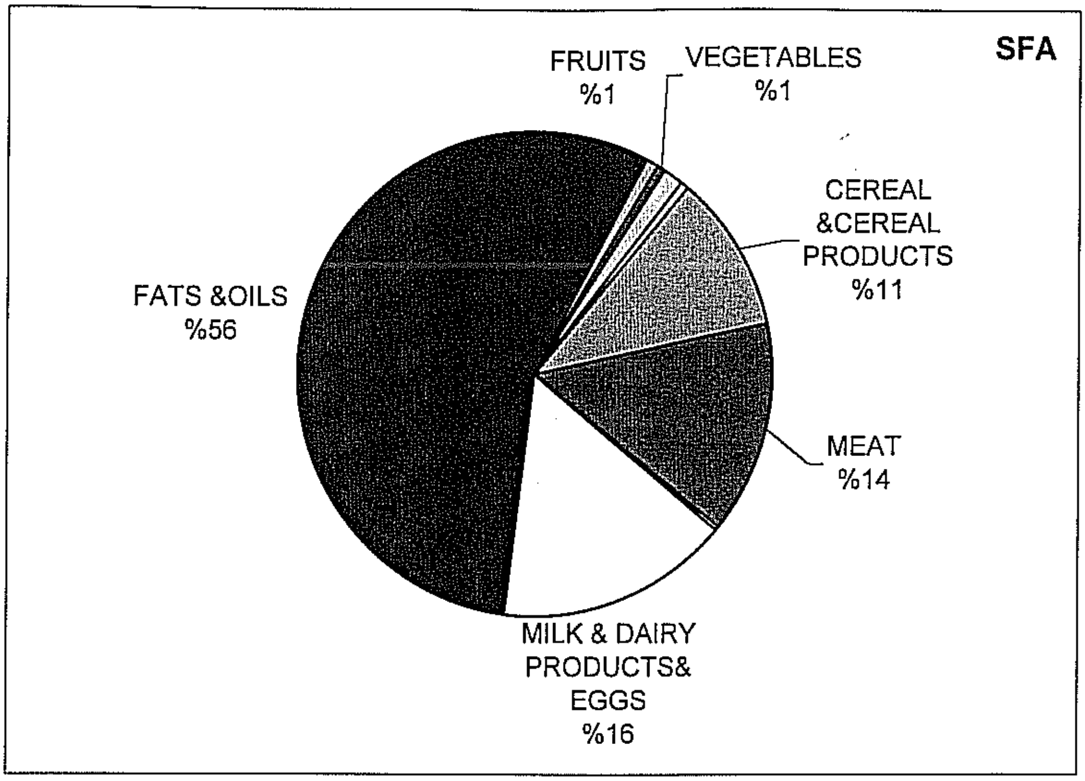


Figure G.12. Contribution of each food group to saturated fatty acid intake as percentage of total supply

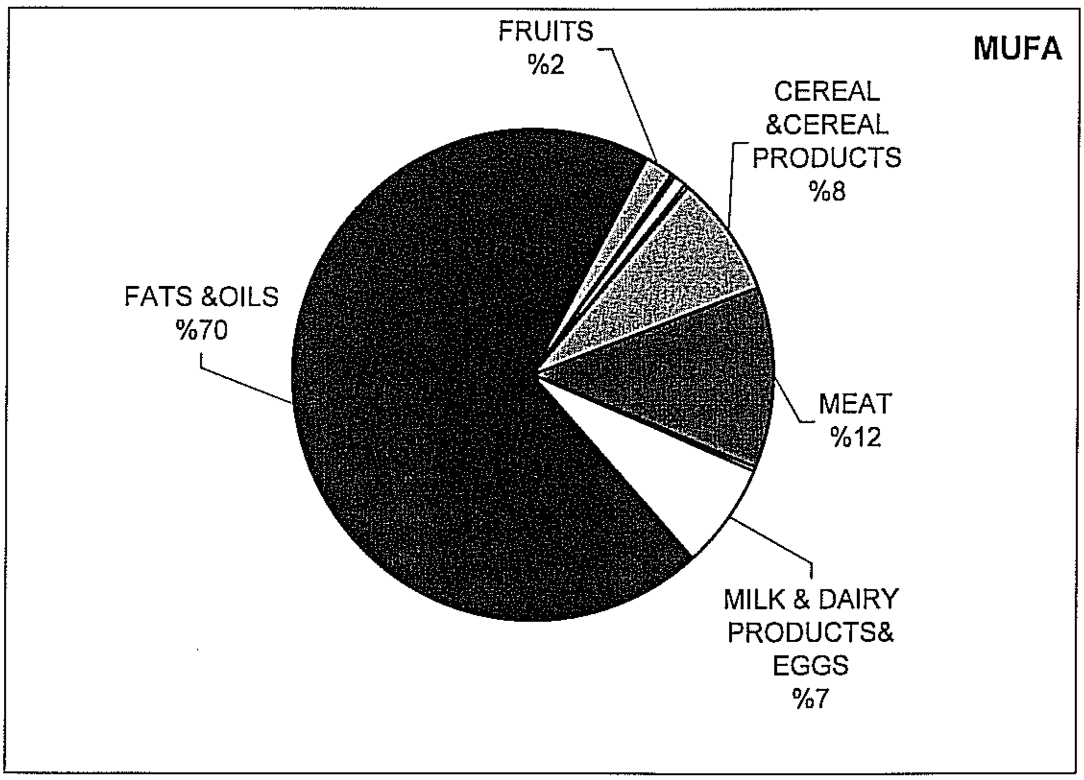


Figure G.13. Contribution of each food group to monounsaturated fatty acid intake as percentage of total supply

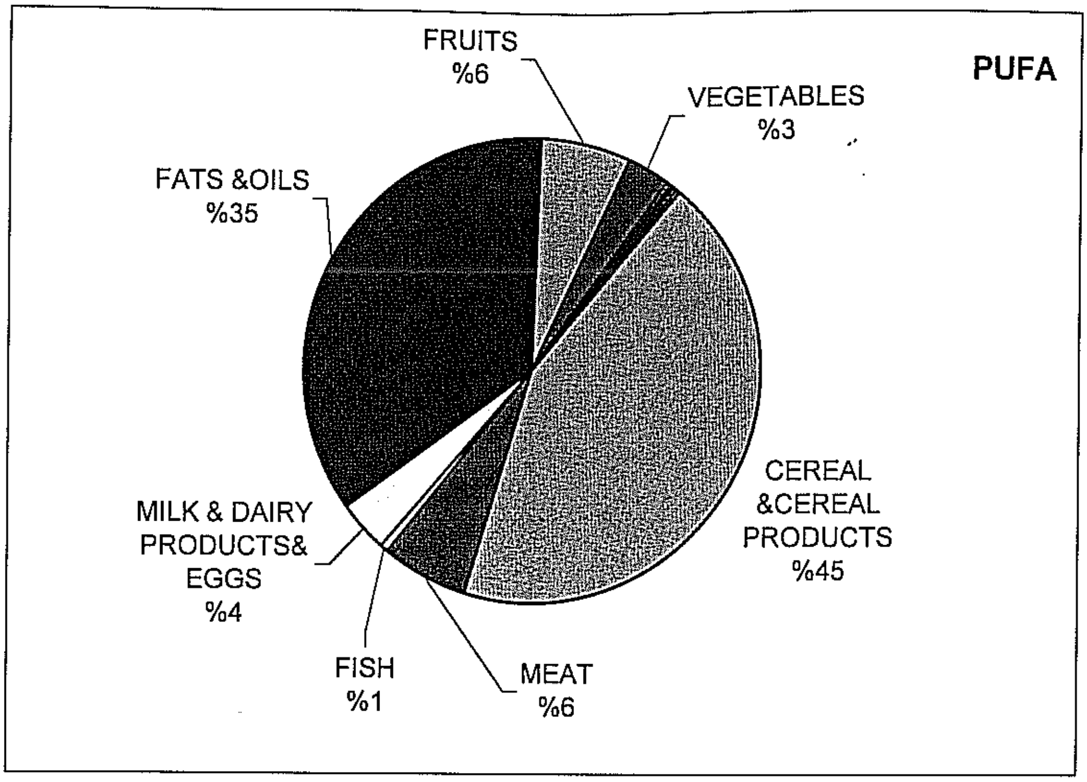


Figure G.14. Contribution of each food group to polyunsaturated fatty acid intake as percentage of total supply

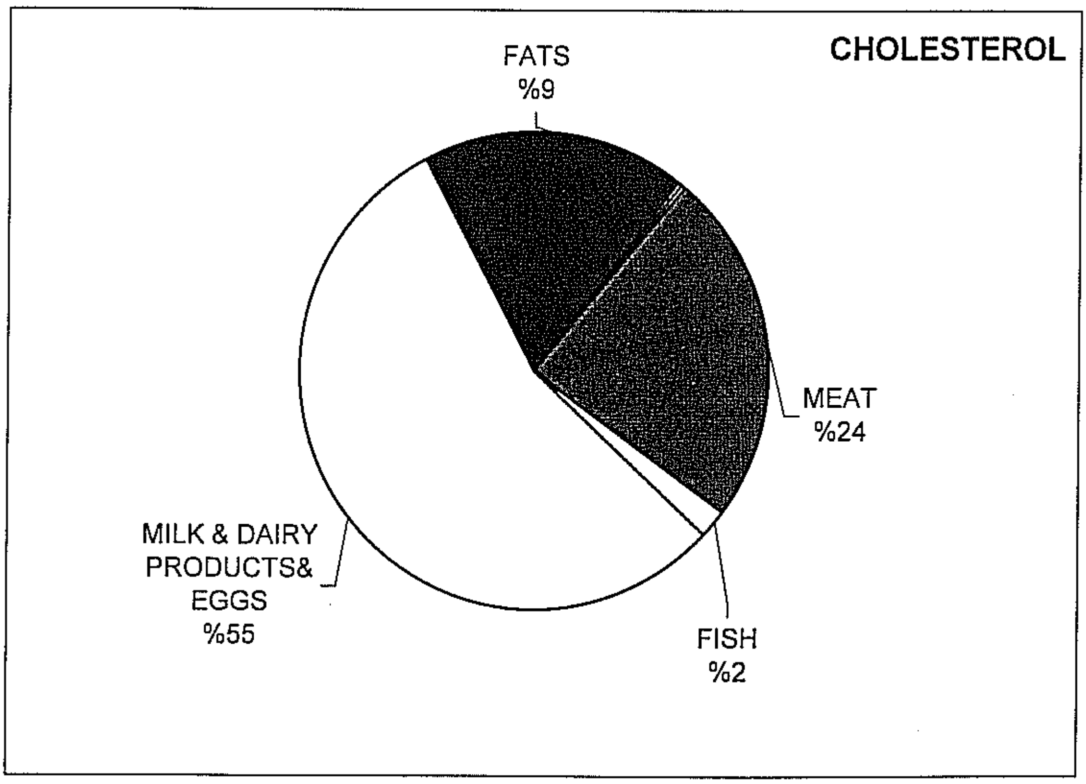


Figure G.15. Contribution of each food group to cholesterol intake as percentage of total supply

APPENDIX H

MEDITERRANEAN REGION

CONTRIBUTION OF EACH FOOD GROUP TO INTAKE OF DIFFERENT NUTRIENTS AS PERCENTAGE OF TOTAL SUPPLY

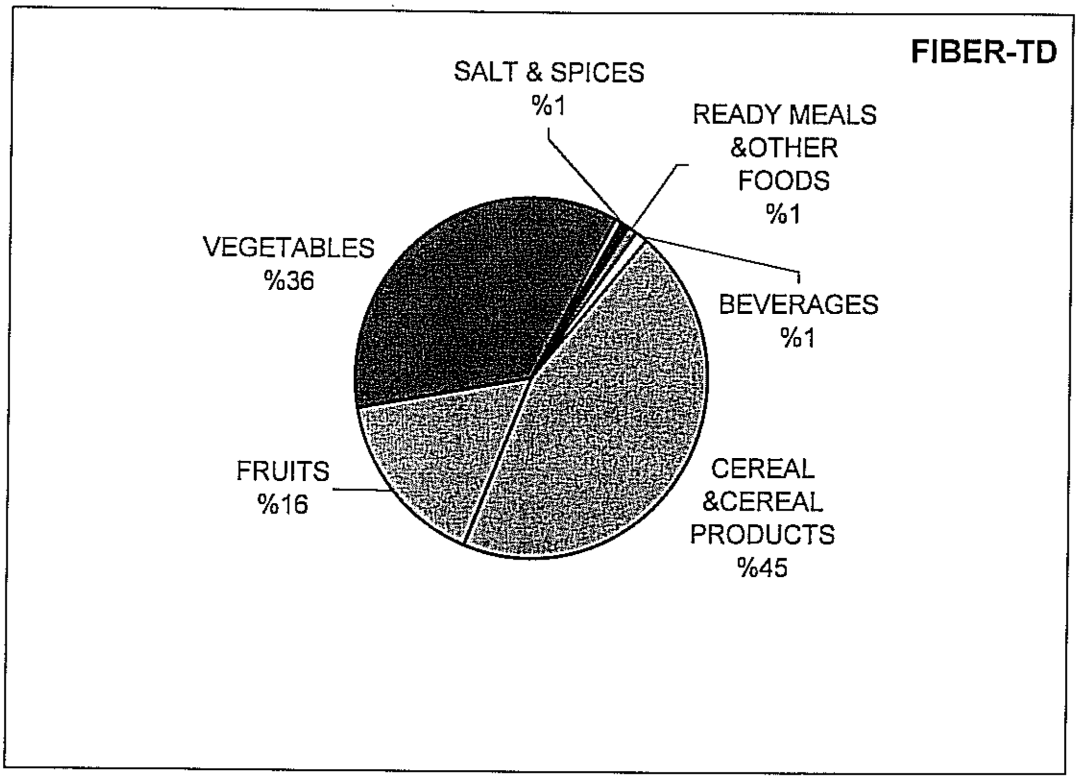


Figure H.1. Contribution of each food group to total dietary fiber intake as percentage of total supply

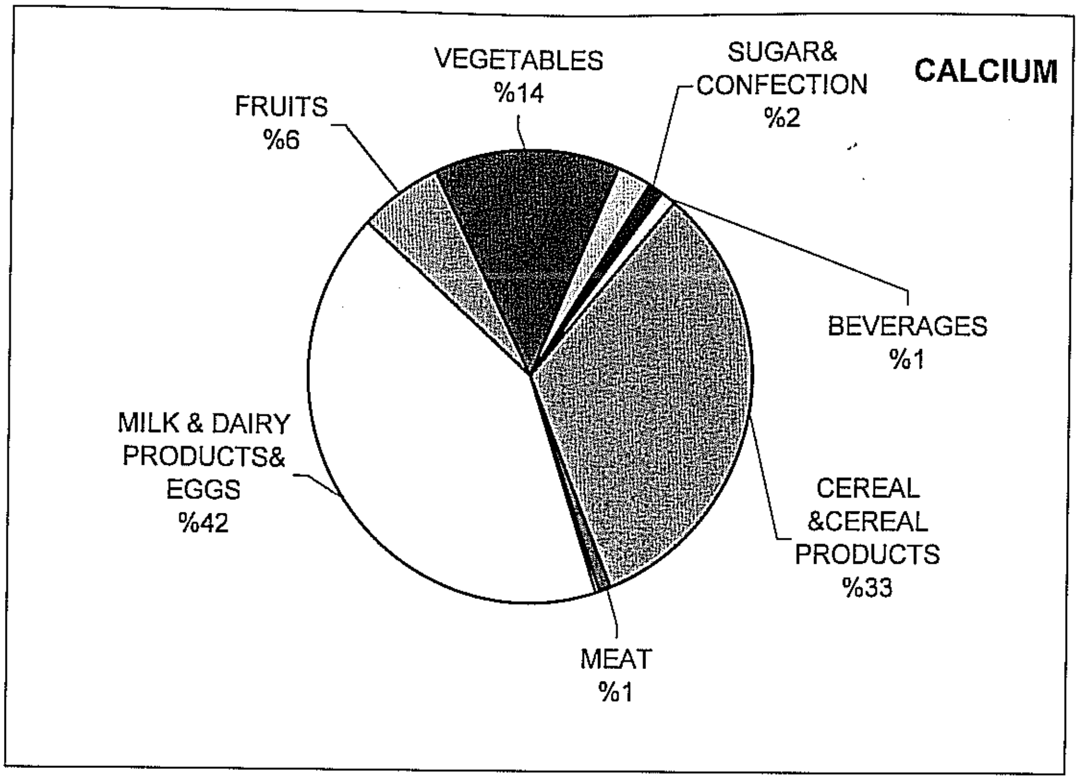


Figure H.2. Contribution of each food group to calcium intake as percentage of total supply

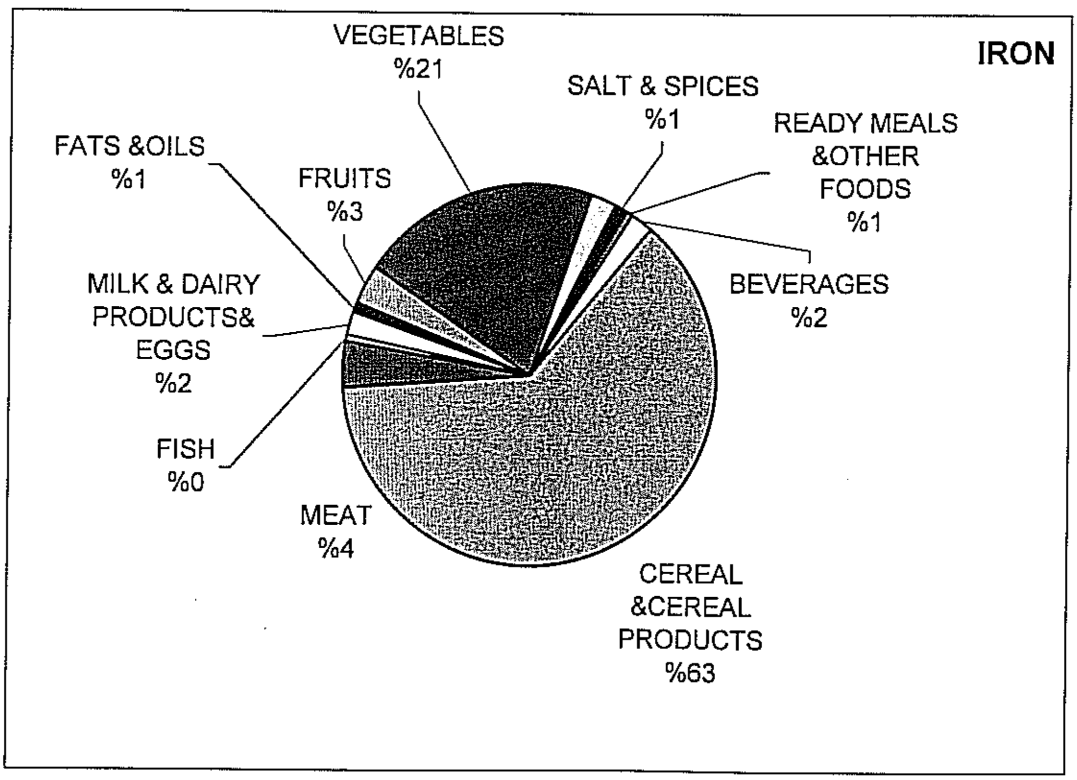


Figure H.3. Contribution of each food group to iron intake as percentage of total supply

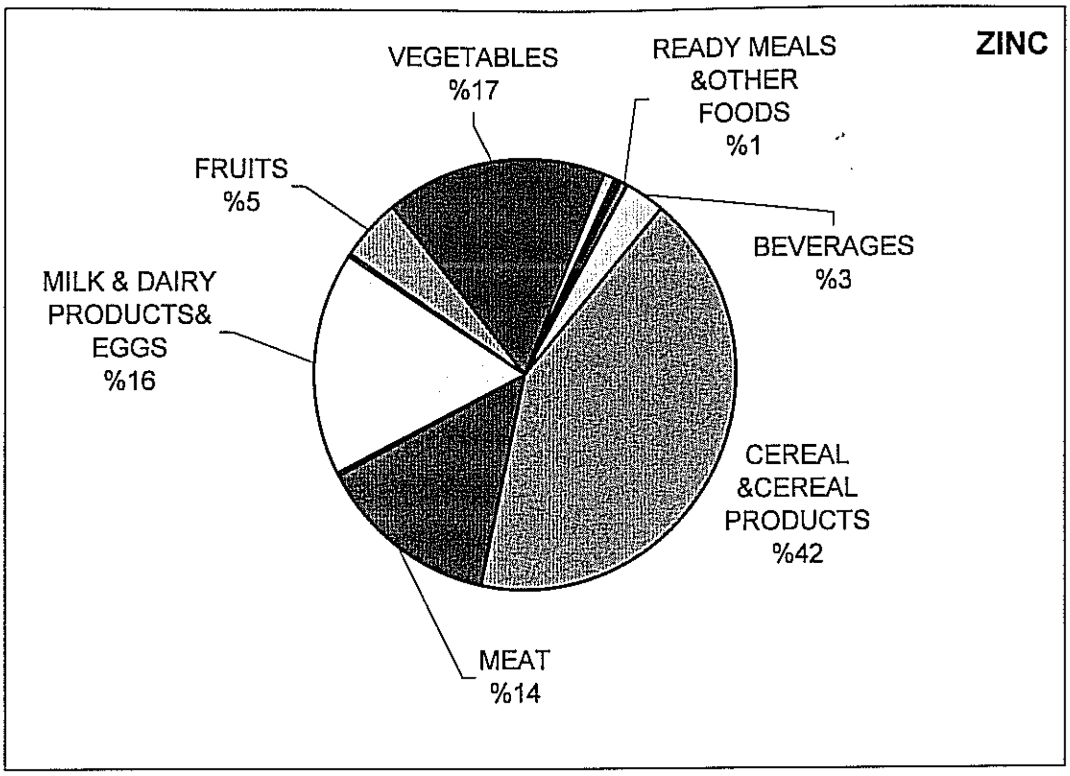


Figure H.4. Contribution of each food group to zinc intake as percentage of total supply

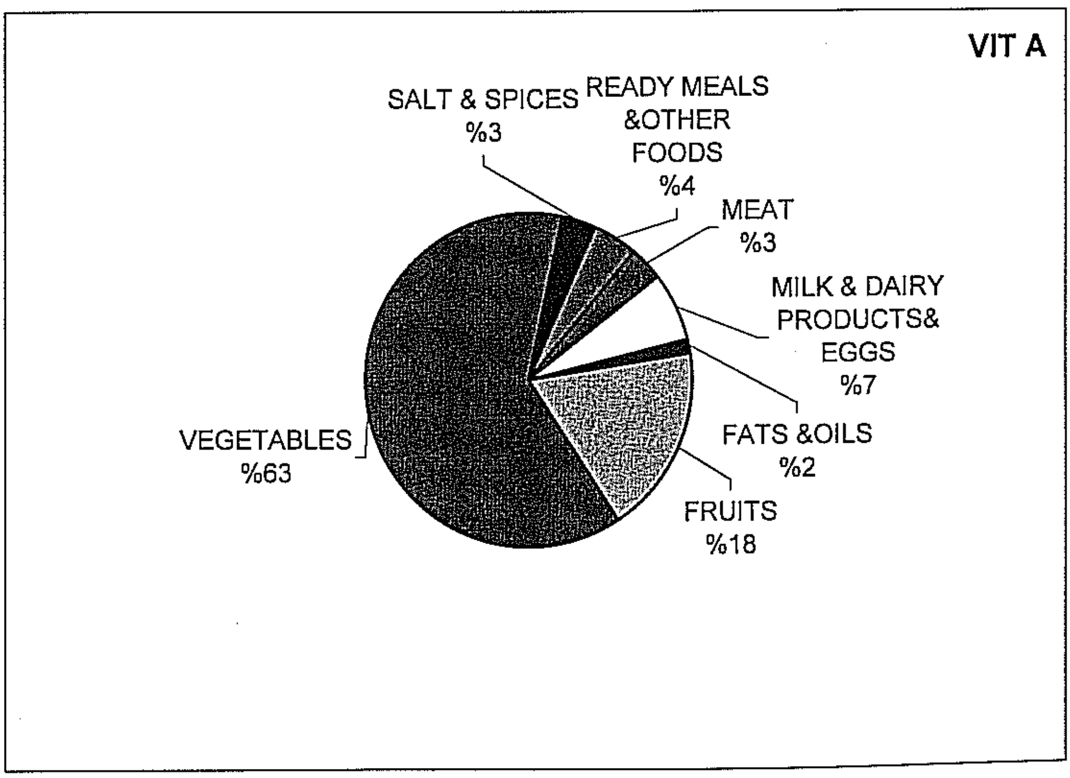


Figure H.5. Contribution of each food group to vitamin A intake as percentage of total supply

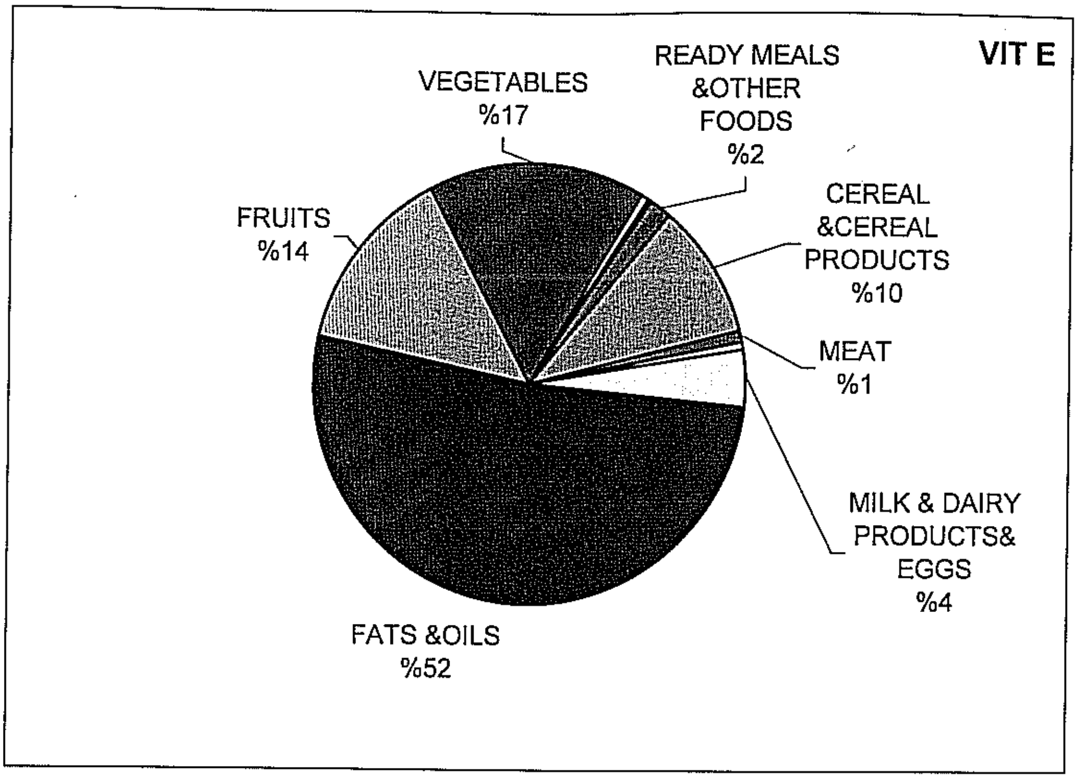


Figure H.6. Contribution of each food group to vitamin E intake as percentage of total supply

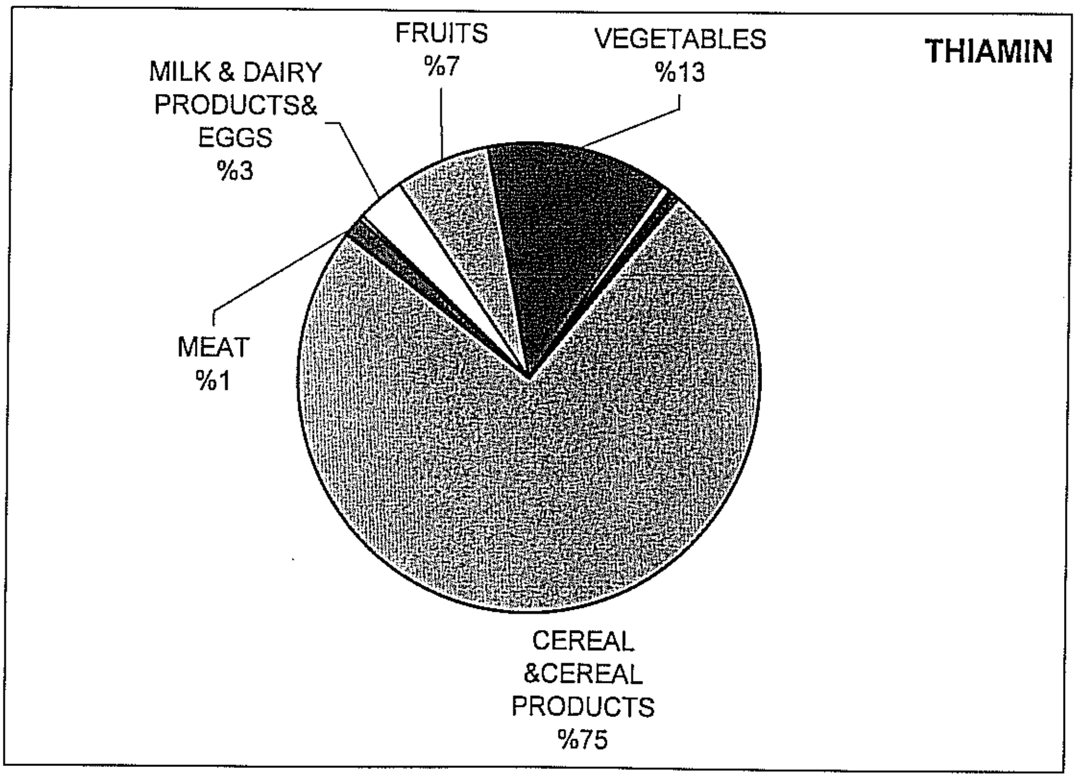


Figure H.7. Contribution of each food group to thiamin intake as percentage of total supply

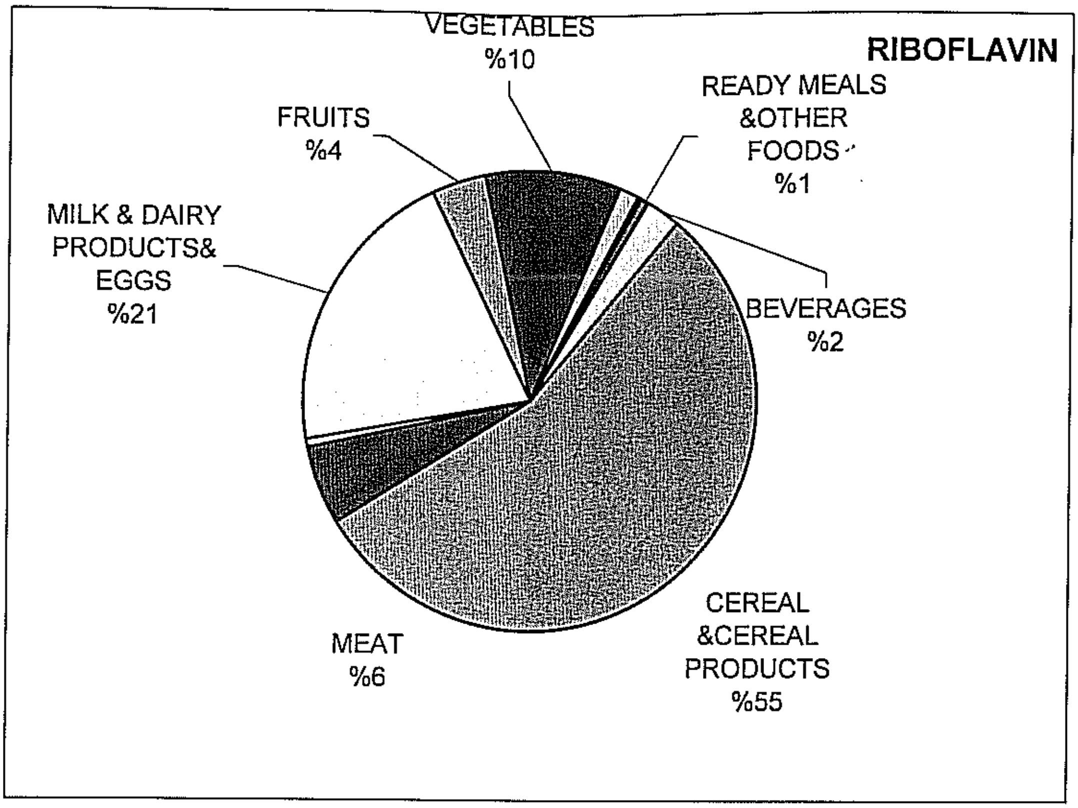


Figure H.8. Contribution of each food group to riboflavin intake as percentage of total supply

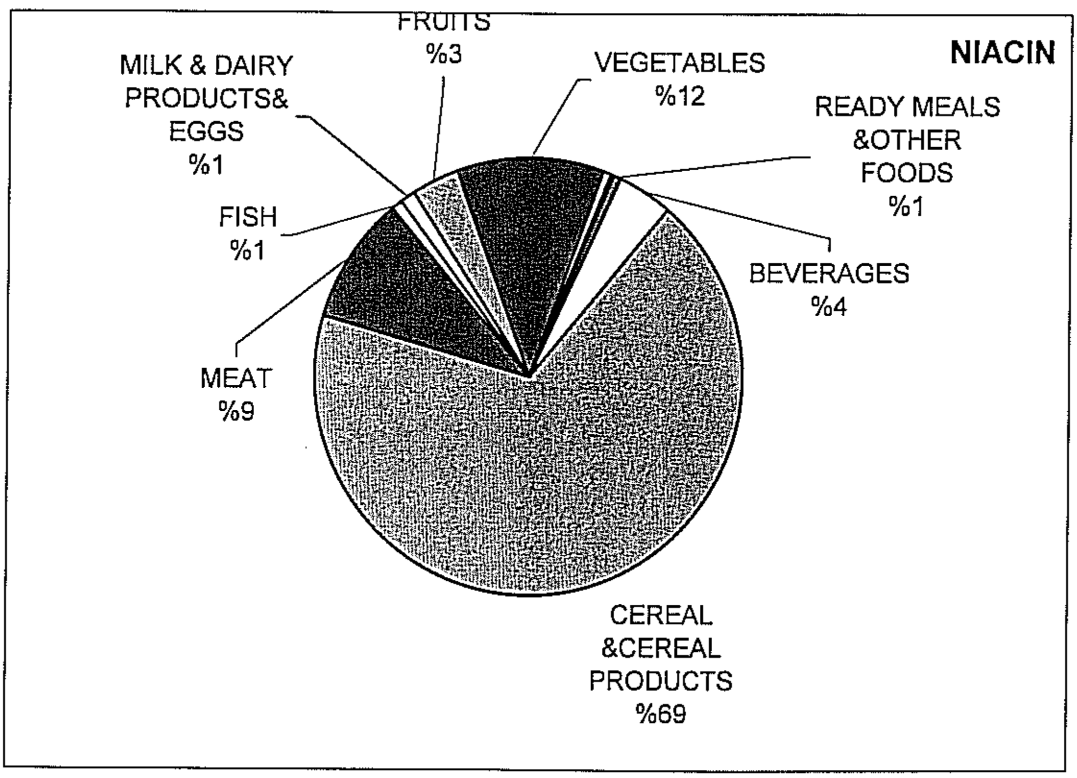


Figure H.9. Contribution of each food group to niacin intake as percentage of total supply

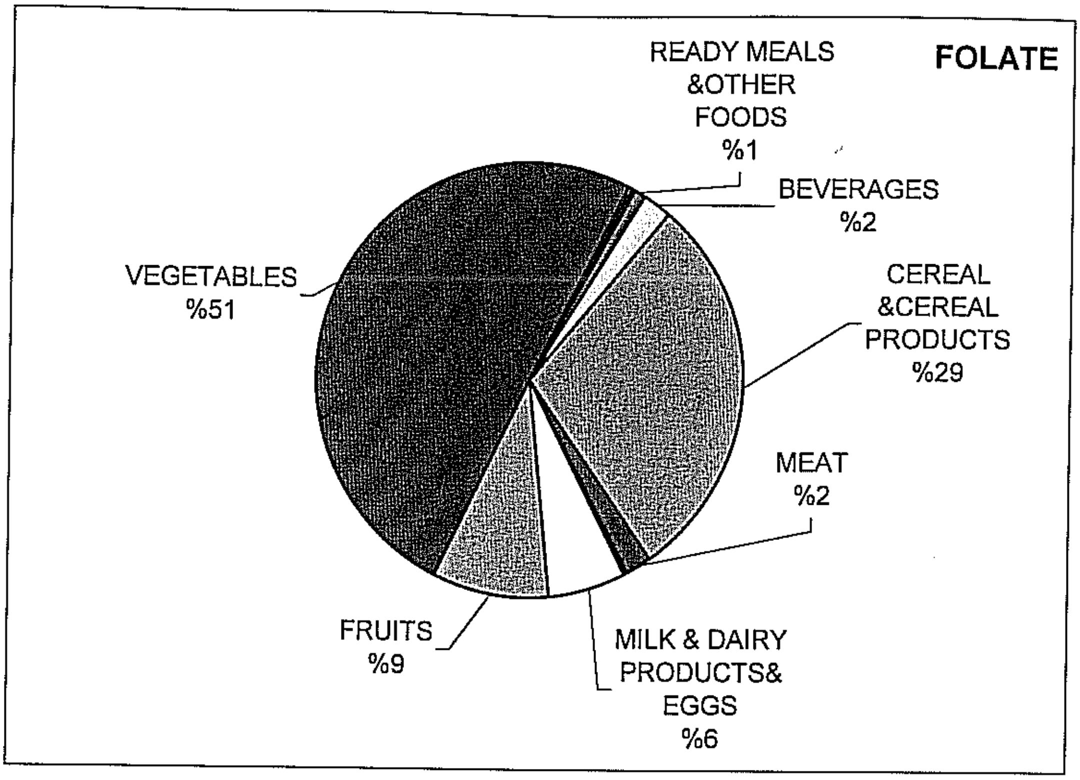


Figure H.10. Contribution of each food group to folate intake as percentage of total supply

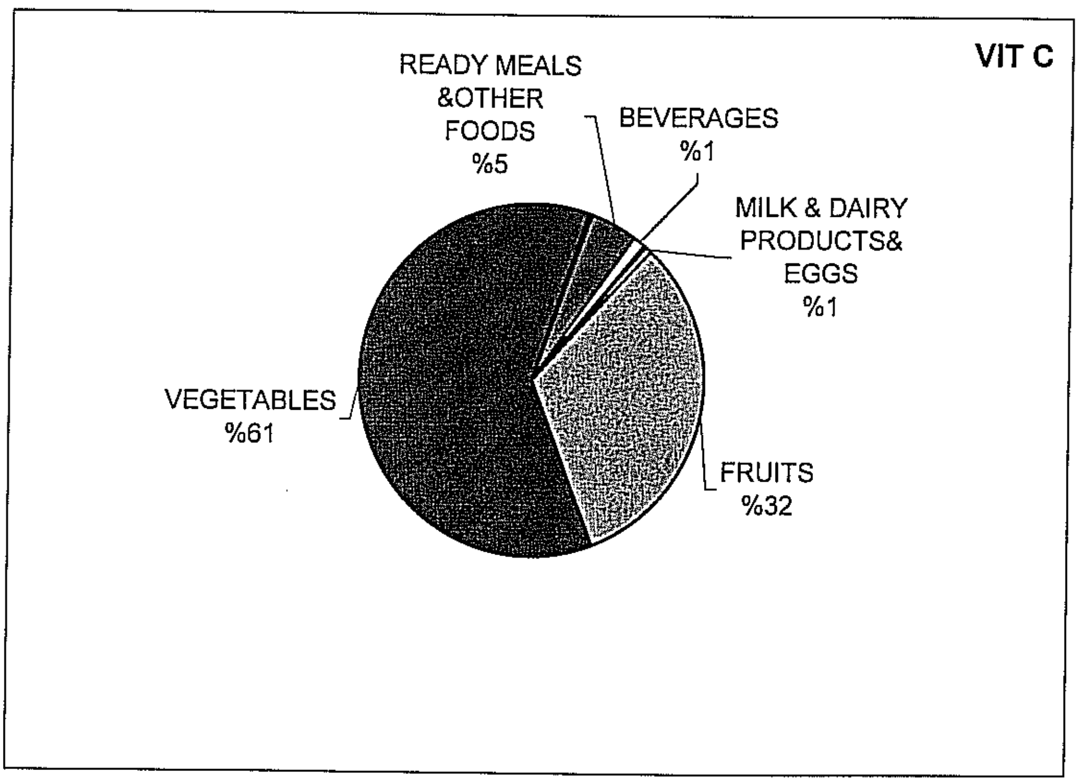


Figure H.11.Contribution of each food group to vitamin C intake as percentage of total supply

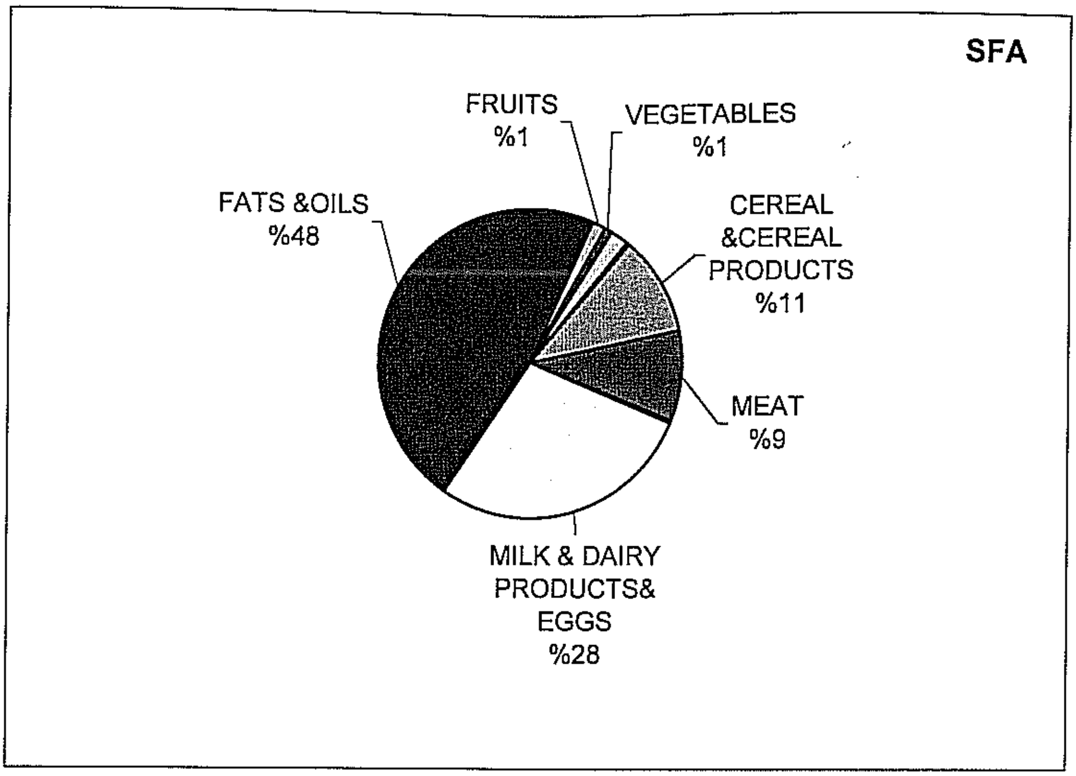


Figure H.12. Contribution of each food group to saturated fatty acid intake as percentage of total supply

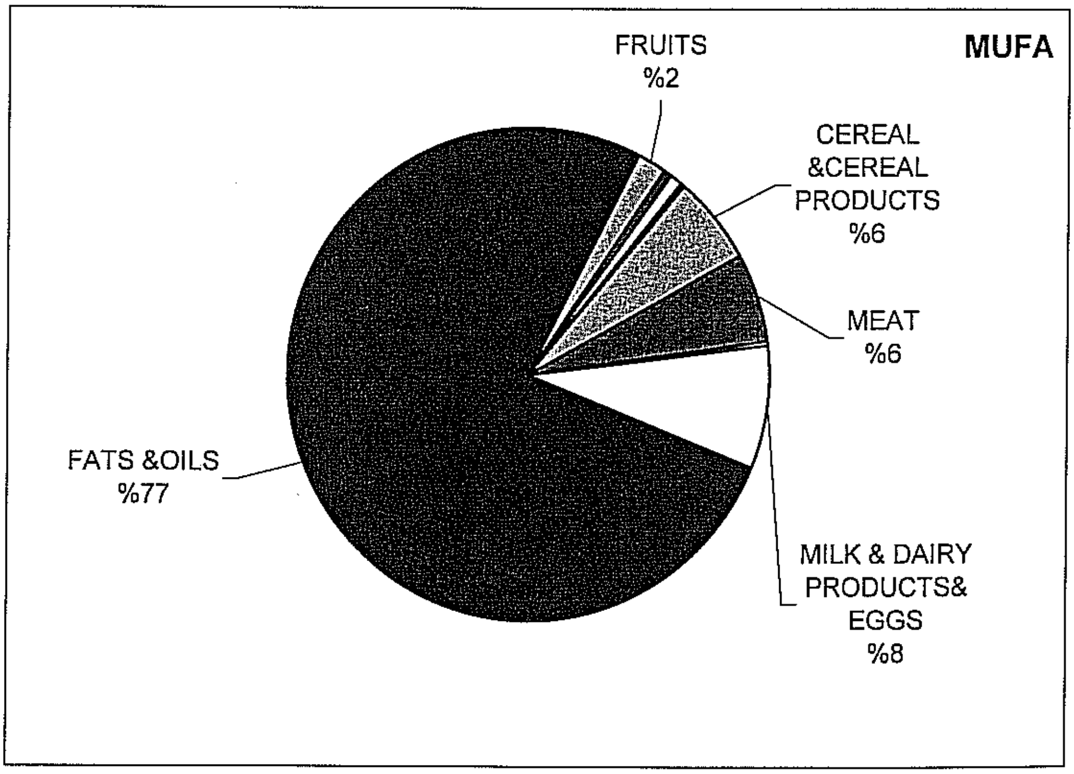


Figure H.13. Contribution of each food group to monounsaturated fatty acid intake as percentage of total supply

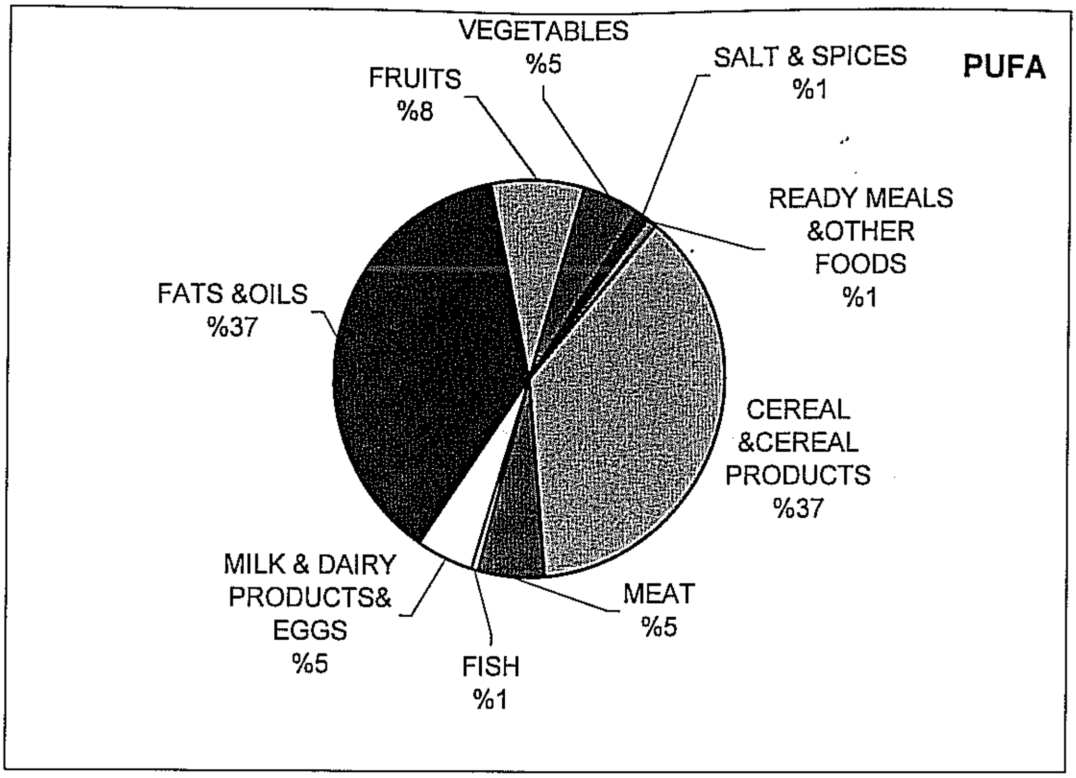


Figure H.14. Contribution of each food group to polyunsaturated fatty acid intake as percentage of total supply

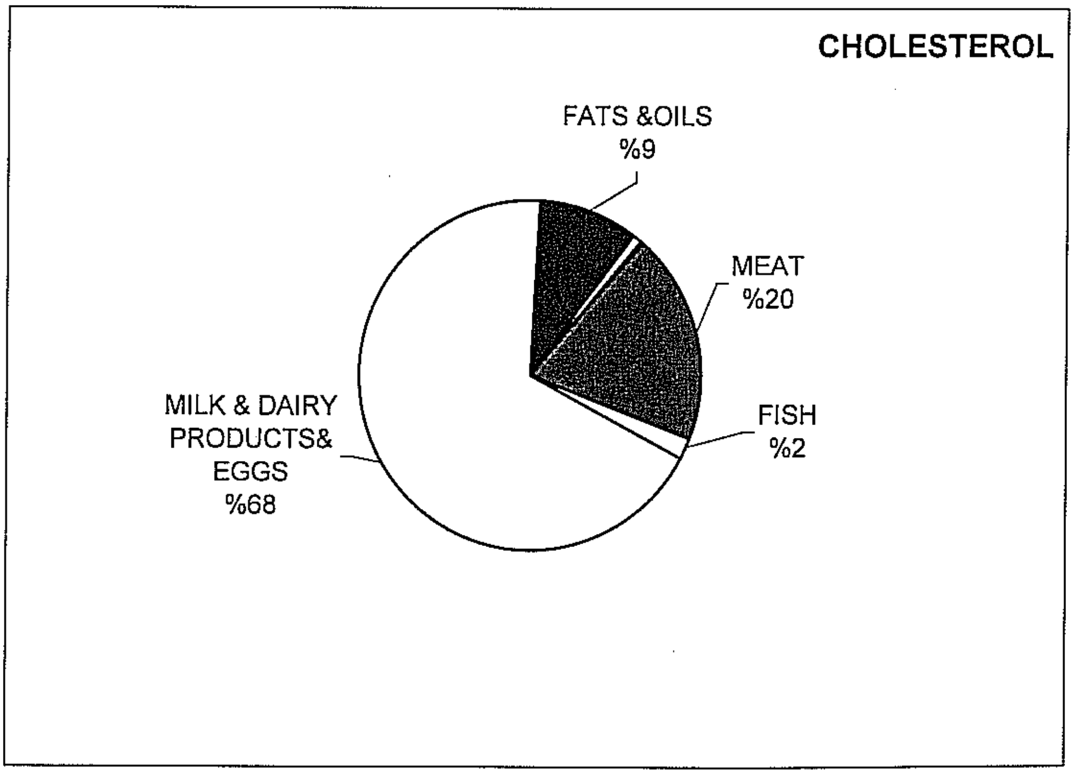


Figure H.15. Contribution of each food group to cholesterol intake as percentage of total supply

APPENDIX I

MARMARA REGION

CONTRIBUTION OF EACH FOOD GROUP TO INTAKE OF DIFFERENT NUTRIENTS AS PERCENTAGE OF TOTAL SUPPLY

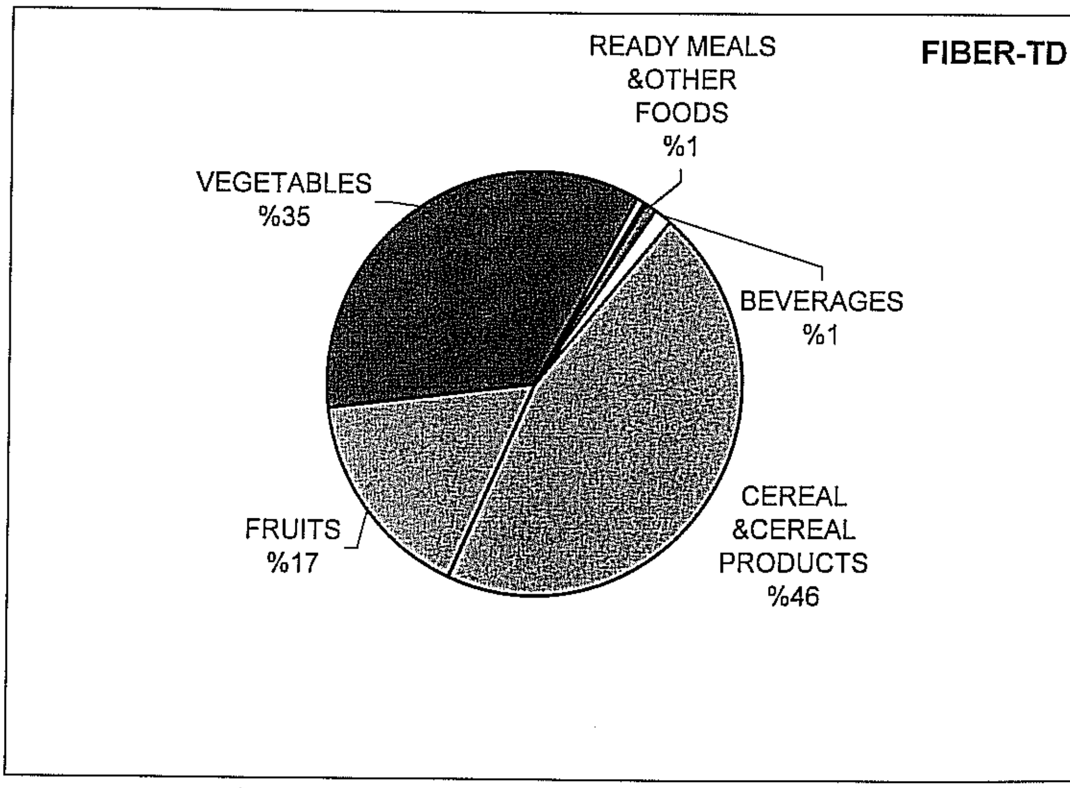


Figure I.1. Contribution of each food group to total dietary fiber intake as percentage of total supply

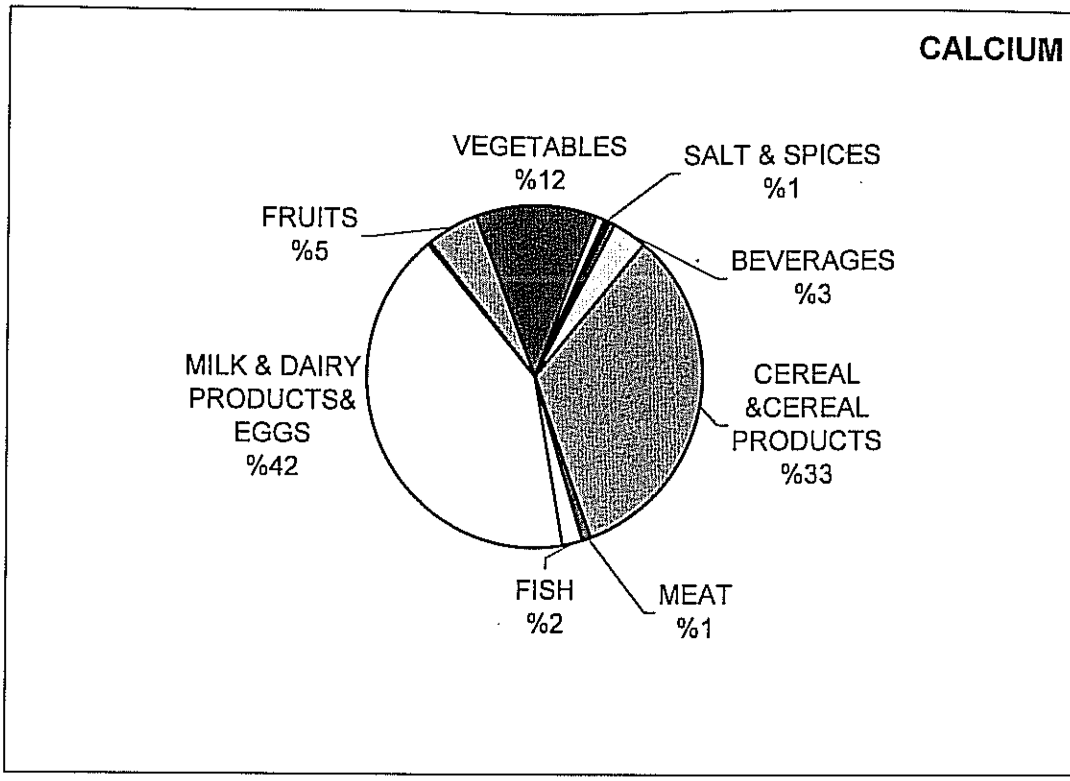


Figure I.2. Contribution of each food group to calcium intake as percentage of total supply

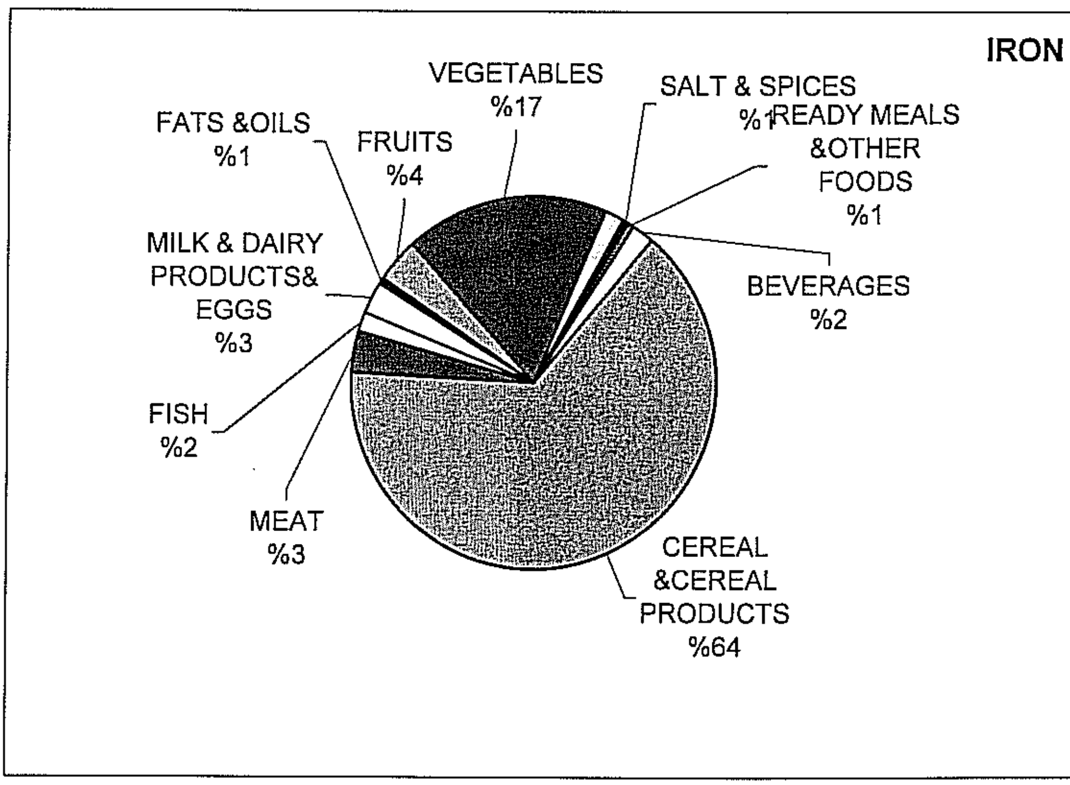


Figure I.3. Contribution of each food group to iron intake as percentage of total supply

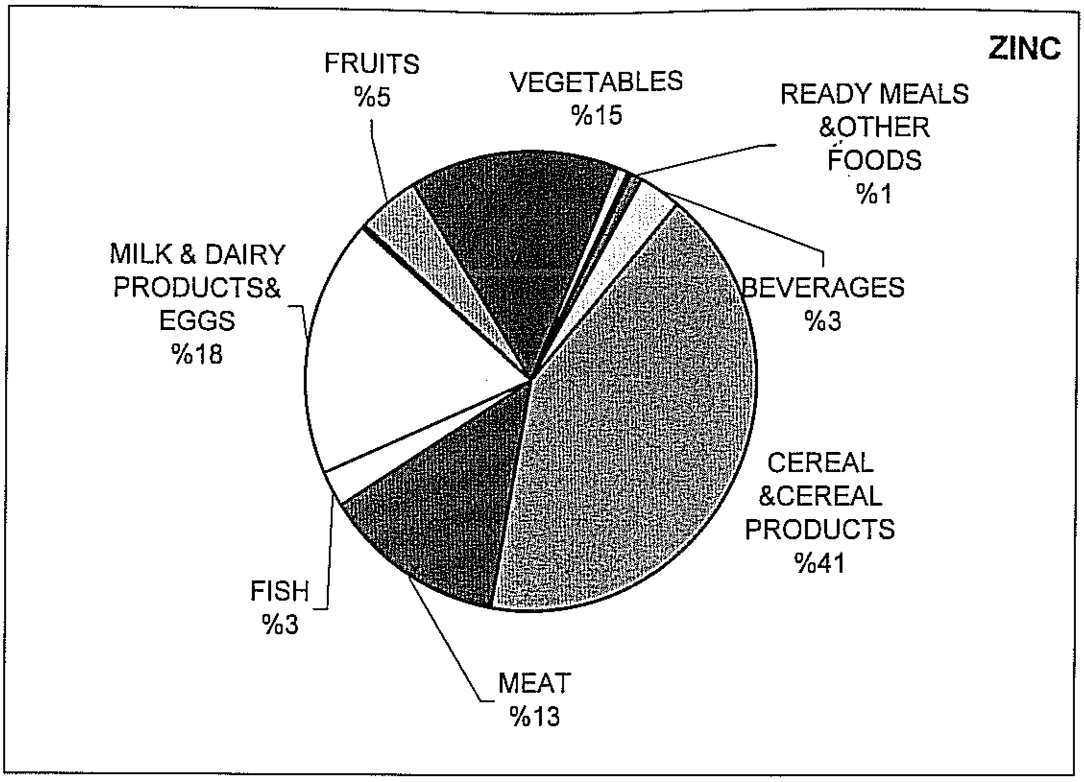


Figure I.4. Contribution of each food group to zinc intake as percentage of total supply

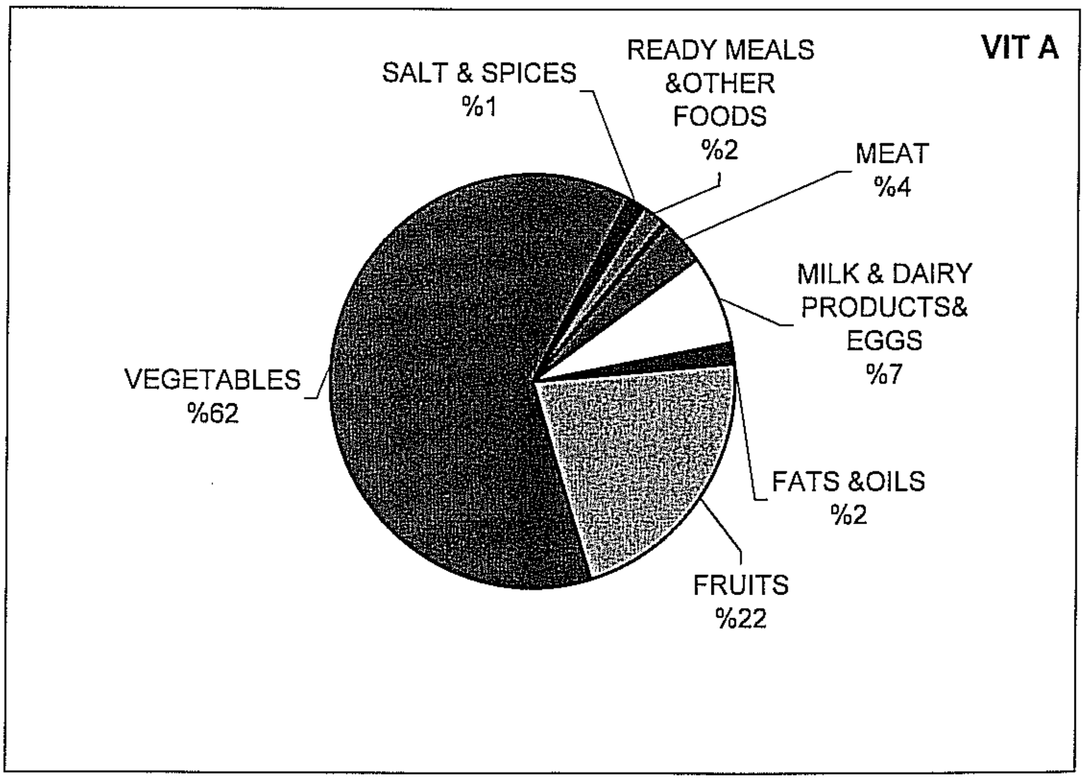


Figure I.5. Contribution of each food group to vitamin A intake as percentage of total supply

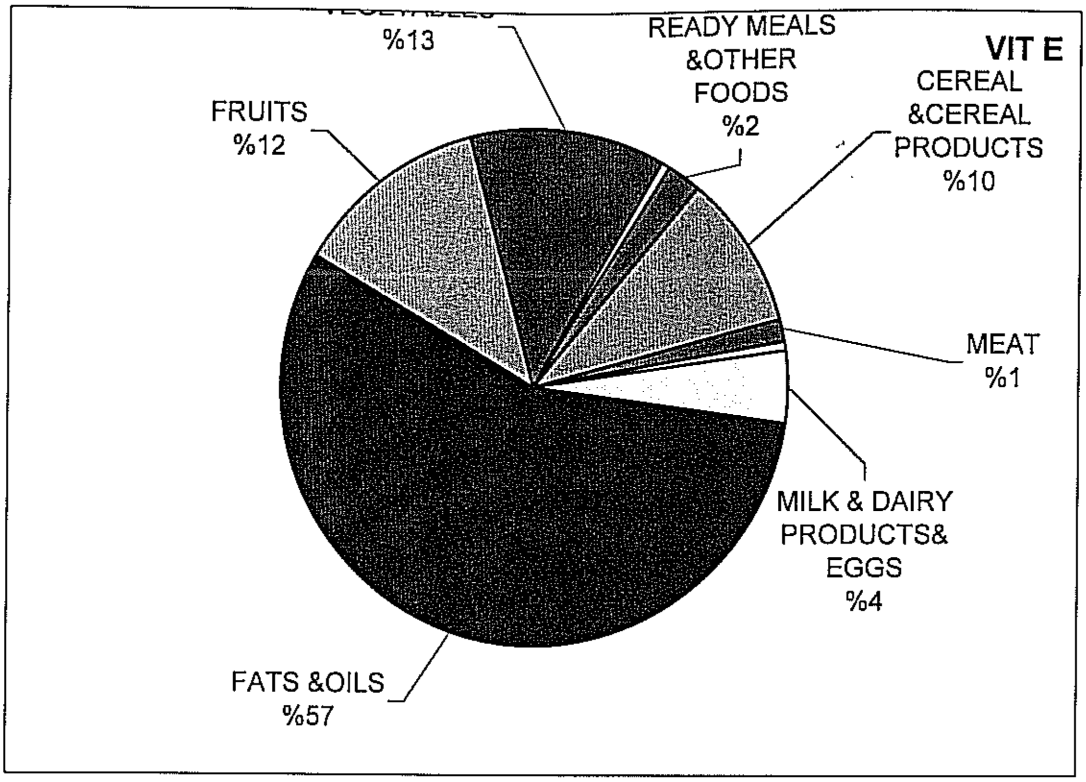


Figure I.6. Contribution of each food group to vitamin E intake as percentage of total supply

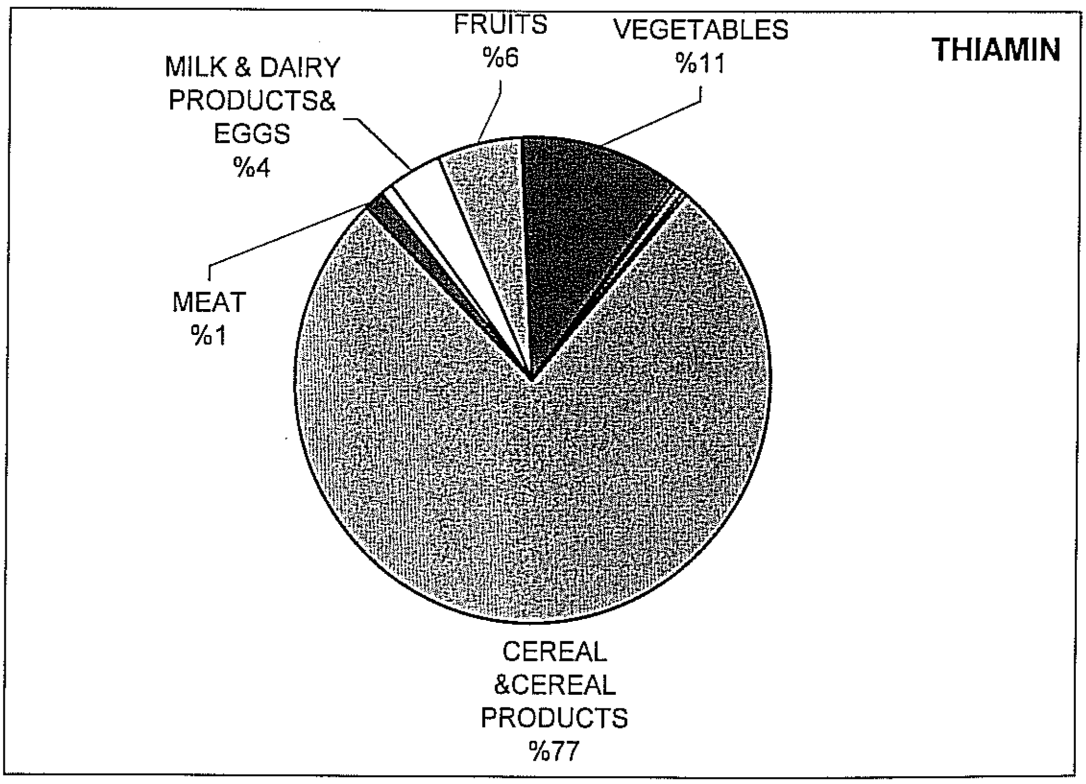


Figure I.7. Contribution of each food group to thiamin intake as percentage of total supply

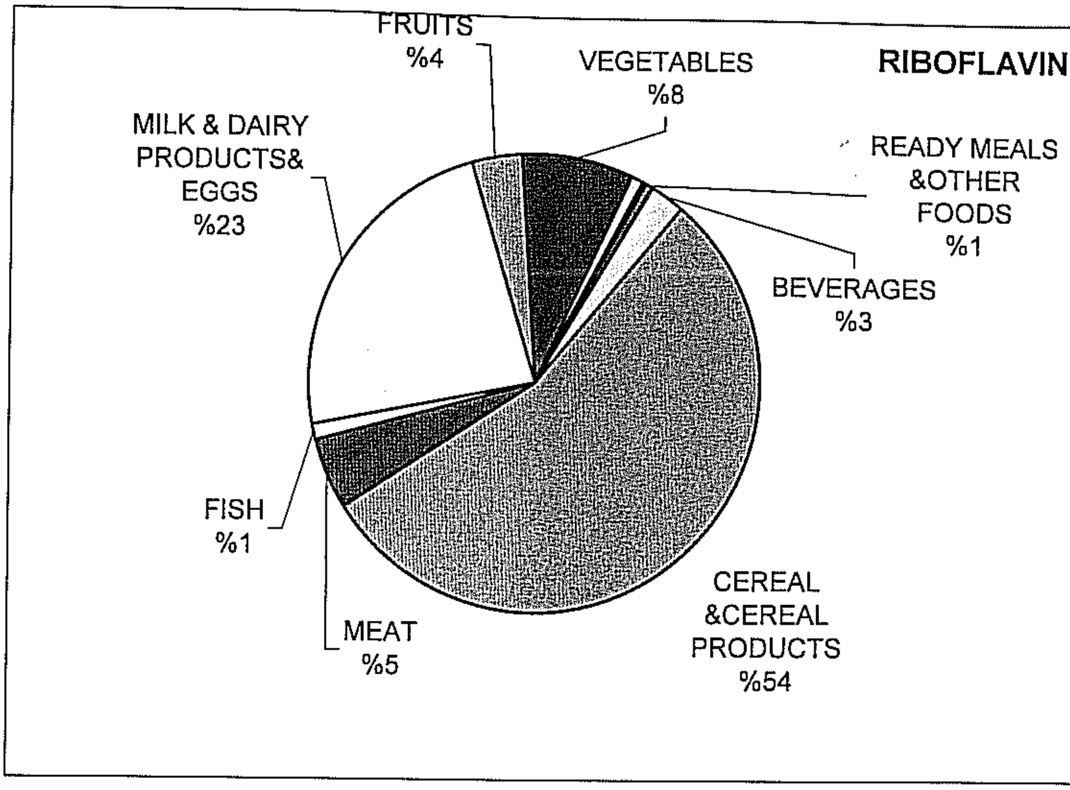


Figure I.8. Contribution of each food group to riboflavin intake as percentage of total supply

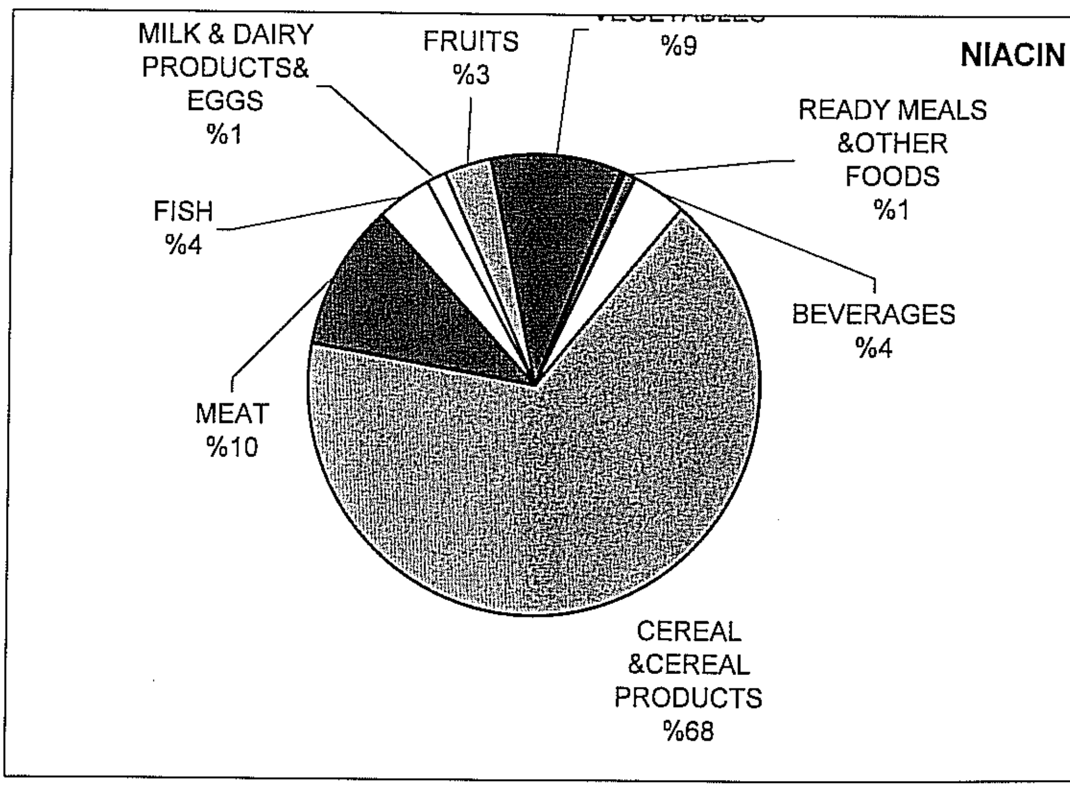


Figure I.9. Contribution of each food group to niacin intake as percentage of total supply

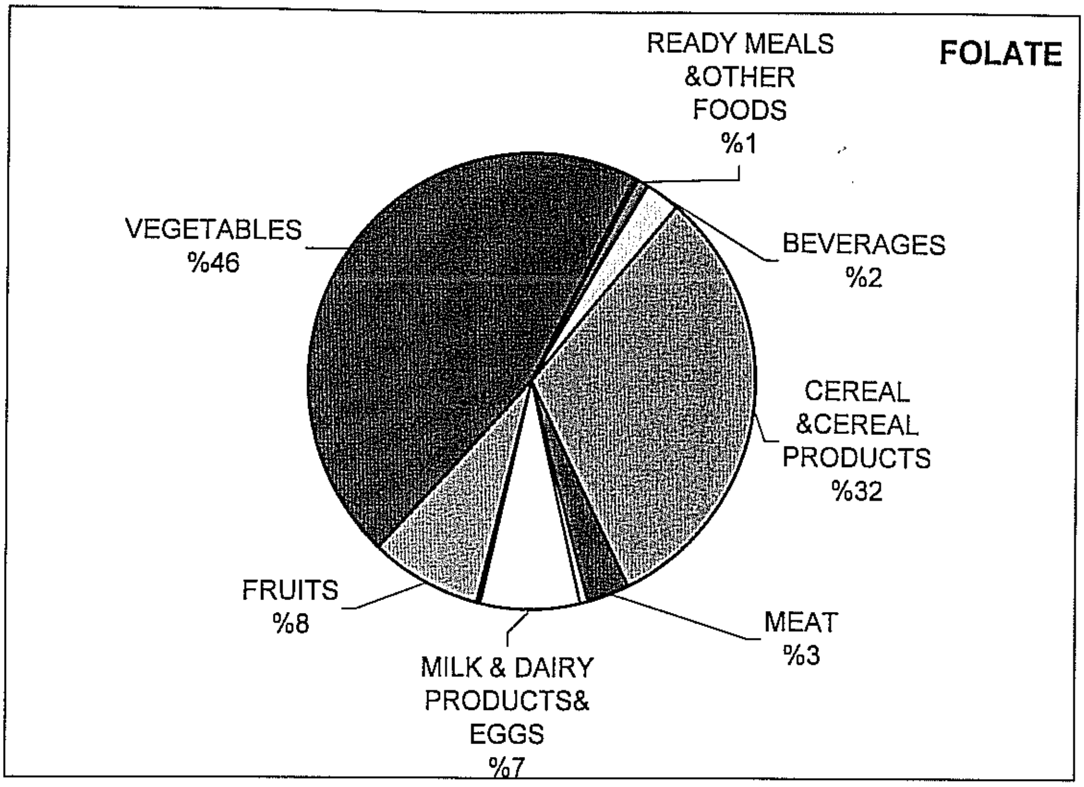


Figure I.10. Contribution of each food group to folate intake as percentage of total supply

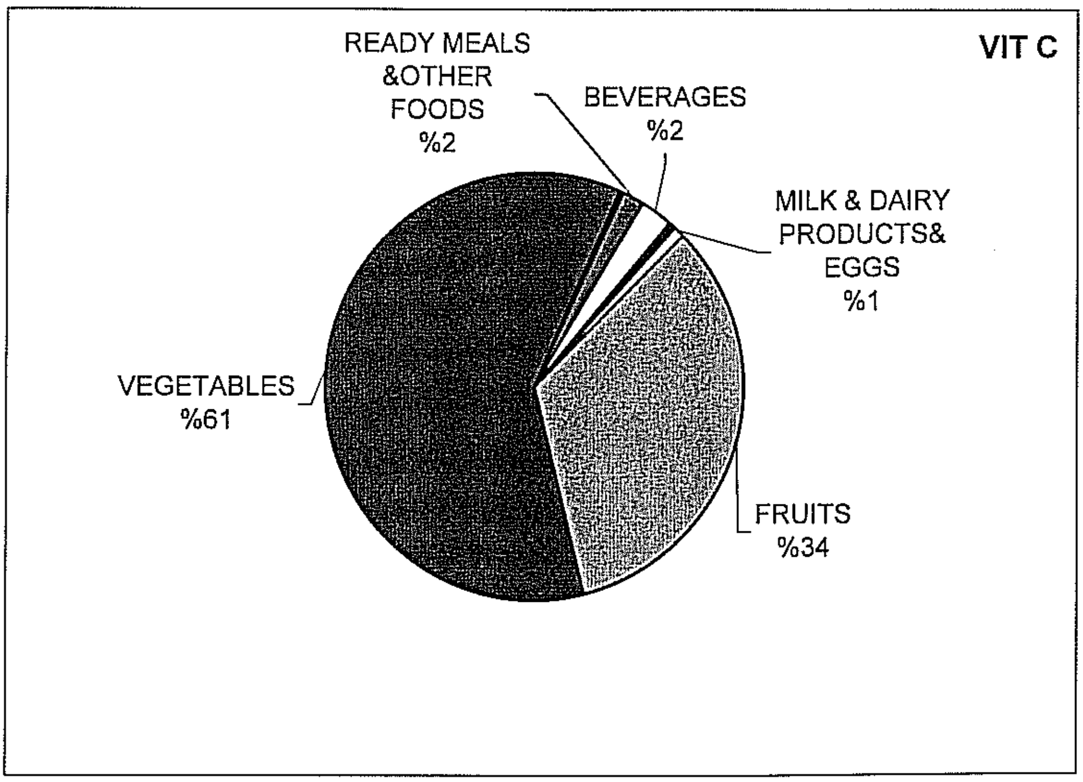


Figure I.11.Contribution of each food group to vitamin C intake as percentage of total supply

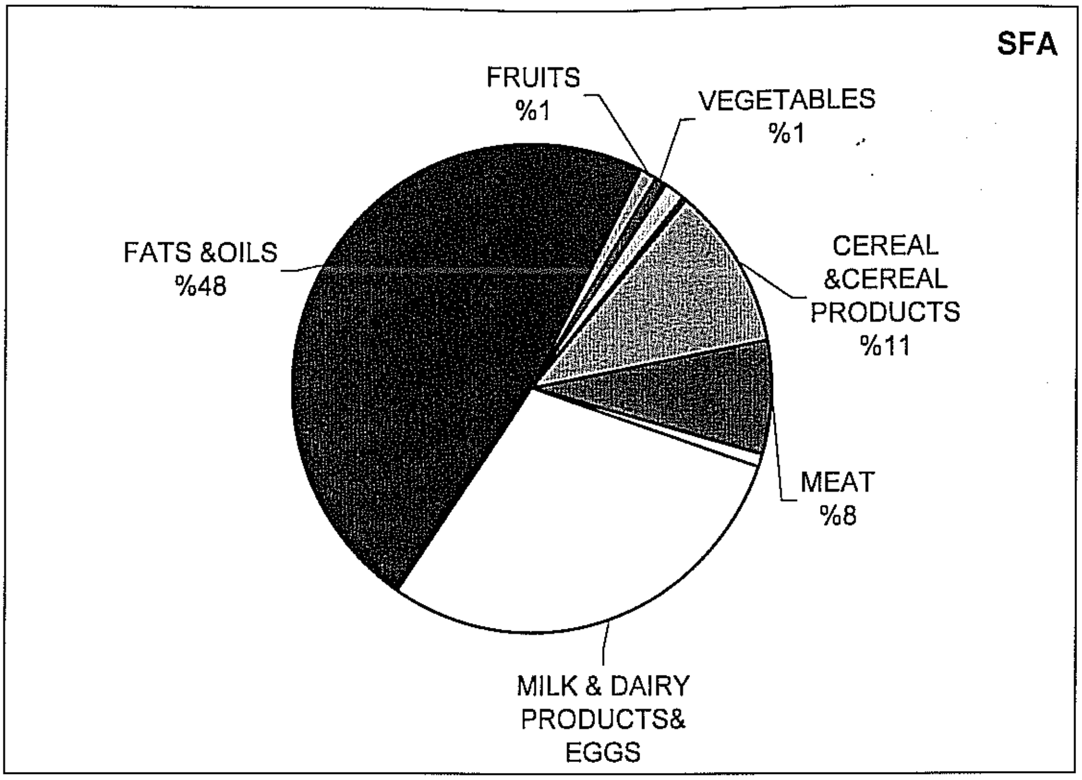


Figure I.12. Contribution of each food group to saturated fatty acid intake as percentage of total supply

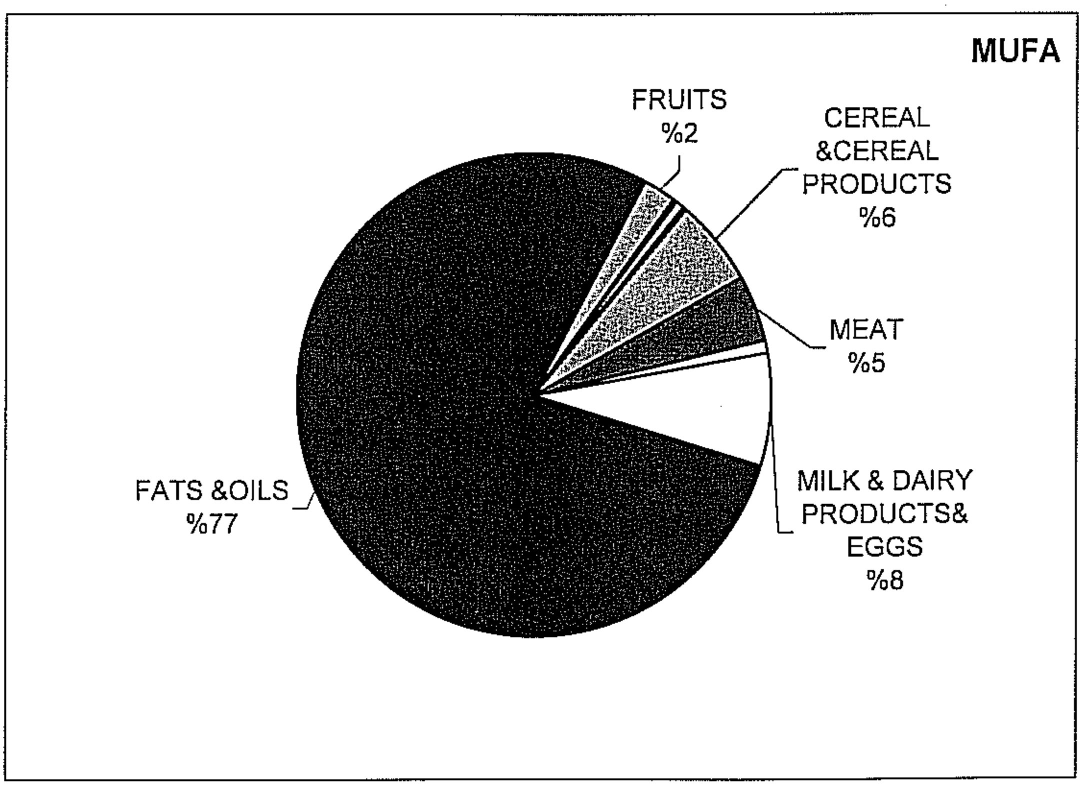


Figure I.13. Contribution of each food group to monounsaturated fatty acid intake as percentage of total supply

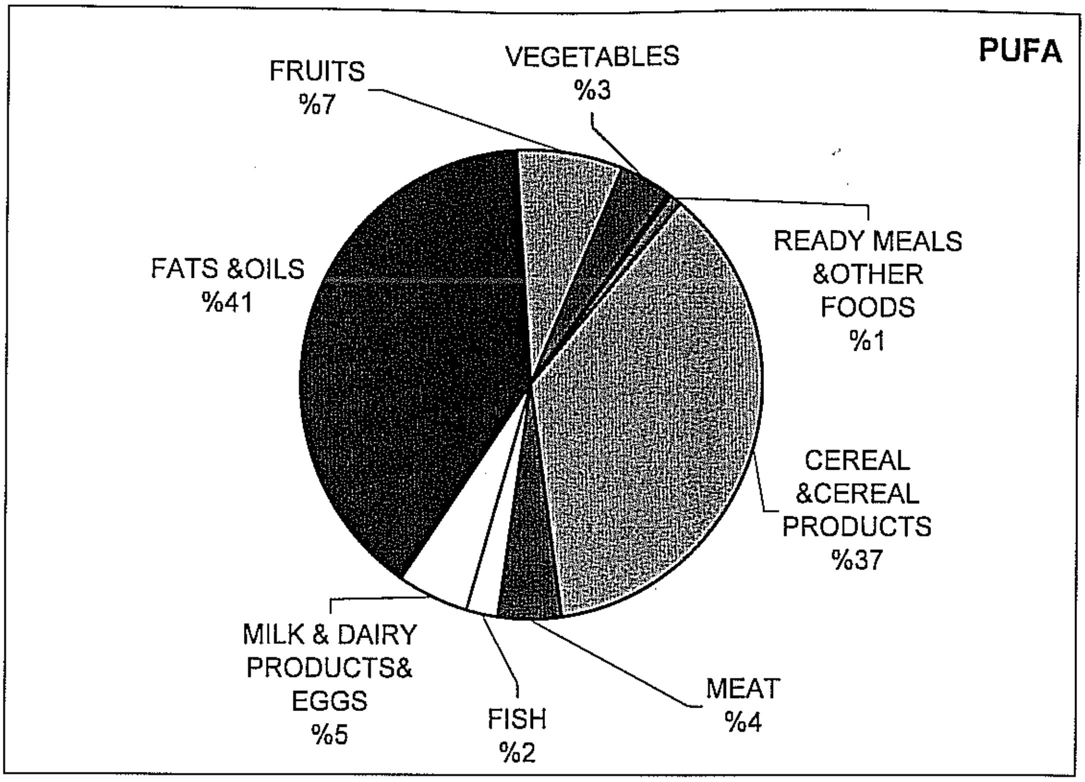


Figure I.14. Contribution of each food group to polyunsaturated fatty acid intake as percentage of total supply

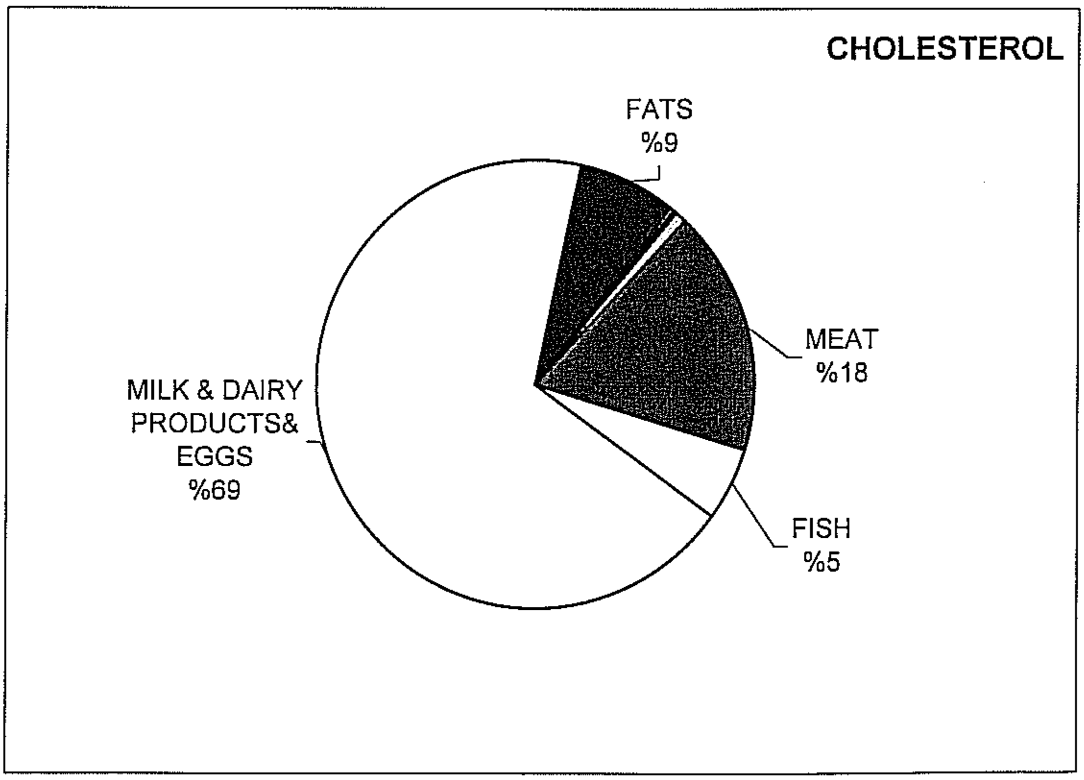


Figure I.15. Contribution of each food group to cholesterol intake as percentage of total supply

APPENDIX J

AN OVERVIEW OF TURKEY

CONTRIBUTION OF EACH FOOD GROUP TO INTAKE OF DIFFERENT NUTRIENTS AS PERCENTAGE OF TOTAL SUPPLY

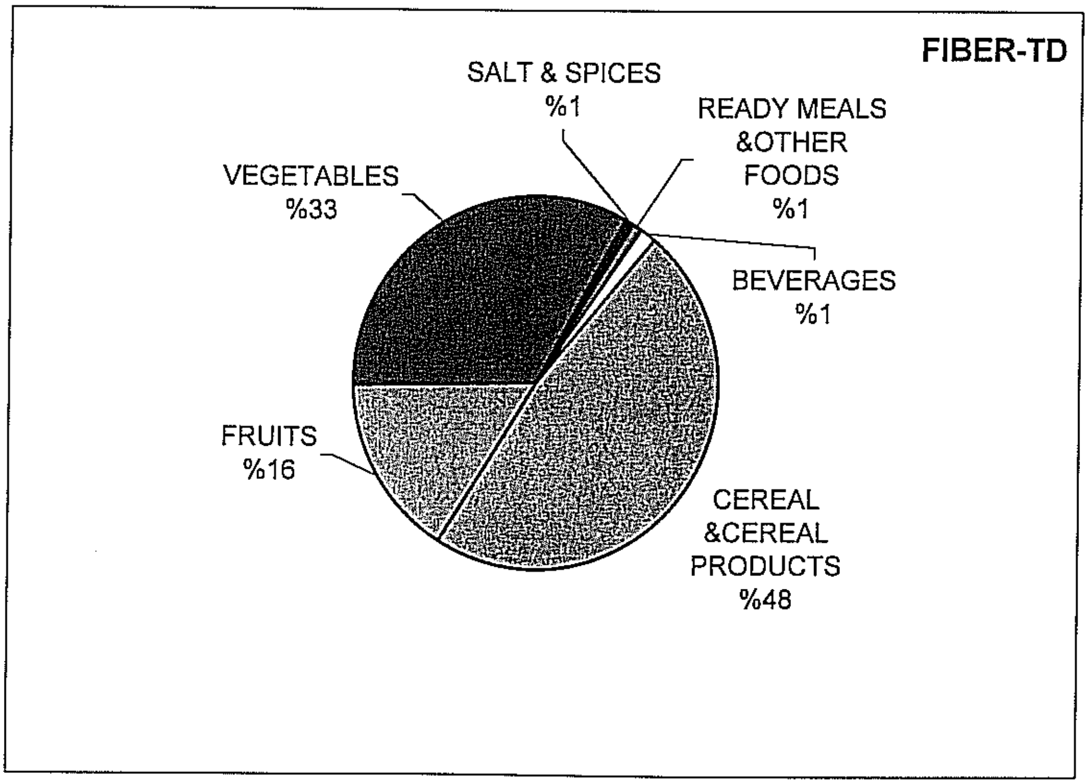


Figure J.1. Contribution of each food group to total dietary fiber intake as percentage of total supply

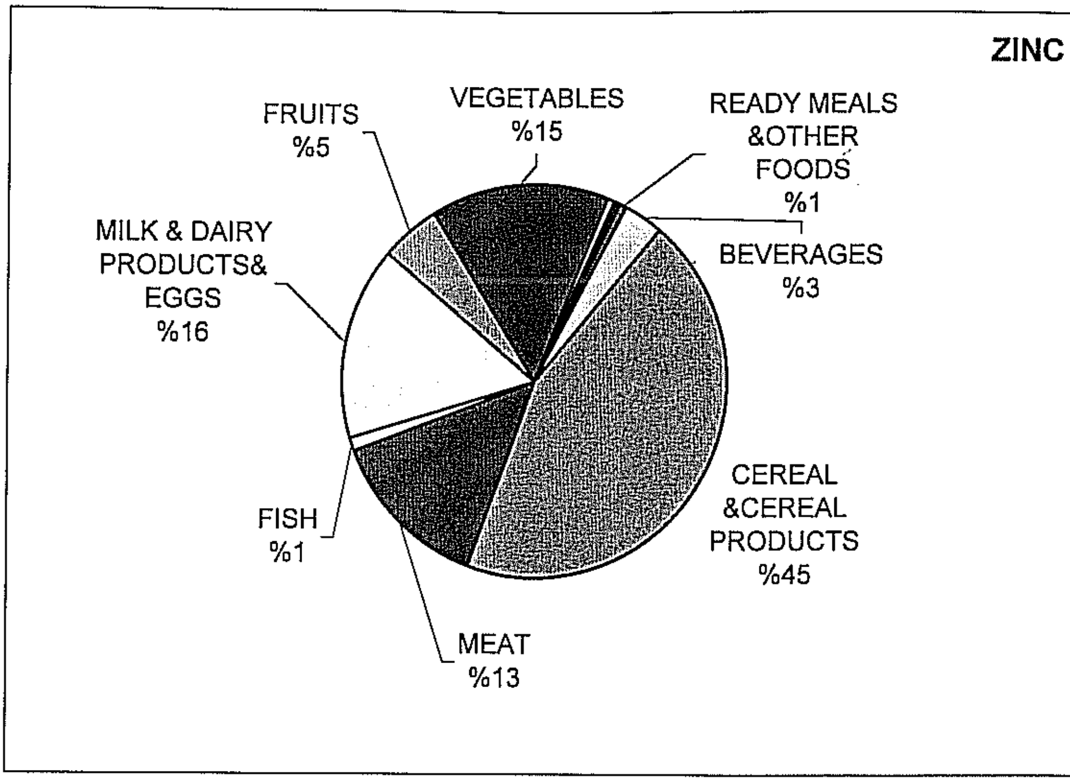


Figure J.4. Contribution of each food group to zinc intake as percentage of total supply

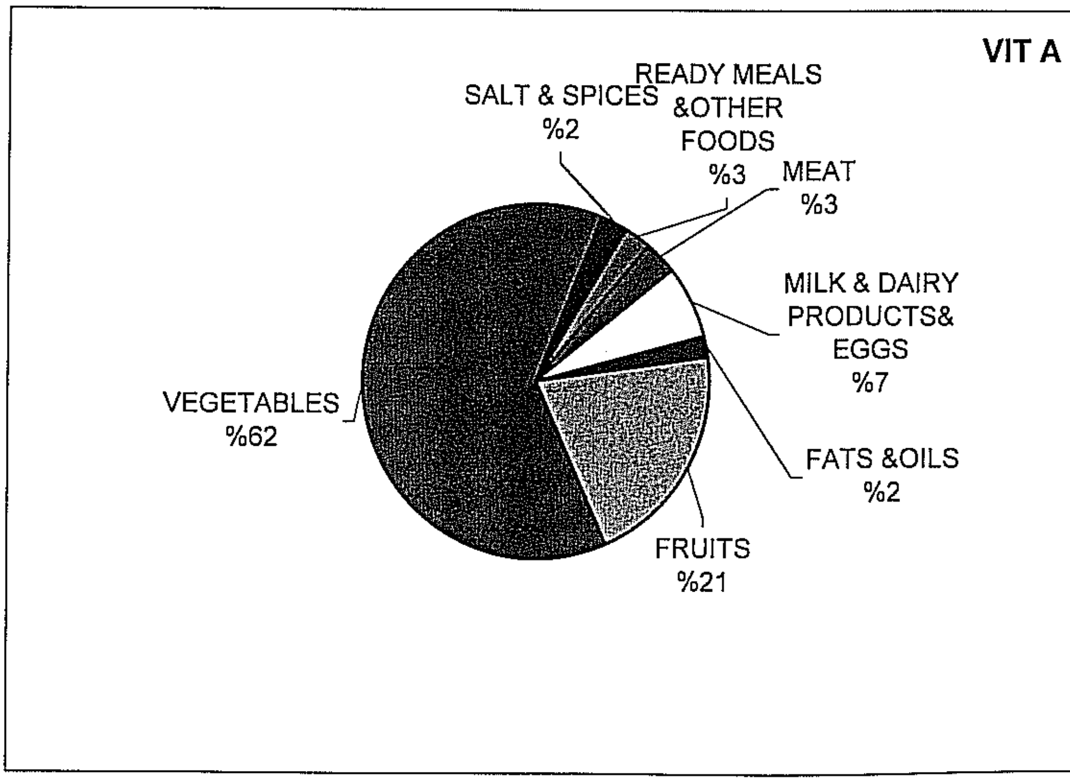


Figure J.5. Contribution of each food group to vitamin A intake as percentage of total supply

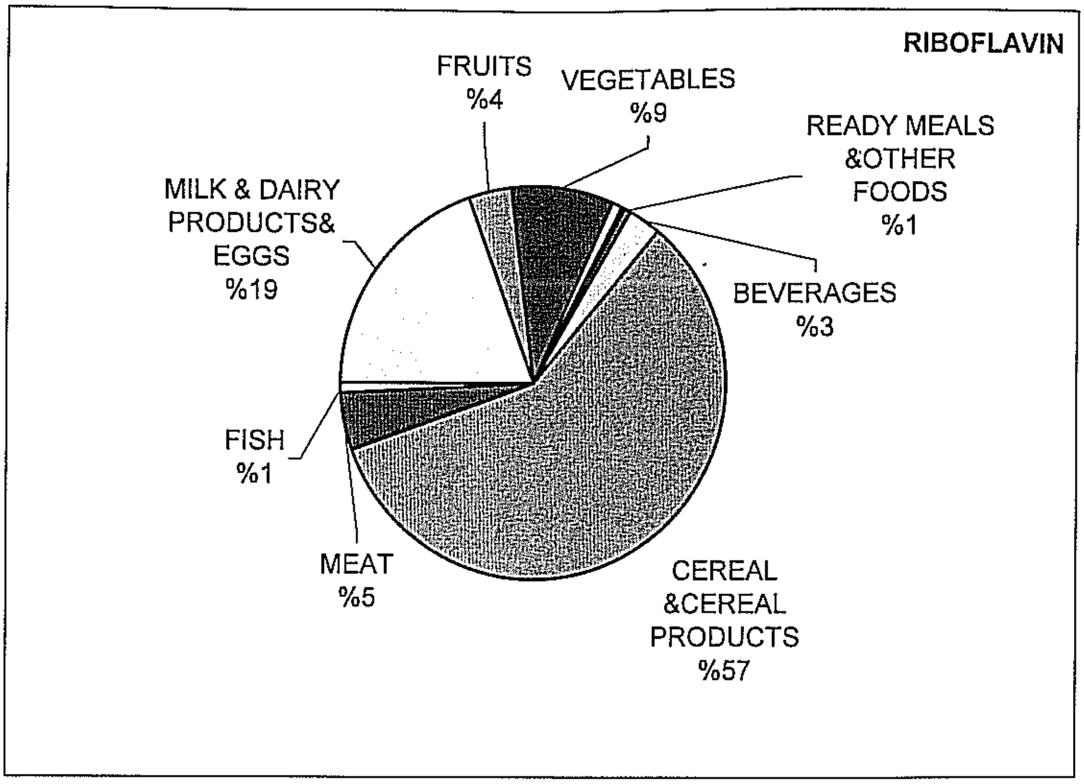


Figure J.8. Contribution of each food group to riboflavin intake as percentage of total supply

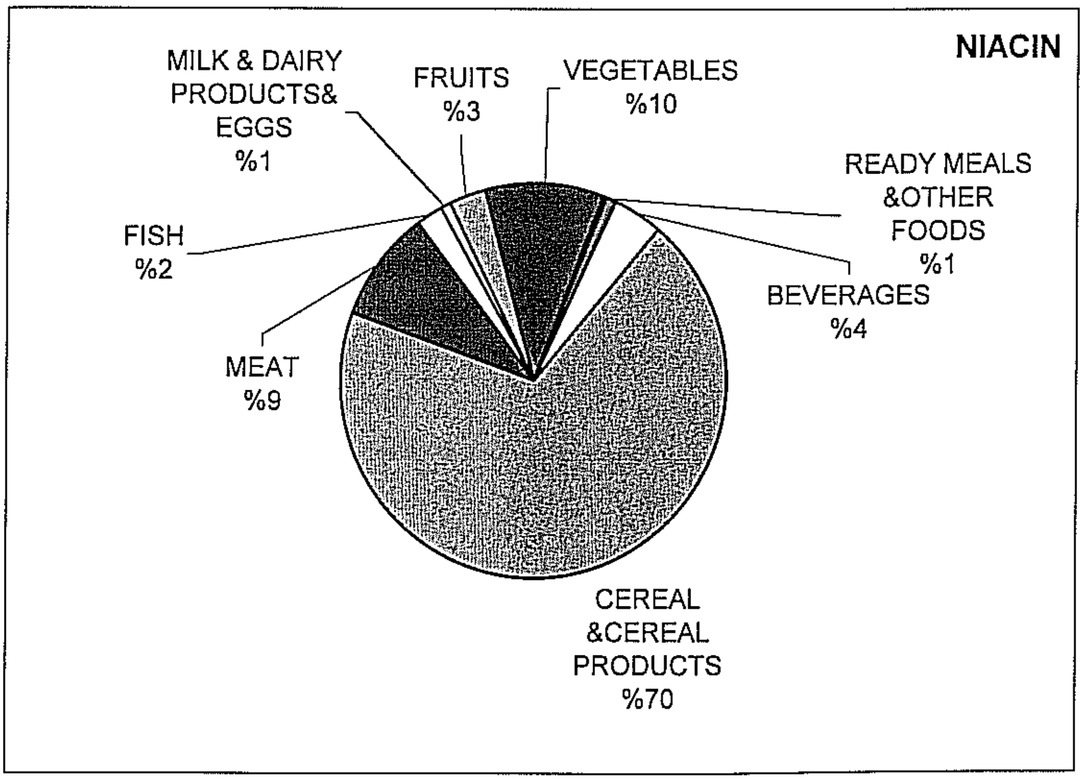


Figure J.9. Contribution of each food group to niacin intake as percentage of total supply

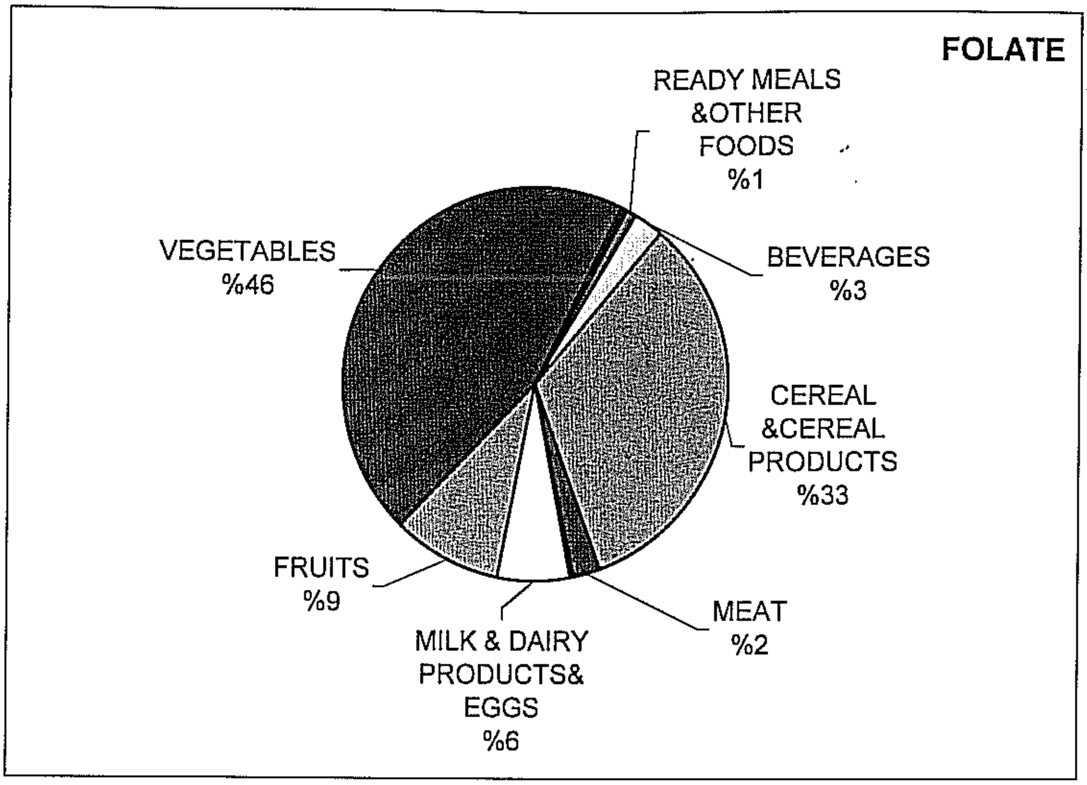


Figure J.10. Contribution of each food group to folate intake as percentage of total supply

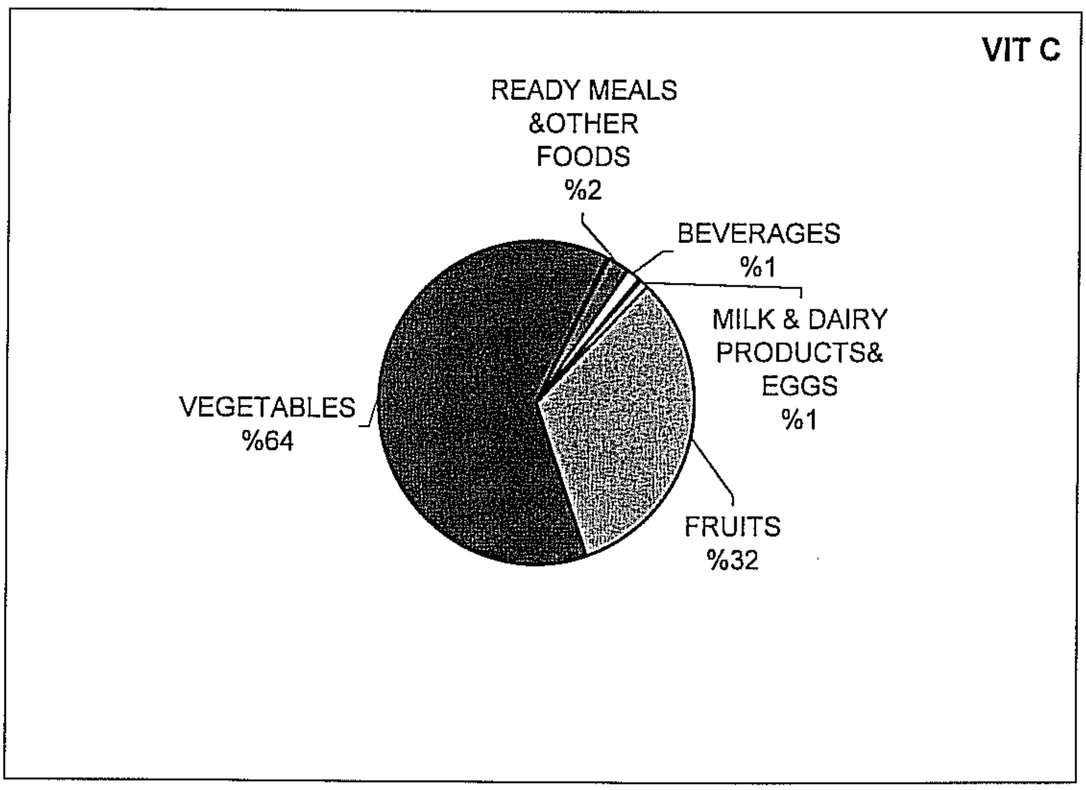


Figure J.11.Contribution of each food group to vitamin C intake as percentage of total supply

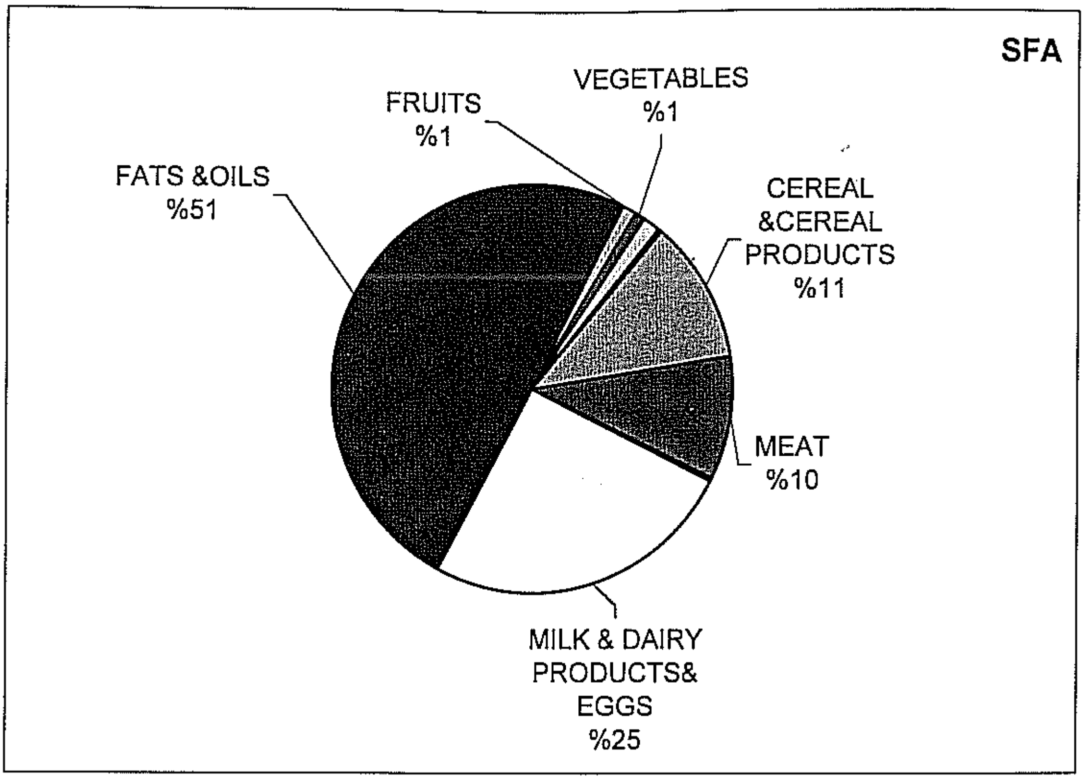


Figure J.12. Contribution of each food group to saturated fatty acid intake as percentage of total supply

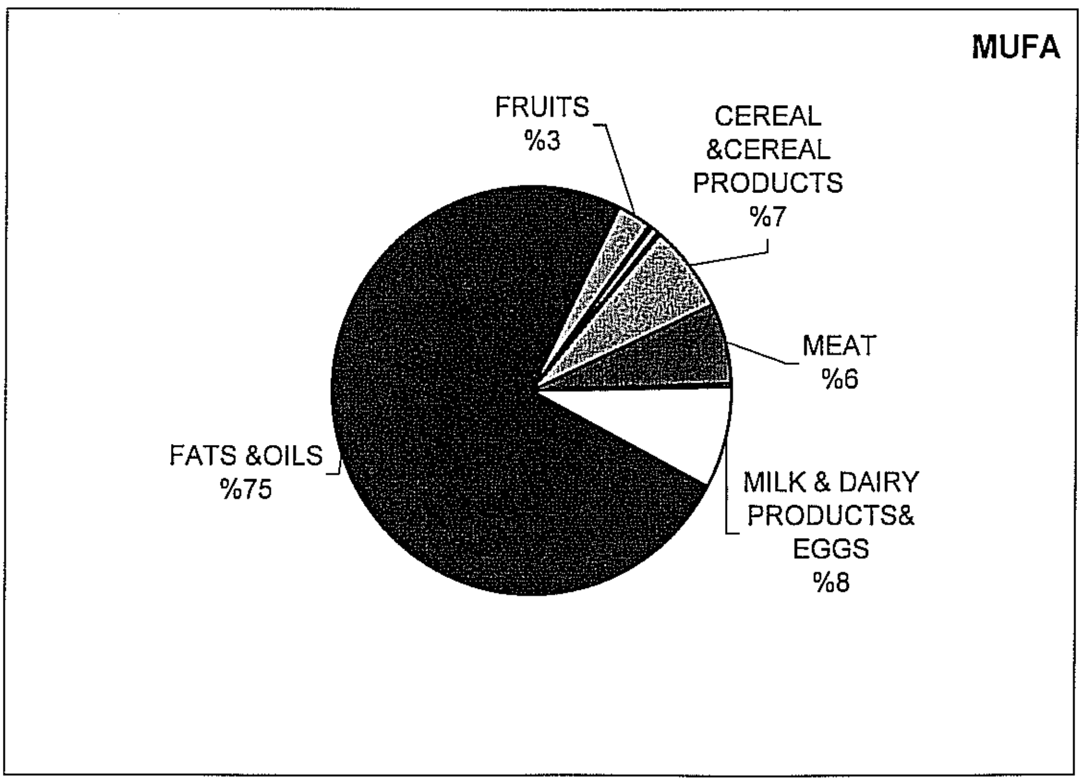


Figure J.13. Contribution of each food group to monounsaturated fatty acid intake as percentage of total supply

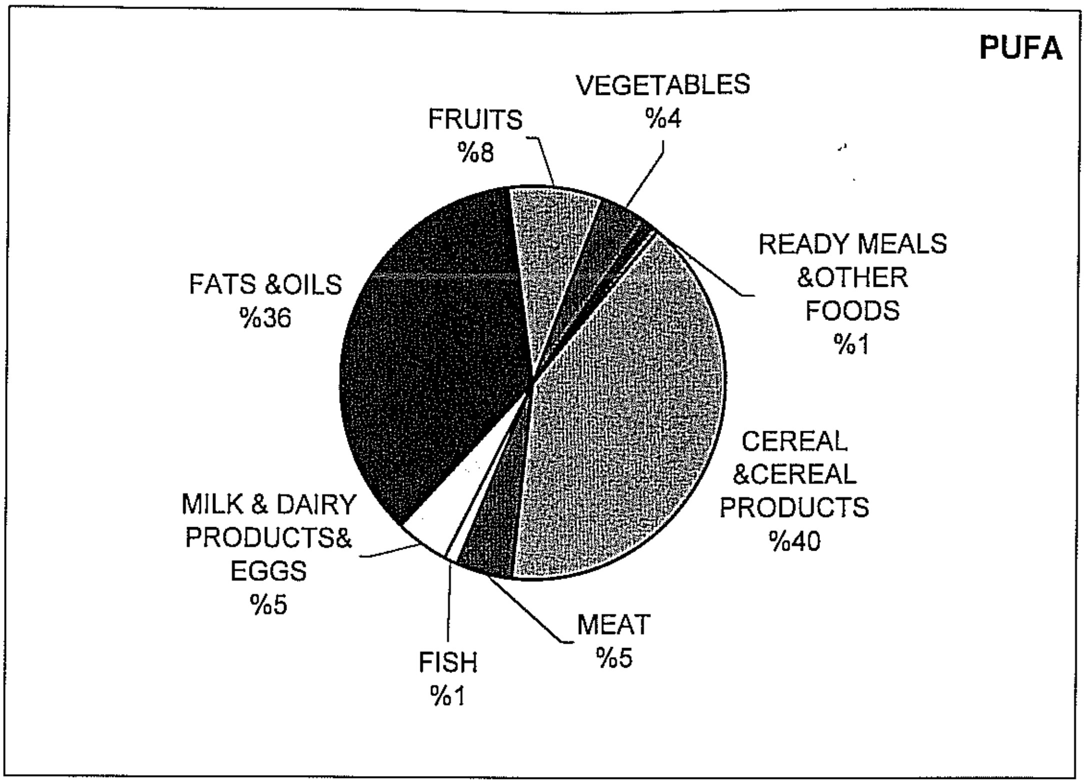


Figure J.14. Contribution of each food group to polyunsaturated fatty acid intake as percentage of total supply

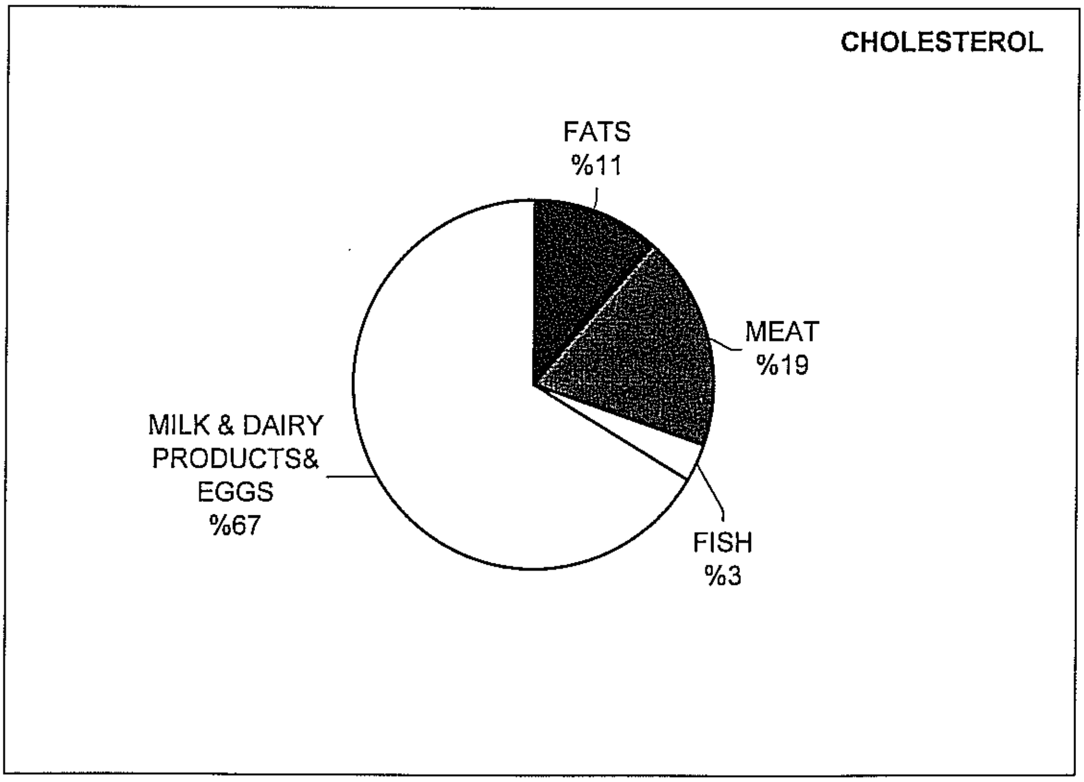


Figure J.15. Contribution of each food group to cholesterol intake as percentage of total supply

APPENDIX K

LIST OF FOOD GROUPS

CEREAL & CEREAL PRODUCTS
Baby biscuit
Biscuit - marine
Biscuit - pasta type
Bread,corn
Bread,milk
Bread,rools,hamburger etc...
Bread,rye
Bread,wheat bran
Bulgur
Chickpeaas flr
Chickpeas flour (humus flr)
Chocolate wafer biscuit - gofret
Corn flakes
Corn flr
Cracker
Cracker- soda
Gullac
Kadayif cooked
Kadayif not cooked
Lentil flr
M. kemal pasa sweet
Macaroni
Oat flr
Pastry-cake
Pop corn
Puff pastry(borek)
Rice
Rice flr
Rool of bread (simit)
Rusk toast (peksimet)
Rye flr
Sekerpare cooked
Sekerpare not cooked
Semolina
Squash winter sweet(kabak tatlisi)
Starch
Sweet made of dough
Tarhana
Wafer - yufka
Wheat flr
Wheat flr, cake

FATS & OILS
Butter
Corn oil
Cotton oil
Margarine
Olive oil
Shortening
Soybean oil
Suet
Sunflower oil
Tail fat

MEAT & MEAT PRODUCTS
Beef arm
Beef brain
Beef carcass
Beef ground
Beef rib
Beef sirloin
Beef steak
Beef tripe
Buffalo water
Chicken capons
Chicken giizzard
Chicken liver
Cihcken ,slaughtered, cleaned, whole
Cihcken light meat
Dried salt meat(pastirma w\ cemen)
Duck
Duck wild
Fried meat
Game meat rabit
Goat meat
Goose
Kid meat
Lamb brain
Lamb ground
Lamb heart
Lamb kidney
Lamb leg
Lamb retail cuts
Lamb rib
Lamb spleen
Lamb tongue
Muton retail cuts
Muton rib
Partridge
Quail
Salami
Sausage (sosis)
Sausage (sucuk)
Sheep brain
Sheep liver
Turkey
Veal brain
Veal cubed
Veal ground
Veal heart
Veal kidney
Veal liver
Veal retail cuts
Veal rib
Veal roast
Veal sirloin
Veal spleen
Veal steak

FISH
Anchovy
Bluefish
Bonito ,palamut
Bream
Carp
Cinekop
Cray fish
Cupra
Gar fish
Grey mullet
Horse mokerel
Large bonito
Large crap
Mackerel
Mussel
Pike
Red mullet
Sahad
Sardine
Sargo
Sea bass
Shad
Sheat fish
Sheat fish
Shrimp
Silver atherine
Squid
Sturgeon
Sword fish
Tongue fish
Trout
Turbot
Whiting fish

APPENDIX K (cont.)

FRUITS
Almonds
Apple
Apple frozen
Apricot canned
Apricot dried
Apricot frozen
Apricots
Banana
Blackberries frozen
Carob
Cheeries, sour red
Cheeries, sweet
Cheery sour red canned
Cheery sour red frozen
Cheery sweet canned
Cheery sweet frozen
Chestnut
Coconut
Coonut meat
Currant
Dates
Figs
Figs dried
Filberts
Grapefruit
Grapes
Kiwi
Lemon
Loquats
Melons
Mixed nuts
Mulberry
Orange
Peach
Peach canned
Peanuts
Pear
Pistachionuts
Pineapple
Pinenuts
Plum
Plum dried
Plums canned
Pomegranate
Popcorn air popped
Pumpkin seed
Quince
Raisins seeded
Raisins seedless
Raspberry frozen
Roasted chicpeas
Strawberry
Strawberry canned
Strawberry frozen
Sunflower seed
Tangerine
Walnuts
Watermelon

READY MEALS & OTHER FOODS
Anchovy canned
Baby food
Baking powder
Baking soda
Broth
Canned meal anchovy fish
Canned meal beans kidney
Canned meal beans white
Canned meal chiken stwd
Canned meal eggplant
Canned meal meat
Canned meal sardine fish
Canned meal tunny fish
Canned meal yaprak dolmasi
Catsup
Caviar
Frozen cig borek
Frozen manti
Frozen pizza
Jellies
Leavening agent active dry
Leavening agent compressed
Mayonnaise
Mustard
Olive dark
Olive green
Pepper red paste
Pickle cucumber
Potato cips
Ready meal icli kofte
Ready meal arnavut cigeri
Ready meal chickpeas cooked
Ready meal cig kofte
Ready meal doner
Ready meal egg boiled
Ready meal fish cooked
Ready meal grill chicken
Ready meal humus
Ready meal kadinbudu kofte
Ready meal kiymali pide
Ready meal kofte ekmek
Ready meal lahana dolma
Ready meal midye dolma
Ready meal patates kofte
Ready meal rus salatasi
Ready meal tarator
Ready meal yaprak dolma
Soup w cream dry powder
Soup w/o cream dry powder
Tomato paste
Tomato puree
Vanilla extract
Vinegar cider
Vinegar

BEVERAGES
Ayran
Boza
Cappuccino
Carbonated beverage
Cocoa
Coffee instant
Cola
Concantrated fruit juice powder
Fruit juice
Fruit juice concantrated
Ice tea
Lemon juice
Pomegranates juice
Sage
Salep
Soda
Tea
Tomato juice
Tonic
Turkish coffee
Water

REFERENCES

Baysal A., Keçecioğlu S., Arslan P., et al. 1991. Besin Bileşimleri (Food Compositions). Türkiye Diyetisyenler Derneği, Yayın: 1. Yeni Çağ Basın Yayın. Ankara.

Bourne, Geoffrey H. 1983. Aspects of Human and National Nutrition. Karger Basel. New York.

Bourne, Geoffrey H. 1987. Applied Nutritional Principles in Health and Diseases. Karger Basel. New York.

Castenmiller, Jacqueline J.M., et al. 1996. Constructing a Nutritional Database for Use in Europe. Draft paper for discussion at the *Workshop on Food Composition Data, Fourth Management Committee Meeting of COST Action 99.*. Stuttgart.

COST99 Home Page: (http://food.ethz.ch: 2000/cost99.html)

Dunne, Lavon J. 1990. 3rd ed. Nutrition Almanac. McGraw Hill Publishing Co. New York.

FAO, Economic and Social Development Department, Statistics Division. 1983a. A Comparative Study of Food Consumption Data from Food Balance Sheets and Household Surveys. Food and Agriculture Organization of the United Nations. Rome.

FAO Economic and Social Development Department, Statistics Division. 1983b. Use of Household Surveys for Collection of Food and Agricultural Statistics. Food and Agriculture Organization of the United Nations. Rome.

Garrison, Robert H. 1985. The Nutrition Desk Reference. NDR Keats Publishing Co. New Canaan, Connecticut.

Greenfield, H, et al. 1992. Food Composition Data: Production, Management and Use. Elsevier Applied Science Publishers / Chapman and Hall. London.

Köksal, Orhan; Baysal Ayşe. 1969. Besin Simpozyumu: Türkiye'de Beslenme Problemleri. (Nutrition Symposium: Nutrition Problems in Turkey). TÜBİTAK. Ankara.

Köksal, Orhan. 1977. Türkiye'de Beslenme: Türkiye 1974 Beslenme-Sağlık ve Gıda Tüketimi Araştırması (Nutrition in Turkey: Turkey 1974 Nutrition-Health and Food Consumption Research). Hacettepe University. Ankara.

National Food Agency of Denmark. 1995. Food Monitoring: 1988-1992. Publication no. 232. Quickly Tryk A/S. Denmark.

Passmore, Regi. 1974. Handbook on Human Nutritional Requirements. World Health Organization. Geneva.

Spiller, Gene A. 1988. 2nd ed. Handbook of Dietary Fiber in Human Nutrition. CRC Press, Inc. Florida.

The Second International Food Database Conference. 1995. Food Composition Research: The Broader Context. University of Helsinki. Lahti, Finland.

Tönük, Belma, et al. 1987. 1984 Gıda Tüketimi ve Beslenme Araştırması (1984 Food Consumption and Nutrition Survey). Tarım Orman ve Köyişleri Bakanlığı, Koruma Kontrol Genel Müdürlüğü. Ankara.

U.S. Department of Agriculture, Agricultural Research Service. Composition of Foods: Raw, Processed, Prepared. Agricultural Handbook No. 8. NDL Home Page (http://www.nal.usda.gov/fnic/foodcomp)

Unwin, Ian, et al. 1996. Data Interchange Formats. National Food Agency of Denmark. Soborg.

Whitney, Elenor N. 1993. Understanding Nutrition. West Publishing Co. Minneapolis, St.