

AN INTRODUCTION TO HEALTHY DIET



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The Unity

Title	AN INTRODUCTION TO HEALTHY DIET
Area	Healthy nutrition
Main Target Audience	<p>The end users of the module are:</p> <ul style="list-style-type: none"> ➤ Students of the participant institutions ➤ Trainers in the partner' institutions ➤ Consumers' associations ➤ Adult training centers ➤ Teachers of primary and secondary education that teach lessons related to environmental awareness and nutrition
Description of the module and general aims	<p>This module allows the participant to understand the following:</p> <ul style="list-style-type: none"> ● Energy requirements and consumption ● Acquaintance with the nutrients ● Diet tips for good health ● Greek (Mediterranean) Diet ● Are organic products safer than conventional? ● Are Organic products more nutritious than conventional?
Learning Time and Duration	<p>Learning time and maximum duration for the training related to the module:</p> <p>24 hours of theoretical training</p>
Learning Objectives	<p>Specific learning goals, i.e. what is going to be trained and will be learnt by the target after a successful completion of this module.</p> <p>Once you have completed this course you will be able to:</p> <ul style="list-style-type: none"> ● Understand which are the characteristics of the basic foods ● Know what are the energy requirements for a healthy life ● Organize your diet so that you use the right variety of food ● Understand the basic elements of Mediterranean diet and how it affects positively longevity ● Understand the advantages of organic products
Competences achieved	<p>Specific competences related to the project theme</p> <ul style="list-style-type: none"> ● knowledge of the nutritional characteristics of main foods; ● how to organize a balanced diet; be able to evaluate organic versus conventional food.
Pedagogical methods used (selfstudy, group work, distance learning, etc.)	<p>Type of activities considered useful for the training of this module:</p> <ul style="list-style-type: none"> - Face to face teaching - Online learning - Suggestion of additional websources and bibliography

1. Abstract

This unit is structured into two main sections: (1) Characteristics of healthy diet and suitable foods and (2) Traditional mediteranian diet and production of organic foods.

In the first section the basic knowledge of energy requirements per gender and age are presented. All nutrients and their main functions are desribed. It gives several tips for healthy diet. The second section consists on a technology of organic cultivation and the presentation of Mediteranian cuisine and its health benefits.

Key words: nutrition, energy intake, energy consumption, Mediterranean diet, balanced diet, organic food, vitamins, minerals, lipids, carbohydrates, fatty acids

2. Introduction

Nutrition science investigates the relation between food intake and physiological functions of living organisms. It also studies organism's requirements in nutrients in order to produce energy, to maintain life, to grow and reproduce. The aim of the science of nutrition is:

- the improvement of the physical and mental health,
- the achievement of longevity and
- the prevention of chronic diseases such as cardiovascular disease, hypertension, diabetes mellitus, hyperlipidemia and cancer.

This handbook is an introduction unit, to present some basic nutrition concepts and give general advice for a balanced diet. The concepts are introduced in the simplest and most understandable way possible and often without the use of very strict definitions in order to be easily understood by an average reader.

In the first and second chapter the concepts of energy intake and consumption are presented while the reader gets also acquainted with the nutrients and their role in the organism. In the third chapter a reference is made to the food groups, their role and the frequency of their consumption. Then, in the fourth chapter the characteristics and benefits of the greek mediterranean diet are presented. Finally, in the fifth chapter a reference is made to organic foods and comparison with the respective conventional, due to the increasing interest of the public for organic food during the recent years.

The adoption of good dietary habits is important for all age groups. A balanced healthy diet ensures adequate nutrients, improves health indicators, helps in the prevention of chronic diseases, and provides wellness, toning and better physical and mental health.

Section I

3. Core contents

3.1. Energy requirements and consumption

The organism must cover the energy needs of all its cells through nutrition (food and beverages). The energy received from food is called **energy intake** and is usually measured in calories (cal). The calorie is the unit of thermal-energy and represents the energy required to raise the temperature of one cubic centimeter of water from 14.5 °C to 15,5 ° C. Because food usually gives thousands of calories per gram, the unit most used is the multiple of the calorie, the kilocalorie (kcal), which in everyday life sometimes is known as calorie (cal).

On the other hand, the energy which the organism consumes for its various functions is called **energy consumption**. When we eat, what matters is not only the food quality but also the quantity. If we want to maintain our body weight, energy intake should be equal to the energy expenditure (energy balance). Table 1.1 shows the variations in energy requirements according to age, gender and level of physical activity:

Table 1.1

Energy requirements in calories per gender and age, and depending on the level of physical activity				
Gender	Age* (years)	Level of physical activity **		
		Low	Moderate	Intense
Children ¹ (girls & boys)	2-3	1000-1200	1000-1400	1000-1400
Girls-Women¹	4-8	1200-1400	1400-1600	1400-1800
	9-13	1400-1600	1600-2000	1800-2200
	14-18	1800	2000	2400
	19-30	1800-2000	2000-2200	2400
	31-50	1800	2000	2200
	51+	1600	1800	2000-2200
Boys-Men¹	4-8	1200-1400	1400-1600	1600-2000
	9-13	1600-2000	1800-2200	2000-2600
	14-18	2000-2400	2400-2800	2800-3200
	19-30	2400-2600	2600-2800	3000
	31-50	2200-2400	2400-2600	2800-3000
	51+	2000-2200	2200-2400	2400-2800

¹ The calories are calculated based on the average height and average weight. For adults, the average man is 1,78 m and 70 kg and the average female is 1,62 m and 57 kg. For

children average height and weight differ.

** Children and teenagers need more calories as age increases while adults need fewer calories as age increases.*

*** Low means lifestyle that includes physical activity associated with typical daily activities (stairs, errands, etc.). Moderate means physical activity equivalent to walking about 2,5-5 km / day, and intense to walking more than 5 km / day.*

Source: Institute of Medicine. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. Washington (DC): The National Academies Press; 2002.

Man takes energy and nutrients from food. Carbohydrates, lipids and proteins are the nutrients which can produce energy. Alcohol produces energy as well.

3.2. Acquaintance with the nutrients

Foods consist of nutrients. Adequate nutrient intake is necessary for both maintenance and growth of the organism. Nutrients are classified into six major categories: carbohydrates, proteins, lipids, vitamins, minerals and water. Each of these components has its own special role in the performance of bodily functions and all together are essential for the health and well being of the organism.

1.2.1. Carbohydrates

Carbohydrates are the main dietary source of energy. The average person gets from carbohydrates about half of its total energy intake. They are divided into simple and complex carbohydrates.



3.2.1.a. Simple carbohydrates

Simple carbohydrates (or sugars) include various sugars and especially:

- glucose, which is contained in honey and fruits,
- the fructose contained in honey, fruits and vegetables,
- the sucrose which is our common sugar and
- lactose, the milk sugar.

3.2.1.b. Complex carbohydrates

Complex carbohydrates include:

- Starch, the main complex carbohydrate that we take from bread, cereals, potatoes, rice, corn, pasta and legumes.
- Glycogen, which we find only in animal tissues and mainly in the liver.
- Fiber(or dietary fiber) which is the 'non-digestible' carbohydrates, that do not undergo the process of digestion and go directly to the colon, stimulating its mobility and reducing the occurrence of constipation . The fiber contained abundant in fruits, vegetables and whole grains , does not provide energy to the organism as other carbohydrates , but its intake has been associated with the diminution of cholesterol levels and the reduction of the risk of colon cancer .



Glucose derived from the digestion of carbohydrate foods is the main energy substrate (ie “fuel”) of brain cells

3.2.2. Lipids



The lipids (or fats) constitute about one third of total energy intake in the diet of an average person (30-40%). Lipids are important components of our diet and when consumed in moderation and in the right proportion they offer many benefits to our organism:

- They are the primary form of energy storage in the organism.
- They are a structural component of cell membranes (of all cells).
- They insulate and protect organs.
- They are substances from which many important biological molecules originate such as steroid hormones (eg, testosterone, estrogen) and vitamin D.
- They carry the fat-soluble vitamins A, D, E and K
- They supply the organism with the essential fatty acids that it can not synthesize itself.
- They participate in the form of bile salts (bile components) in the digestive process.

The group of lipids mainly found in foods are triglycerides. The free fatty acids are structural components of triglycerides and, depending on their chemical structure are divided into: saturated, mono-unsaturated and poly-unsaturated. In most food the lipids we meet are mixtures of the above three categories, while one of them dominates.

3.2.2.a. Saturated fatty acids

Saturated fatty acids are found mainly in animal foods such as meat, milk, cheese, yogurt, butter, margarine and their high intake is associated with an increase of 'bad' cholesterol and the appearance of cardiovascular diseases.



3.2.2.b. Monounsaturated fatty acids

Olive oil is the main source of mono-unsaturated fatty acids which reduce the levels of "bad" cholesterol, without affecting the "good" cholesterol. Also, *mono-unsaturated* fatty acids are contained in almonds, avocado and peanuts.



3.2.2.c. Poly-unsaturated fatty acids

The *poly-unsaturated* fatty acids contain the *essential omega-3* and *omega-6 fatty acids*, which can not be synthesized by the organism and must get them through food. Fish, seafood and vegetable oils (such as corn oil, soybean oil, walnuts, linseed) are rich sources of polyunsaturated fatty acids (exceptions are palm oil, cocoa butter and coconut oil containing saturated fat) and the meat, liver, lard and fat in eggs (omega-6). The omega-3 and omega-6 fatty acids are essential for nervous system development in fetuses and infants, help the defense of the organism and improve cardiovascular risk factors.

3.2.2.d. Trans fatty acids

Trans fatty acids that are produced from poly-unsaturated fats are found in some margarines, in fried foods or packaged foods rich in fat. These fatty acids increase the 'bad' and reduce the 'good' cholesterol.

3.2.3. Proteins

Proteins constitute vital nutrients for the organism, participating in many of its functions and being necessary for the development and reconstruction of body tissues. The building blocks of proteins are amino acids. Twenty-one (21) different amino acids are being used by our

body in all possible combinations for the synthesis of proteins. The biological role of the proteins may be:

- **Structural:** Proteins are structural components of all tissues, like the skin and muscles (e.g. collagen).
- **Regulatory:** The proteins regulate the water and acid base (maintenance of the acidity of body fluids at a *constant* level) balance in the blood (e.g. stable blood pH. PH is an "indicator" that shows how much acidic or alkaline a solution or a substance is).
- **Transport:** The proteins act as carriers of various substances and molecules in blood and body fluids (e.g., lipoproteins, transferrin, etc.)

They are also involved in hormonal, enzymatic and immune functions of the organism.



3.2.3.a. Biological value of proteins

Nine of the amino acids found in the tissues, are **necessary**, that is they are not synthesized by our organism and must be obtained from food. The content of essential amino acids in proteins determines their biological value. Proteins containing the essential amino acids in sufficient quantities and in the right proportion are of **high biological value** and are those that come from animal sources such as meat, fish, eggs, milk and other dairy products. In contrast, the proteins of plant origin (eg legumes, grains, nuts, vegetables) have **low biological value**, but this does not mean they are not important for our diet. By combining two low biological value proteins we can have a high biological value protein, such as meals that combine cereal with legumes (eg fakoryzo:lentils and rice) or cereals with nuts.

The biological value of proteins is determined by their content of essential amino acids.

In case of limited food intake (malnutrition) and in certain diseases (cancer, AIDS, renal failure, burn) the body proteins are degraded to produce energy. Inadequate protein intake results in muscle loss, growth limitation, suppression of the immune system (failure of healing, susceptibility to infections), the appearance of edema and of fatty infiltration of the liver.

3.2.4. Vitamins



Vitamins are a group of organic compounds that are needed in very small quantities by the organism and are not synthesized by the body in sufficient quantities to meet its physiological functions (maintenance, growth, reproduction, etc.). They are natural constituents of foods and in case of absence or insufficient intake they cause specific failure syndromes and health disorders. Vitamins are divided into ***fat soluble*** and ***water soluble***. The first category includes the vitamins A, D, E and K, while all the rest (C, B1 (thiamine), B2 (riboflavin), B3 (niacin), folic acid, B6 (pyridoxine), B12 (cobalamin), biotin, pantothenic acid) are water soluble vitamins. The fat soluble *vitamins* depend on lipids in the diet for their storage and transport and are easily stored in the tissues, while the water soluble ones are not. The exception is vitamin K, which although is fat soluble is stored in a very small extent, as well as vitamin B12, which, although water soluble, is stored to some extent in the tissues.

3.2.5. Minerals

Minerals (often referred to as metals) are a large group of micronutrients, most of which are essential for the organism, participating in many of its functions. Inadequate intake of these components may lead to impaired concentration and cause malfunctions in the tissues. They are distinguished to ***main mineral elements*** (calcium, phosphorus, sodium, potassium, sulfur, chlorine and magnesium) and ***trace elements*** (iron, zinc, iodine (non-metal element), selenium, copper, manganese, fluorine, chromium, molybdenum, silicon, cobalt) . The main minerals are so characterized because the nutritional requirement for each of them is greater (> 100 mg / day) compared to the trace elements (<100 mg / day).

The following **table 1** refers to the main dietary sources of vitamins and main minerals and trace elements, their basic biological functions and as well disorders that accompany their inadequate intake.

Table 1

Nutrient	Dietary sources	Biological functions- role	Disorders due to insufficient intake
Vitamin A or retinol	Liver, fishoil, egg, butter, dairy products, carrot, cayenne pepper, spinach, broccoli, tomato	Proper function of the immune system, visual function, bone elongation, healthy skin, gene regulation	Blurred vision, dry eyes, <i>skin tissue</i> keratinization, diarrhea, immune system depression, impaired development, reproductive dysfunction
Vitamin D	Liver, egg, breakfast cereals, margarine, milk, 'oily' fish such as salmon	Maintenance of calcium and phosphorus levels in the blood, maintenance of bone mass- osteoporosis prevention	Rickets in children, osteomalacia (bone pain and muscle weakness) in adults
Vitamin E	Almonds, sunflower seeds, peanuts, sunflower oil, corn oil and other vegetable oils, avocado	Antioxidant activity, protection of cell membranes	Nervous system disorders (rare)
Vitamin K	Spinach, broccoli, cabbage, vegetable oils (mainly soybean oil), chestnuts, egg, meat, liver, dairy products	Essential factor in blood coagulation, bone composition	Inability of coagulation
Vitamin C or ascorbic acid	Kiwi, orange, lemon, grapefruit, strawberries, mango, papaya, peppers, Brussels sprouts, broccoli, sweet potato	Antioxidant activity, contribution to the synthesis of collagen, carnitine and certain hormones, increase of iron absorption in the intestine, immune function	Scurvy (weakness, fatigue, bleeding gums, failure of wound healing)

Vitamin B₁ or thiamine	Bread, whole grains and fortified cereals, nuts, legumes, pork, liver, yeast, sunflower seeds	Energy metabolism, neuronal function through synthesis of neurotransmitters	Beri-Beri (heart failure or nerve disorders), encephalopathy Wernicke (confusion and paralysis of eye muscles in chronic alcoholics) , Korsakoff syndrome (memory loss-psychosis-apathy)
Vitamin B₂ or riboflavin	Eggs, milk and dairy products, liver, mushrooms, fortified cereals, green leafy vegetables (spinach, broccoli)	Cellular energy production, participation in the metabolism of fats	Oral disorders
Vitamin B or niacin	Beef, pork, chicken, egg, milk, fish, nuts	Energy metabolism, fatty acid synthesis	Pellagra (dermatitis, diarrhea, confusion and disorientation)
Folic acid	Brussels sprouts, spinach, broccoli, cabbage, cauliflower, beans, peas, potatoes, legumes, citrus fruits, offal	Necessary for the synthesis of proteins, DNA and for nervous system function	Megaloblastic anemia
Vitamin B₆	Meat, fish, seafood, poultry, green leafy vegetables, whole grains, banana, nuts	Protein metabolism, synthesis of several neurotransmitters and adrenaline	Oral disorders, microcellular anemia
Vitamin B₁₂	Meat, egg, milk and dairy products, fish, offal (plant foods DO NOT contain vitamin B12 - attention vegetarians)	Participation in recycling homocysteine , in hematopoiesis and anemia prevention regulation of the metabolism of folic acid, necessary for synthesis of myelin	Malabsorption of nutrients, ileal diseases, pernicious anemia, neurological disorders

Biotin	Liver, milk, cheese, egg yolk, nuts, banana	Participation in the metabolism and in energy release in the cell	Dermatitis, glossitis, hair loss, anorexia, depression, hypercholesterolemia
Pantothenic acid	Eggs, liver, meat, milk, green vegetables, mushrooms, avocado, sweet potato (found in most foods - "pantothen" in greek means everywhere)	Participation in the metabolism of fats and carbohydrates	Burning sensation in legs, depression, fatigue, muscular weakness
Calcium (Ca)	Milk and dairy products, sardines (fish eaten with bones), legumes, tahini, green leafy vegetables (eg spinach, broccoli), oysters, mussels	Structural component of bones and teeth, blood clotting, proper muscle and nerve signals function and regulation of metabolism and blood pressure	Developmental delay in children, osteoporosis in adults
Phosphorus (P)	Milk and dairy products, whole grains, meat, fish, eggs, nuts, legumes, fruits and vegetables (less good sources)	Structural component of teeth, bones, cell membranes, genetic material and compounds binding energy	Very rare
Magnesium (Mg)	Green vegetables and greens, nuts, figs, many spices, cocoa, coffee, tea, seafood, whole grains, legumes (<i>a large percentage is lost during food processing</i>)	Component of bones, enzymes function, affects metabolism of potassium, calcium, vitamin D, muscle relaxation, neuromuscular activity	Cardiac arrhythmias

Sodium (Na)	Salt, foods high in salt (anchovies, cheese, crackers, sausage, bacon, potato chips, smoked meat or fish)	Water balance, acid-base balance of blood, transmission of nerve impulses	Disorders of pressure, muscle and nerve dysfunction
Potassium (K)	Fruits and vegetables, meat and dairy. Richest sources: banana, apricot, avocado, potato, spinach, tomato, chocolate, cocoa, coffee, soy milk, salt substitutes	Water and acid-base balance, maintenance of heart rate	Muscle weakness, arrhythmias, confusion
Iron (Fe)	Liver, meat, fish, seafood, <u>liver</u> and other offal, egg, bread, wholegrain cereals, green leafy vegetables, nuts, dried fruits (figs, prunes, apricots), legumes <i>The animal source foods have high bioavailability (rate of absorption in the intestine, 20-25%) while plant source foods have low bioavailability (1-5%)</i>	Major component of hemoglobin and myoglobin for transfer and utilization of oxygen to tissues, structural of enzymes, composition of amino acid, hormones and neurotransmitters	Iron deficiency anemia
Zinc (Zn)	Crustaceans and molluscs, offal, lamb, beef, pork, poultry, milk and dairy products, eggs, nuts, mushrooms, figs, whole grain cereals, soy products	Structure and function of enzymes in many functions: energy metabolism, growth, immune system, synthesis of proteins and DNA, alcohol metabolism, neutralization of free radicals	Developmental delay and sexual maturation delay, dermatitis, diarrhea, hair loss, neuropsychiatric symptoms

Copper (Cu)	Meat, offal, cocoa, legumes, nuts, whole grains	Hemoglobin and collagen synthesis, neutralization of free radicals	Developmental delay, edema, iron deficiency anemia, osteoporosis, immune disorders and nervous system disorders
Iodine (I)	Milk and dairy products, fish such as cod and seafood, iodized salt, all plant foods grown in coastal areas	Necessary for synthesis of thyroid hormones (T3 and T4), regulation of basal metabolic rate	Hypothyroidism in adults, cretinism in embryos (mental and physical retardation, hearing and speech disorders)
Selenium (Se)	Crustaceans, fish, eggs, poultry, meat, milk, vegetables and grains that are grown in soils with adequate levels of selenium	Antioxidant activity in combination with vitamin E	Keshan disease (cardiomyopathy), Kashin-Beck disease (musculoskeletal disorders)
Manganese (Mn)	Nuts, whole grain cereals, tea, leafy vegetables, blueberries, nuts	Component of enzymes, bone formation	Rare
Molybdenum (Mo)	Legumes, nuts, wholegrain cereals, green leafy vegetables, milk and dairy products	Component of many enzymes	Mental disorders
Chromium (Cr)	Egg yolk, meat, wholegrain cereals, legumes, nuts	Transfer of glucose from the blood into cells	Glucose intolerance, weight loss, neuropathy, high lipid levels
Fluorine (F)	Water, tea, coffee, rice, soybeans(soya), cooked spinach, onions, lettuce	Stronger bones and teeth, reduction of the incidence and severity of dental caries	Dental caries

3.2.6. Water

Water is essential for all cell functions. The $\frac{1}{2}$ to $\frac{2}{3}$ of our body weight is water. Overweight people have less water in their bodies from the thin or normal weight. This is due to the fact that the overweight individuals have more adipose tissue and adipose tissue contains lower levels of water (about 20-35%) compared to the muscle tissue (about 80%). The biological value of water is enormous because of the properties it has, which makes it necessary for the organism:

1. It is solvent of many substances (eg nutrients).
2. Facilitates the absorption and transport of nutrients, hormones, immune factors.
3. Helps the excretion of waste products.
4. Assists chemical reactions in the organism.
5. Regulates body temperature at about 37°C.



The individual water requirements are influenced by the type of diet, physical activity and environmental conditions, as with sweating and high temperatures the needs of the individual increase. The intake of water should cover the losses from the body (eg, urine, sweat, saliva, etc.). The total intake of water, that one person drinks is calculated by adding any water we take from other beverages (juices, milk, soft drinks) as well as from food.

The adoption of a balanced diet that is characterized by moderation and great variety of foods ensures adequate intake of all nutrients. When this balance is disturbed for a long time, health problems may appear. The identification and modification of dietary factors that caused the problem will help to the restoration of the organism's health.

3.3. Diet tips for good health

3.3.1. What is the meaning of a healthy diet?

The key to a healthy or proper diet is *balance*. Balance means to have a variety of foods in the correct proportions and to consume adequate amounts of food and beverages in order to be

healthy, to have reduced risk of chronic diseases and to achieve and maintain a healthy body weight.








Variety: No food by itself, with the exception of breast milk for about the first six months of life, can provide all the nutrients in the amounts needed for good health. It is important that our eating habits are characterized by a variety of foods. The existence of variety in the diet minimizes the possibility of a significant lack of a nutrient. Even foods that are not recommended to be consumed regularly should not be completely excluded from the diet, as they can provide one or more nutrients (eg meat as a source of vitamin B12). Avoiding certain foods is only recommended in cases of food allergy or intolerance (eg lactose) or genetic or other kind of sensitivity to certain foods (eg G6PD enzyme deficiency that causes susceptibility to the consumption of broad beans).

Moderation: The classification of foods as "good" and "bad" does not fit in the context of a balanced diet and can move many people away from improving their dietary habits. There are no "good" and "bad" foods, rather than foods that need to be consumed more or less often and some that exceed in providing nutrients. All foods have a place in our diet as long as they are eaten in moderation and in appropriate quantities per category. What matters is the overall dietary regimen followed and not individual foods or meals.

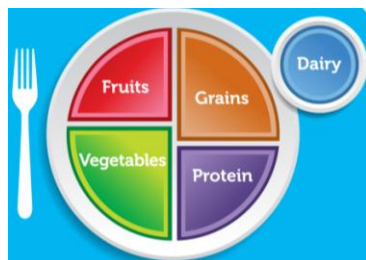
3.3.2. Food Groups

On the basis of their characteristics concerning their nutritional value, foods are divided into *food groups*. Each group has different characteristics and differences may exist even in foods of the same group. In the context of a balanced nutrition, a dietary regimen needs to include a variety of choices from the 5 basic food groups, which are presented in the following table:

Groups	Vegetables	Fruits	Grains	Protein	Dairy
					
Food	Raw or cooked vegetables and 100% fresh vegetable juice	Fruits (fresh, dried, cooked or frozen) and 100% fresh fruit juice	Breakfast cereals, oats, bread, rice, pasta, corn, couscous, quinoa	Meat, poultry, eggs, fish, seafood, legumes, nuts, soy products	Milk, cheese, yogurt, desserts based on milk (frozen yogurt, rice pudding), soy milk
Characteristics of the group	Fiber, vitamins, minerals	Fiber, vitamins, energy	Energy, B vitamins	Protein, B vitamins, iron	Calcium, vitamin D

3.3.3. What will I finally put on my plate?

These food groups are summarized in a very representative way in the following figure of a dish that has concentrated all 5 groups. The "plate" shows us in what proportion we need food from each group in one day but also at every meal:



Source: United States Department of Agriculture (USDA), ChooseMyPlate.gov

- It is good that half of your plate consists of fruits and vegetables.
- A little more than a quarter of the plate to be covered by the grain group (starchy foods). Replace at least half of the grain with equivalent wholegrain or high-fiber (wholemeal bread, cereals, pasta, brown rice).
- Choose low-fat dairy.
- It is good to have variety in your choices from the group of the protein, which covers about a quarter of the plate. You should prefer chicken, fish, legumes and

you should decrease red meat (eg beef, lamb, goat, pork) to 1 time / week or less.

3.3.4. What foods or ingredients are good to reduce?

From various studies it is understood that certain foods or food ingredients are overconsumed and may increase the risk of certain chronic diseases such as cardiovascular disease, type 2 diabetes, hypertension and obesity. These include salt (sodium), solid lipids, added sugars, refined grains, alcohol.

3.3.4.a. Salt (sodium)

Sodium is an essential nutrient for the body that is needed in small quantities. The sodium in our diet is consumed mainly in the form of salt but is also a component of most foods. The increase of sodium intake leads to the increase of blood pressure while increased sodium intake is observed in both adults and children compared with the quantity recommended. Hypertension is a risk factor for cardiovascular diseases and kidney disease, so both adults and children need to limit sodium intake to 2300 mg per day (about 1 teaspoon of salt). To reduce your salt intake:



- Reduce processed and packaged foods like pizza, chips, savory snacks, cooked meats, canned food, pickles. Fresh foods contain less salt (and sodium).
- You should prefer homemade food, where you can control the amount of salt and avoid eating takeaway food that is rich in salt.
- Read carefully the ingredients on food labels and look for indications of "low sodium" or "no added salt".
- Avoid sauces based on ketchup or soya, pickles, olives or cheese. It is good to choose ketchup or "low sodium" soy sauce or sauce based on yoghurt, lemon and vinegar.

- The herbs and spices such as garlic, basil, oregano, pepper can help you to reduce the amount of salt in your food or salads.

3.3.4.b. Solid lipids (or fat)

Most of the lipids with a high content of saturated and trans fatty acids are solid at room temperature and are called "solid lipids" while those containing more unsaturated fatty acids are usually liquid at room temperature and are called "oils". The lipids of the diet are important for the organism as they constitute up to 35-40% of total energy intake for adults. However, the type of fatty acids has a greater effect on the risk for cardiovascular disease compared with the total amount of lipids in the diet.

i. Saturated fatty acids

There are strong indications that more than the recommended (<7-10% of total energy intake) intake of saturated fatty acids is associated with higher levels of total blood cholesterol and "bad" cholesterol (LDL) as well as with increased energy intake. To reduce their consumption:

- Saturated fats are found mostly in animal-source foods. It would be good to reduce the consumption of foods such as full fat yellow cheese, cold meats, sausages, cow butter, lard, sour cream, sweets and fatty meats like ribs and replace them with foods rich in monounsaturated and polyunsaturated fats (eg in cooking use olive oil instead of butter).
- Replace full-fat dairy products with low-fat dairy or lean.
- Remove visible fat and skin from meat and poultry.

ii. Trans fatty acids

Trans fatty acids are present in small amounts in meat and dairy products or they are created during food processing (hydrogenation). A large number of studies show that their increased consumption is associated with increased cardiovascular risk due to the increase of "bad" cholesterol (LDL). Their intake can be limited:

- By reducing the consumption of fried and packaged foods rich in fat as well as of some margarines.
- By eating lean meat and poultry and low-fat dairy.



3.3.4.c. Added sugars

These are sugars which are added during processing or manufacturing of food and beverages, sweeten their taste and make them tastier. They include: corn syrup rich in fructose, the white or brown sugar, malt syrup or maple, fructose sweetener, liquid fructose, honey, molasses, anhydrous and crystal dextrose. Unlike foods that contain natural sugars (fruits, dairy), foods containing added sugars usually provide enough calories but few or no nutrients and fiber while they are consumed at high frequency. To reduce their consumption, it would be good:

- To limit soft drinks, juices with sugar, energy or sports drinks as well as sweets and candies.
- To replace them with other foods or drinks that do not contain or have little content of added sugars (eg 100% natural juices, light refreshments, water).

3.3.4.d. Refined grains

The processing (refining) of wholegrain cereals leads to loss of vitamins, minerals and fiber. For this reason, refined grains are often enriched with various vitamins and minerals, but this does not substitute all the components that were lost during processing. Also, many processed cereals which are being over consumed are rich in solid lipids and added sugars (eg biscuits, cakes, pies, donuts). Therefore, it is recommended to replace them with whole grains (at least half) both because of their lower nutritional value and the extra energy they may offer.

3.3.4.e. Alcohol

Moderate alcohol consumption (up to 1 drink / day for women and up to 2 drinks / day for men) may be beneficial for health as it is associated with a lower risk for cardiovascular disease and mortality from all causes. On the other hand, excessive alcohol consumption (> 3 drinks / day or > 7 drinks / week for women and > 4 drinks / day or > 14 drinks / week for men) increases the risk for liver cirrhosis, hypertension, stroke, type 2 diabetes, cancer of the upper respiratory tract, injury and violence. It is also associated with increased body weight (due to the high energy provided) and impaired cognitive function. Special situations where alcohol consumption is contraindicated are:

- Pregnant women or women planning to become pregnant
- People who are under the legal low limit age
- People who take medication
- People with specific health problems (liver disease, hypertriglyceridemia, pancreatitis)
- People who plan to drive or operate machinery
- People who can not be confined to moderate consumption

What does 'one drink' mean? 1 drink = 1/2 can of beer = 2/3 of a small glass of wine (100 ml) = 1 small portion (25 ml) of alcoholic beverage (40% alcohol, eg ouzo, raki, whiskey, vodka, rum)

3.3.5. What foods are good to eat more?

The challenge is to consume "nutrient-dense" or "nutrient-rich" foods, which means foods that offer us nutrients beneficial for health with relatively few calories. These foods do not contain or contain few solid lipids, added sugars, salt and refined grains. Fruits and vegetables, wholegrain cereals, lean or semi-skimmed dairy, fish, poultry, legumes and nuts are "nutrient-dense" or nutrient rich foods. Studies show that the consumption of such foods is lower than recommended. As a result low intake of nutrients like potassium, fiber, calcium and vitamin D it is remarked. The increase of the above food groups is associated with health benefits and meeting of nutritional needs.

3.3.5.a. Fruits and vegetables



It is recommended to consume at least 5 portions of a variety of fruits and vegetables a day.

The increase of the consumption of fruits and vegetables is important because:

- i. They are an important source of vitamins (eg folic acid, vitamins A, C, K, magnesium, potassium) and fiber necessary for the organism.
- ii. The consumption of at least 5 servings of fruits and vegetables is associated with reduced risk of chronic diseases such as cardiovascular disease (eg heart attack, stroke). Also, certain fruits and vegetables may be protective against certain types of cancer.
- iii. When consumed or prepared without added fats and sugars they are relatively low in calories. Consuming them instead of foods that are rich in energy, will help better regulation and maintenance of body weight.

1 serving = 1 cup fresh fruit / vegetables ½ cup cooked or 1 cup natural fruit juice

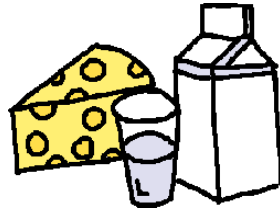
3.3.5.b. Wholegrain cereals



The group of grain (starchy foods) consist about a third of our daily energy intake and thus a basic part of our diet. More specifically, whole grain cereals are a good source of fiber, vitamin B complex, iron, magnesium and selenium. There are indications that the consumption of whole grain cereals is associated with lower cardiovascular risk, lower body weight and perhaps reduction in the incidence of type 2 diabetes. Therefore, it would be good, at least half of the grains we eat to be wholegrain. What is also very important is the

reading of food labels to see if a food contains some cereals which are whole grain or if they are all (100% wholemeal). Some examples of cereals that should be whole grain are bread, rusks and wholemeal pasta, brown rice and oats.

3.3.5.c. Milk and dairy products



The dairy group provides many nutrients such as protein, calcium, vitamin A, vitamin D (for those enriched) and potassium in our diet. There are indications that their intake is associated with better bone health, especially in children and adolescents and perhaps with less cardiovascular risk, type 2 diabetes and lower blood pressure in adults. The choice of low fat dairy offers the same nutrients, but with fewer calories and solid lipids. The 2-3 servings of dairy recommended daily, it is preferable to originate from milk or low fat yoghurt and less from cheeses because most contain much sodium and saturated lipids.

(1 serving = 1 cup of milk = 1 cup of yogurt = 30g. of cheese)

For people who have intolerance to lactose, dairy products are available with reduced lactose or lactose-free. Also, for those who do not consume dairy products, there is the alternative of soy products (milk, cheese), which is enriched in calcium and vitamins A / D.

3.3.5.d. Fish and seafood



Fish and seafood, from the group of protein, are usually consumed less than meat, poultry and eggs. They also constitute an important source of protein, vitamins and minerals as well as omega-3 fatty acids, which are essential for the organism. Fish rich in omega-3 fats are especially fatty fish like salmon, sardines, anchovies, trout, mackerel, herring and oysters. Eating fish twice a week (of which one should be fatty fish) is associated with the prevention of heart disease and reduced cardiac deaths. It is also recommended to be consumed by pregnant or lactating women as omega-3 fats are important for embryonic's and infant's physical and cognitive development. The only fish that pregnant and lactating women should

avoid are those rich in mercury such as swordfish, sharks, royal mackerel as well as albacore in smaller quantities.

3.3.5.e. Oils

The lipids with a high content in monounsaturated and polyunsaturated fatty acids are usually liquid at room temperature and are called "oils". The oils are not a separate food group but are important as they provide essential fatty acids (omega-6) and vitamin E. These oils are found in foods such as olive, nuts and seeds, avocado and seafood or are plant extracts as olive oil, sunflower oil, corn oil, sesame oil. Furthermore, foods that are basically oils are soft margarines, mayonnaise and salad dressings with oil base. The replacement of saturated fats with unsaturated fatty acids (eg olive oil instead of butter in cooking) appears to reduce both total and "bad" blood cholesterol. It is recommended to use mainly olive oil, which plays an important role in greek (and mediterranean) diet as it is a rich source of antioxidants and its consumption is associated with increased consumption of vegetables and legumes. It should be noted that the quality of lipids (oils or solid fats) is more important than their overall intake. However, because the oils are rich in calories, their moderate consumption is recommended.

3.3.6. Principles of a balanced diet - 10 tips

We could summarize all of the above along with some additional elements on the following tips:

- Consume a variety of fruits and vegetables on a daily basis.
- Prefer bread, cereals or pasta whole meal.
- Consume fish and legumes at least once per week.
- Consume olive oil as the main source of fat in foods and salads and restrict the consumption of animal fats (eg butter, skin, fat in meat, cream).
- Avoid salt. Instead, you can use herbs and spices.
- Prefer plenty of water and avoid liquids with calories (eg refreshments, processed juices). Prefer their light versions.
- Consume sweets wisely and leave them for special circumstances (holidays, birthdays, sorties).
- Eat breakfast on a daily basis and distribute the food of the day in 4-5 meals and snacks.
- Eat slowly, calmly, in a specific room and without doing something else (eg watching TV).
- Listen to your body, eating when you are really hungry and stopping before you have the feeling of a bloated stomach.

Section II

4. Put into practice

4.1. Greek (Mediterranean) Diet

The dietary recommendations for the different food groups and the frequency of their consumption are included in the dietary regimens (or standards), which reflect a total of dietary habits. One of the most studied dietary regimens is that of the Greek (Mediterranean) Diet, which forms a standard of a balanced diet worldwide. Also, it has many advantages compared with other dietary models, mainly in reducing the risk of diseases related to nutrition (eg cardiovascular disease, obesity, diabetes, etc.).

The various Mediterranean countries have their own special dietary habits, but all can be considered variants of the Mediterranean Diet because they have many features in common with the olive oil holding the central position.



4.1.1. Traditional greek diet

The traditional Greek diet is part of the cultural heritage of Greece. Since ancient times, the food tradition of Greece is characterized by the sense of moderation. The rich and complex meals (feasts, symposiums) were happening now and then while the daily diet was based on legumes, vegetables and olive oil. In contrast, meat, sweets and wine were consumed in limited quantities. The milk intake was moderate but the consumption of yogurt and cheese high.

The main factors that contributed to the formation of traditional greek cuisine are the climate of the country, the geographical location of the different regions, the way to prepare food in each of them and the customs that were developed in them. Great is also the influence of religion on dietary habits of the Greeks, since during the days of the year when Orthodox Christians fast, they avoid meat, dairy, eggs and on some seldom times even olive oil. These dietary practices promote good health.

Unfortunately, during the last years, there had been a tendency to substitute the traditional diet with ready-made or processed food, which was detrimental for the health. However, lately, there is a gradual shift to tradition and to Greek traditional recipes.

4.1.2. Historical review of the Mediterranean diet

The term "Mediterranean diet" refers to nutrition of countries surrounding the Mediterranean Sea and especially of Crete and some areas of Greece and South Italy. This term began to be used since the early 1950s, when a large research started, known as Seven Countries Study, during which were studied the dietary habits of people (men) from 7 different countries (Yugoslavia, Greece, USA, Japan, Italy, Netherlands/ *Holland* and Finland) in relation to health indicators. From Greece men from Crete and Corfu took part. The study lasted 30 years and its results showed that the Cretans had the lowest mortality rate from cardiovascular disease and cancer as well as the highest average life expectancy. The secret of longevity of the Cretans was simple and frugal diet (mainly foods of plant origin: fruits, vegetables, whole grain cereals, olive oil and red wine) as well as greater physical activity (work outdoors) than the rest populations.

Based on the findings of the above study, dietary guidelines were created which constitute the Cretan or Greek Diet which later prevailed as Mediterranean diet.

4.1.3. The characteristics of the Greek (Mediterranean) Diet

The traditional Greek diet has much in common with the Mediterranean diet. The traditional Mediterranean diet and especially its greek variation, has the following nine basic characteristics:

1. High consumption of olive oil
2. High consumption of vegetables
3. High consumption of fruits
4. High consumption of wholegrain cereals
5. High consumption of legumes
6. Moderate consumption of milk and dairy products (mainly cheese and yogurt)
7. Moderate consumption of fish
8. Low consumption of meat and its products
9. Moderate consumption of alcohol, mainly in the form of wine with meals

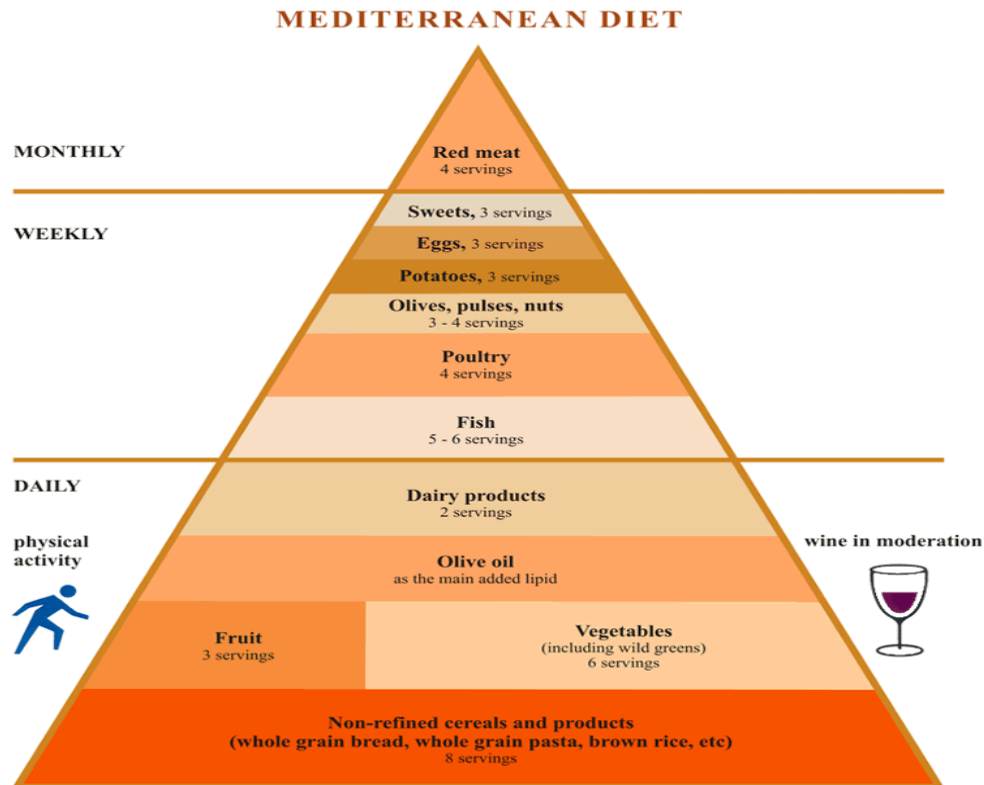
The greek diet was based on three dominant mediterranean products: olive oil, cereals and wine. Next to these, we can add the wild greens, which are part of the food tradition of Greece.

The dietary guidelines are illustrated in the form of a pyramid, the base of which refers to foods that should be consumed very often and the top to foods that should be consumed less frequently, with the other foods occupying intermediate positions.

In 1999, the Supreme Scientific Health Council (SSHC) of the Greek Ministry of Health and Welfare, outlined the dietary guidelines for adults in Greece, where the nutritional value of the traditional Mediterranean diet is emphasized. These dietary guidelines are summarized in the Mediterranean diet pyramid (picture 3.1).

At the base of the pyramid, *are* wholegrain cereals, fruits and vegetables (and greens), which are rich in fiber, carbohydrates (energy), vitamins and minerals for which **daily consumption** is recommended. Also, the daily moderate consumption of olive oil and dairy products (mainly cheese and yogurt) is recommended. **Weekly consumption** is recommended for legumes, eggs, fish, seafood, white meat (*eg* chicken, turkey, rabbit), which are sources of high biological value protein, iron and vitamin B complex. Also weekly consumption is recommended for potatoes, nuts and sweets (less often). Finally, **monthly consumption** is recommended for red meat (*eg* pork, beef, goat) and meat products, which are at the top of the pyramid, mainly because of their high content of saturated lipids, although they are an excellent source of iron and protein of high biological value. Also regular physical activity is recommended, adequate daily water intake and moderate alcohol consumption, mainly in the form of wine. Finally, the pyramid suggests the consumption of herbs (oregano, basil, thyme), which can help to avoid salt as well as consumption of herbs and their infusions.

In the Mediterranean Diet Pyramid, the amounts are referred as "servings", which correspond to smaller quantities than restaurant servings, vary by food and are indicative. Emphasis is given mainly to the frequency of consumption, while the exact amounts depend on gender, age, body weight and physical activity of individuals.



One serving equals approximately half of the portions as defined in the Greek market regulations (portions served in restaurants)

Also remember to:

- drink plenty of water
- avoid salt and replace it by herbs (e.g. oregano, basil, thyme, etc.)

Source: Supreme Scientific Health Council, Ministry of Health and Welfare

4.1.4. Health benefits of the Greek (Mediterranean) Diet

The beneficial effect of the traditional Greek (Mediterranean) diet is expressed by its whole rather than individual foods and nutrients. It seems that the combination of foods and the biological interactions of the different components of the Greek (Mediterranean) diet bring in the significant health benefits. Various researches suggest that the traditional Greek (Mediterranean) diet contributes to the prevention of coronary heart disease and possibly of some forms of cancer while it has been shown to be effective in weight loss as well. Also, from studies conducted in Denmark, the Netherlands/*Holland*, Sweden, Spain and the United States emerged that the diet that resembles the traditional Mediterranean diet is associated with longevity.

The Mediterranean Diet is not just a dietary regimen but a lifestyle

It is noted that the scientific evidence supporting the beneficial properties of the Greek (Mediterranean) diet refer to the traditional Mediterranean diet rather than the current diet of the countries of the Mediterranean region. From data of the EPIC program (European Prospective Medicine and Society) and also from study in children and adolescents, appears that the degree of commitment of the Greek population in the Mediterranean diet is decreasing and especially among young people. The increase of the availability of food, new products' introduction, advertising and the emergence of functional foods (foods that offer specific health benefits beyond their content of nutrients) and supplements, are some of the factors that may have influenced the change of dietary habits of Greeks.

In conclusion, the Mediterranean diet is addressed to all those who want to follow a healthy diet and life in general. Undoubtedly, it is an excellent dietary pattern that includes all the essential nutrients since it is rich in fiber, vitamins, minerals, antioxidants and omega fatty acids. Obviously, it can be implemented easier in Mediterranean countries, where its distribution of foods is much more familiar and the foods that compose it are in abundance, but it is certainly appropriate for other civilizations and cultures.



4.2. Biological or organic foods

4.2.1. What are they?

Biological or organic foods are products produced in accordance with the rules and principles of biological agriculture and cattle raising, which are based on:

- Natural processes, without the use of synthetic chemical fertilizers, pesticides, antibiotics, hormones or enhancers.
- The use of appropriate production techniques that maintain the natural balance and soil fertility (eg recycling of plant and animal residues, crop rotation).
crop rotation: rotation of cultivation of different crops in the same field
- The use of native plants and animal breeds which are adapted to local conditions and are more resistant to the development and transmission of diseases.
- The good conditions of breeding and treatment of the animals.

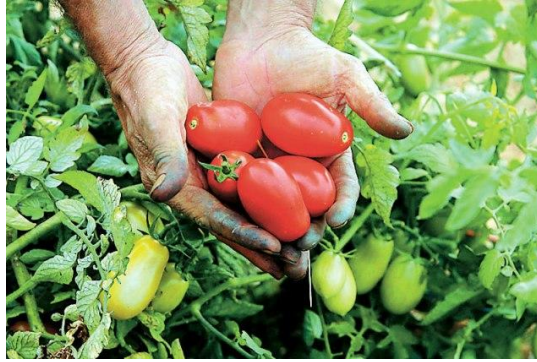
- The protection of the environment



4.2.2. How are they different organic than conventional food?

1. Organic foods are more *environmentally friendly*. They promote physical balance, recycling of plant and animal residues and soil fertility while at the same time they contribute in the reduction of the environmental pollution and of the veterinary waste.
2. Organic products do not have the impressive *uniformity* and size that have the conventional counterparts. The appearance, shape and color in conventional food are affected by the chemical plant protection and the way of their cultivation.
3. Organic fruits and vegetables have 20-30% *lower proportion of water* than conventional, thus have a greater concentration of vitamins, trace elements and minerals. This fact sometimes leads to longer cooking time.
4. Packaged organic products are not protected by chemical means (eg preservatives) opposed to some conventional packaged, so they are more *susceptible* to alterations. If they are found in the suitable conditions (humidity, heat), live microorganisms grow rapidly and lead to physical spoilage of the products.
5. Regarding taste, studies are ambiguous about whether organic products outclass conventional.
6. The *price*. Organic products are more expensive than their conventional counterparts because farming methods do not constitute to the increase of the volume of production, but of the quality. Also, labor costs are higher in organic cattle raising while the number of animals per unit area is reduced. Finally, they are burdened with the additional cost of certification and continuous controls.

According to a research by the Research Laboratory of Marketing, of the Economic University of Athens, even if organic products are more expensive than conventional, there is an increased demand by Greek consumers, despite the current difficult economic situation.



4.2.3. Are organic products safer than conventional?

Organic foods are high quality products and seem to be more secure than conventional as they do not contain synthetic chemical fertilizers and pesticides, antibiotics, hormones and Genetically Modified Organisms (*GMOs*). During their production, the use of limited natural fertilizers and herbicide safeners is allowed. Also, numerous studies have shown that they contain lower concentrations of toxic for health heavy metals, nitrates (because of the absence of use of nitrate fertilizers), as well as residues of insecticides and pesticides, which are used only in conventional agriculture.

4.2.4 Are Organic products more nutritious than conventional?

Although there are some indications, we cannot clearly conclude that organic products are more nutritious than conventional ones. It is difficult to compare the results of studies conducted by different researchers because of differences in the way of the design and realization of each research. Results of studies show that organic fruits and vegetables are richer in vitamin C, minerals and antioxidants and contain lower amounts of protein but of higher biological value than conventional. Also, researches show that organic grains and legumes have a higher mineral content. Finally the situation is not clear as far as organic animal products are concerned since the available data are incomplete. Moreover, it does not seem to exist substantial differences in nutritional value of organic products compared to conventional ones.

4.2.5. How the consumer will understand that a product is organic?

In order for an agricultural product to be characterized as organic it must be certified by an approved body (in Greece there are 15 such *bodies/institutions*) to be ensured that it is produced in conditions of organic production and is authentic. All *these bodies/institutions* are controlled by the Agricultural Products Certification and Supervision Organization (AGROCERT) and by the Hellenic Accreditation System (E.SY.D.). Each *institution* has its logo. There is as well the EU organic logo for organic products. The logos are particularly useful for consumers to easily distinguish that this is a certified organic product. The table below presents the logos of greek certification bodies and the EU Organic Logo:

Institution /Inspection Organization	logo
EU Organic Logo	
Certification & Inspection Organization of Organic Products DIO	
BIOHELLAS Inspection and Certification Body for Organic Products	
PHYSIOLOGIKE-Inspections Certifications for Organic Products	
GREEN CONTROL – Inspection and Certification Organization for Organic Products	
A-Cert European Organization for Certification S.A.	
Q-Ways Quality Ways S.A.	
A.Hatzidiki & Co – IRIS	
Geotechnical Laboratory S.A.	
QMSCERT – ‘Q-CERT LTD’	
Naoum Panayiotis- Kountios George Co. GMCERT	
TÜV HELLAS S.A.	
OXYGEN Greek Certification Organization	
Agricultural Products Certification and Supervision Organization (AGROCERT)	
Hellenic Accreditation System (E.S.Y.D.)	

Questions

1. Could you name the six major categories of nutrients?
2. Which foods contain essential omega-3 and omega-6 fatty acids?
3. What is meant by a "high biological value" protein?
4. Could you name three good food sources of Vitamin C?
5. What is meant by a "healthy diet"?
6. In which foods can saturated and trans fatty acids be found?
7. What foods are good to eat more?
8. What are the characteristics and the health benefits of the Greek Mediterranean diet?
9. Which foods are at the base of the Mediterranean diet pyramid?
10. Are organic foods safer and more nutritious than conventional?

Are you interested?

5. Further readings

- Department of Health and Human Services: www.dietaryguidelines.gov
- US Department of Agriculture (USDA): www.choosemyplate.gov
- British Dietetic Association: www.bda.uk.org
- Academy of Nutrition and Dietetics: www.eatright.org
- Hellenic Health Foundation : www.hhf-greece.gr
- WHO Collaborating Centre for Food and Nutrition Polices : www.nut.uoa.gr
- European Food Information Council (EUFIC): www.eufic.org
- Mediterranean Diet Foundation: <http://dietamediterranea.com/piramide-dietamediterranea/>
- Ministry of Rural Development and Food-Department of Organic Farming: www.minagric.gr/greek/3.6.B.html
- Organic Farming in Europe: http://europa.eu.itn/comm/agriculture/qual/organic/plan/comm_el.pdf

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