

## THE ROLE OF MEDITERRANEAN DIET AGAINST AGING AND OBESITY FOR AN ELIXIR OF LONG LIFE AND HUMAN HEALTH

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*This study represents the main features of eating patterns of the type of “Mediterranean Dietary Pattern”, to identify the foods (in-out line) and life style through “Model of Diet” that are the regulator parameters to control body mass weight. The reference to a “prudent diet” is a scheme that may help to maintain the best physical conditions and can protect health, acting in the budget against the spread of diseases in modern industrialized societies, as, for example, the oxygen free radical-mediated lipid peroxidation leading to the loss of membrane integrity and hence compromise cellular function.*



In a previous paper we already dealt with Mediterranean diet as that one, in comparison with other alimentary uses such as in eastern Europe and America, able to minimize the environmental impact, as a less consumption of energy is related. Here we want to see the capacity of the diet to protect our organism and to improve the quality of our life, contrasting by its application the effect of noxious compounds, particularly free radicals, at the same time reducing the consumption of drugs.

### Free radicals

Free radicals are highly reactive chemical species present in the environment and also generated in the body as byproducts of metabolism (Tab. 1). According to the radical theory, free radical damage to cellular function is associated with a number of age-related diseases, namely: atherosclerosis, arthritis, muscular dystrophy, cataract genesis, pulmonary dysfunction, a number of conditions, as inflammatory state ageing, immunosuppression, diabetes, Alzheimer’s disease, liver cirrhosis, atherosclerosis, neurological disorders, heart disease, and even various types of cancer, as the radicals can act negatively (oxidative stress, reducing or oxidizing agent) damaging cell membranes, other cellular constituents and even DNA.

Tab. 1 - Free Radicals

1. Hydroxyl radical	OH
2. Nitroxide radical	NO <sup>•</sup>
3. Lipoperoxylic radical	LOO <sup>•</sup>
4. Superoxide anion	O <sub>2</sub> <sup>•-</sup>

### Free radical damage

Usually Free Radicals “live” in a small fraction of time, a billionth of a “Few thousands of a second”, just long enough to do damage! This makes them difficult to detect by conventional methods.

More attention must be paid to the potential role of free radicals in ageing. Recently, much care is given to the possibility that free radicals damage proteins. The free radicals derived from oxygen lead to the peroxidation of membrane lipids, the inactivation of essential enzymes and damage to DNA by attacking many biochemical substrates. Metabolism of lipids is a process regarding oxidation of fatty acids, synthesis of fatty acids, synthesis of cholesterol, disorder of lipid metabolism. The most common hydrolysis products or building blocks of the lipids are the mono carboxylic organic acids, which are commonly called fatty acids. Of all possible fatty acids we find that only those having an even number of carbon atoms occur to any appreciable extent. There is some variation as the number of double bonds (degree of unsaturation) in these acids, branched chains and ring compounds are rare in fatty acids.

The lipids are found in all parts of the human body and are especially important in the brain. The human body can synthesize most lipids, given sufficient raw material. Some lipids contain principally carbohydrates that are adequate for a diet. The triglycerides represent the most important dietary lipids. The lipid peroxidation, is an autocatalytic process which is caused by free radicals and which ends with degradation of polyunsaturated fatty acids. Under normal circumstances antioxidant defense mechanisms scavenge these toxic oxygen products.

All aminoacidic residues of a protein are subjected to attack by reactive oxygen species (ROS), under physiological conditions (Tab. 2). The result in part demonstrates age-related defects in the protein synthetic machinery or *in vivo* production of oxidative damaged protein that would not be accumulated because cellular proteins are constantly turning over and those abnormally formed or damaged proteins turn over more rapidly than normal proteins.

When the radicals attack proteins they produce oxidative stress. Under these conditions, in absence of an appropriate electron acceptor, the reduced forms of these flavoproteins may react with  $O_2$  to form  $H_2O_2$  or with  $Fe^{3+}$  to form  $Fe^{2+}$  by either superoxide anion radical dependent or independent pathways.

Some oxidative processes involving fat may contribute to the diseases. Oxidized forms of cholesterol are for instance involved in heart disease and atherosclerosis like lesions, produced lipid hydroperoxide or oxidized cholesterol.

Tab. 2 - The nutritional classification of aminoacid

1.Essential aminoacids	lysine, methionine, treonine leucine, isoleucine valine phenylalanine, tryptophan, histidine
2.Other aminoacids	tyrosine (synthetic from phenylalanine) cysteine (synthetic from methionine)
3.No essential aminoacids	glycine (alanine, serine, proline) glutamic acid (gluthamine, aspartic acid, asparagine), arginine, taurine

Therefore many defense mechanisms that protect from mutagens and carcinogens are in the surface layer of our skin stomach, cornea, intestines and colon. The most important carcinogens and major contributors to DNA damage are oxygen radicals and lipid peroxidation agents. The systems that generate oxygen free radicals catalyze the oxidative modification of proteins. Protein oxidation contributes to the increases in size during aging in a various pathological states. Major sources of endogenous oxygen radicals are hydrogen peroxide and superoxide generated as side products of metabolism, and the oxygen radicals burst from phagocytosis after viral or bacterial infection or inflammatory states. A variety of environmental conditions could also contribute to the oxygen radical load. Many enzymes protect cells from oxidative damage: superoxide dismutase, glutathione peroxidase, DT-diaphorase and glutathiontransferase.

Characterizing and optimizing such defense systems, may be an important part of a strategy to minimize cancer and other age-related diseases, and the main ways for a long life.

### **Aging**

It is probably to classify the process of aging as a disease, but it is common in metabolic or degenerative diseases. The general symptoms of aging are known that the skin wrinkles, the hair turns gray and may fail

out, sight is impaired. The bones become brittle and the body no longer can stand so much stress as previously. There are three basic aspects of aging:

1. what is the biochemical nature of the changes accompanying aging?
2. what is the cause of these changes?
3. what treatment or procedures may offset or delay the onset of these changes?

There are only fragmentary answers to these questions but research is proceeding and will undoubtedly have better answers in the future. The search for the nature of the biochemical and chemical changes in aging has centered upon the connective tissue, the material cells that helps to hold them together. The protein collagen is the most abundant component of connective tissue. Upon aging the collagen becomes more rigid, less soluble in phosphate and citrate buffers and assumes an almost crystalline form. The rigidity is probably due to increase cross link collagen molecules.

Other components of the connective tissue, elastin and various mucopolysaccharides (combinations of protein and polysaccharides) change in ways that may make more difficult, nutrition and elimination of waste products of the cells surrounded by the connective tissue. It is known that with aging many cells die and are replaced by connective tissue. A brown lipoprotein pigment called lipofuscin accumulates in many cells with increasing age. Neither the source of this pigment is known. However, in person to be 100 years old, 8% of the volume of heart cells is made by this pigment. There is no lack of theory to explain why people age, most of the theory lack any real verification. Since many of the cell of the body (nerve and muscle cells) never divide, they may just "wear out". We must ask, then what wearing out in biochemical terms. It has been suggested that the DNA is disrupted by chance irradiations so that it no longer has all the informations a cell needs for survive. The amount of RNA found in the nucleus of cells has effect in the age as does its rate of turnover. Perhaps toxic products produced in the cell disrupted some part of the cellular machinery. Other theories of aging point to the fact that many older persons do not adopt well-balanced nutritious diets or the effects of aging may be due to malnutrition. Few valid treatments have been found to delay the onset of aging. In experiments with rats a drastically reduced caloric intake with maintenance of the level of vitamins and proteins increases the life span from a normal value of 1,000 days to 1,400 days. Others epidemiological data have shown that Italy and France, countries with the highest wine consumption, have the lowest incidence of myocardial infarctions.

This hypothesis is supported by three important factors:

1. wine is a tonic emotionally able to improve the healthy foods and is a benefit for the diet;
2. wine has beneficial effects mainly for coronary heart diseases (this effect is not in other alcoholic beverages);
3. the biological plausibility of the mechanism of protection effect is dilatation of the coronary arteries, push the removal of blood levels of cholesterol and triglycerides, antithrombotic effects. Alcohol is associated with lower concentrations of plasma fibrinogen, reduced platelet activity, hence a lower probability of thrombosis, increase of cholesterol to high density lipoprotein (HDL).

In moderate doses the beneficial of wine drinking half a glass a day are:

1. increases the efficiency of skeletal muscle, presence succinic acid, gives the wine its distinctive flavor, active respiration of the muscle fiber;
2. the chemical and physical composition of the blood, the main action of the wine tied to acids and organic salts increase alkalinity;
3. the benefits has regarding renal function. The wine increases circulation in the glomerul by the action of potassium salts, increases urine output and save the alkaline values.

Other theories have advocated the consumption of yoghurt as means for preventing aging.

### **Oxidative stress**

Many oxidative processes cause damage to lipids, proteins and DNA and induce various diseases even cancer and aging. When the radicals attack proteins they produce oxidative stress. Biological systems, under these conditions and in the absence of an appropriate electron acceptor and donor, become sufficient.

The diseases resulting from free radicals due to “oxidative stress”, create the loss of the balance between free radical production and antioxidant defenses. The most typical diseases that may result from the production of free radicals are the various types of cancer and atherosclerosis.

Endogenous antioxidants (those produced within our bodies) are:

- superoxyde dismutase, which converts superoxide to hydrogen peroxide;
- glutathionperoxydase which sweeps away the peroxides at the expense of glutathione;
- glutathiontranferase;
- catalase which breaks down hydrogen peroxide into water and molecular oxygen;
- melatonine;
- ceruloplasmine.

They are also present where there is poor blood circulation, reduced activity of the adrenal glands, persistent presence of bacteria and fungi, chronic infections. In practice they also cause the failure of the repair of the damage replacing aged cells with new cells. Oxidative stress is favoured by many factors. Among the most common chemical factors (chemical synthesis of all medications, drugs, smoking, alcohol, and all pollutants), physical factors (radiation from low frequency noise, ionizing and ultraviolet radiation, electromagnetic fields, radiofrequency, microwave), biological (vaccines, parasites, infectious diseases), mental factors (depression, panic attacks, anxiety, constant stress), nutritional (eating disorders, improper nutrition). In the case of oxidative stress can be observed earlier: reduction of memory, difficulty in sleeping, decreased sex drive, gray hair, baldness, wrinkles and blemishes on the skin, decreased muscle mass and increased fat mass, reduced immune system, increased cardiovascular risk, decreased energy, anxiety stress and depression. Hexogeneous antioxidants can arrive to our organism by foods and by drugs. The foods must be considered according to qualitative and quantitative factors.

The qualitative point of view is concerned principally with the ability to provide materials that our body cannot produce. Other foods, that contain salts, proteins, and also glycodes involve the role of main regulators.

Important concept is food quantity in scientific terms, related to the ability of our organism to provide energy. The energetic value of food is determined by burning the substance in the bomb calorimeter and determining the heat. Substances in the body do not burn completely. To maintain the energy balance in an individual, the number of calories administered should be higher than the energy metabolism of the individual himself (it means that about 10% of food is not absorbed).

Some of the factors that influence the energy we need are distinguished in:

- physiological factors
- environmental factors
- pathological factors.

Dietary intake of natural antioxidants is an important aspect of body defense mechanism against these agents. Many antioxidants are being identified also as anticarcinogens (Tab. 3). Epidemiologic studies have indicated that the dietary practices are the most promising area to explore. These studies suggest that a general increase in consumption of fiber, rich cereals, vegetables, fruit and a decrease in consumption of fat-rich products and excessive alcohol can determine a healthy life style. So far several possible mechanisms by which alcohol and wine in small quantity have been studied and examined.

Tab. 3 - Antioxidant not nutrients present in foods of vegetable origin

No.	Flavonoids	Most fruits and vegetables, red wine
1	Polyphenols	Fruits, vegetables, red wine
2	Lycopene	Tomatoes
3	Lemonene	Lemon, citrus
4	Anthocyanidins	Red wine
5	Resveratrol	Red wine
6	Hydroxynitrile	Olive oil extravergin
7	Oleurepine	Olive oil extravergin

We should not forget to consider wine as integral part of a proper food model with its own specific values. It is important to understand that there is a breakdown of nutrients and food in “good” and “bad” but it is necessary to identify the correct use of a variety of foods available to us as part of a regular supply which is varied, full and healthy.

A food model like that - mostly plant-based and able to promote a lower energy intake at constant amount of food provides the benefits of a reduced intake of fats animal, fats cholesterol, salt and refined sugars, and a high intake of fiber, complex carbohydrates and important factors in children protecting against an eventual presence of cancer. The antioxidants which can be found in fruit and in vegetables, in wine are a fundamental part of the diet. The protection offered by a healthy diet can prevent serious illnesses in people at risk. For example, in the specific field of dietary manipulations aimed at preventing relapse after a first myocardial stroke - but also to operate a primary prevention. The results have been often disappointing results when operating only on the fat component, reducing the intake of fatty acids and increasing that one of polyunsaturated and saturated fats. Only the inclusion of high amounts of polyunsaturated n-3 (fish oils) have led to reductions in mortality.

The doses of consumption and the suggestions concerning the taking of alcoholic beverages and their possible beneficial effects on the human body, have importance to some basic concepts: the moderate use, the prominent position of wine (in front of other beverage), the doses per day and fractionated with a meal. These are characteristics that are faithfully reproduced in the role of wine as alcoholic drink typical of that complex food traditions of the community that takes the name of Mediterranean Alimentary Model (MAM).

The typical Mediterranean diet allows to maintain the concentration of alcohol in the blood within physiological limits and perfectly tolerable. The time wine is ingested represents a very important aspect: it is known that the physiological and psychological effects of alcohol are less marked if it is ingested with food, particularly in conjunction with a lower concentration of alcohol in blood. Since for the Italian population wine is an integral part of the daily diet, and as such, is consumed mainly during meals, some experts have tried to assess what happens under these conditions, i.e. assuming variable number of doses and in different amounts before, during and after a normal meal.

It was shown that the concentration of alcohol in the blood is lower and the blood alcohol curve (i.e. the trend of the blood alcohol level vs time) is shorter when the wine is taken on an empty stomach, but not during, and/or after a meal, when the wine is not taken in a single dose but divided into different doses (3 to 6), it is tolerated and more easily metabolized, and therefore blood alcohol peak level is lower and is delayed in time. Drinking wine with food is a process that involves a reaction between substances-alcohol and influences the alcohol-peak. This effect excludes the possibility that the lower blood alcohol values encountered in these conditions, is related to a delayed absorption. It is necessary to underline, once again, the messages to be transferred to the general public.

In this field the relationship between risks and benefits vary, depending on individual variations, but the moderate use of alcohol in order to obtain greater protection against heart disease (but it cannot and should not be encouraged in a general manner as a public health measure because some may be unable to maintain a moderate level of consumption and the consequences of excessive consumption are devastating).

Moreover with alcohol it is not possible, unlike most nutrients, to make reference to levels of “needs” or of “recommended intake”. Therefore, simple general suggestions can be offered even approximately about the proportion of energy intake in form of alcoholic beverages without the risk of adverse effects (and possibly with some potential to achieve beneficial effects).

The narrow window in the spectrum of alcohol consumption may be increased to a maximum of two intakes of 150-200 mL of wine per day. For healthy and normal people, moderate consumption is acceptable and within it the protective effect of alcohol may occur that is by a daily consumption of 40-50 g (50-60 mL). The protection is not already evident between 50 and 80 g, and beyond 80 g alcohol has a harmful action on the organism.

In addition to sex (women metabolize alcohol with more difficulty) age factors should be taken into account (the elderly are more susceptible to the effects of alcohol), individual tolerance (which varies widely based on genetics, family, race and addiction) as well as certain physiological situations, such as pregnancy and

lactation and the driving of motor vehicles, the use of sensitive or dangerous machinery, etc, where necessary to preserve intact motor coordination and self-criticism.

Tab. 4 - Activity of different elements in dietary

Foods for antioxidative effects	Activity
1. Vitamin E (tocopheryl)	It is the major radical trap in lipid membrane. Protective effects of tocopherols against radiation induced DNA damage and mutation
2. $\beta$ -Carotene	It is another antioxidant in the diet that could be important in protecting fat and lipid membranes from oxidation. Carotenoids free radical traps and efficient quenchers of singlet oxygen. Singlet oxygen is a very reactive form of oxygen which is mutagenic and particularly effective at causing lipid peroxidation. It can be generated by pigment-mediated transfer of the energy of light to oxygen or lipid peroxidation although is somewhat controversial. Carotenoids are present in food that content chlorophyll, and they appear to be the plants, main defense against singlet oxygen generated as by product from the interaction of light and chlorophyll
3. Ascorbic acid	It is also important as an antioxidant. It was anticarcinogenic in rodents treated with ultraviolet radiation, benzo [a]pyrene, and nitrite. Ascorbic acid may have been supplemented and perhaps partially replaced in humans by uric acid during primate evolution
4. Uric acid	It is a strong antioxidant present in high concentration in the blood of humans
5. Selenium	Selenium is important factor, in the active site of glutathione peroxidase, an enzyme essential for destroying lipid hydroperoxides and endogenous hydrogen peroxide and thus helping to prevent oxygen radical-induced lipid peroxidation. Several heavy-metal toxin, such as $Cd^{2+}$ and $Hg^{2+}$ , lower glutathione peroxidase activity by interacting with selenium
6. B-Vitamins	It is found in green vegetables containing vitamins ( B, B6, B12, B9), folate, folic acid, improves mood and reduces Alzheimer
7. Green tea	Has antioxidant capacity
8. Coffee or cacao (1-2cup for a day ) not for aged	Coffee is rich in antioxidants, friends of the skin and body wellness and able to fight ageing and degeneration of cells High antioxidant power, thanks to the content of chlorogenic acids, protective effect against development of type 2 diabetes and Parkinson's disease, slowing the natural decline in the elderly brain, no adverse effect on cardiovascular risk: these are the main new related to consumption of coffee, mineral and the precious fiber that emerge from the most recent international scientific studies. The chlorogenic acids are the main antioxidant compounds contained in coffee, and certainly the most powerful. 100 ml containing about 250 mg of chlorogenic acid, a significant amount. Consumed in moderation and consistently every day, coffee has been shown to be an important aid in the prevention of metabolic diseases and neurodegenerative diseases. Its presence, therefore, in the daily diet not only positively influence the emotional sphere of the person but can contribute to a healthy body. Thanks to largely to the natural content in chlorogenic acid the coffee, even decaffeinated, is among the most abundant sources of dietary antioxidant
9. Dates, bananas	The K vitamin are present in dates and bananas and their consumption favorable circulation and help our health
10. Glutathione	It is present in food and is one of major antioxidant and antimutagens in the soluble fraction of cells. The concentration of glutathione may be influenced by dietary sulphur aminoacids. N-Acetylcysteine, a source of cysteine, raises glutathione concentrations and reduces the oxidative cardio toxicity of adriamicin and the skin reaction to radiation. Dietary glutathione may be an effective anticarcinogen against aflatoxin
11. Vitamins and minerals (Ca, Mg, Zn, P).	The basic foods in the daily diet are an important factor because they bring other vitamins and minerals which are present in fruits, vegetables They are sources for energy and have curative quality (help digestion and are source of force for human organism

### Important elements for a good dietary

Two ways are available to humans to protect from oxidative stress: drugs and good diets. The excess of consumed drugs suggests the latter approach as better so the content of diet becomes a precious help for health.

A variety of small molecules in a human diet are required for antioxidative mechanisms and appear to be anticarcinogens; some of them are (Tab. 4).

Tab. 5 presents the spices product, their components and positively effect in Mediterranean diet.

Tab. 5 - Presence of the spices in Mediterranean diet

a. Cumine	It is the essential aminoacids and a rich concentration of flavonoids <i>anti-age</i> is composed of 52% terpenes that facilitate metabolism of fat
b. Cinnamon	It is active ingredients are eugenol, pinene, cineol, feliandrene, linalool more than 50 aromatic compounds that act on the line. It is located in the cortex of a dried plant tropical like laurel
c. Cardamom	It is a chemical laboratory, contains starch, pigments acting as antioxidants, volatile oils and resins, especially limonene a substance that is used in the cosmetics laboratory (care of cellulite) accelerates the penetration of plant extracts and works in tandem with them
d. Saffron	Has a capacity weight loss, is also a potent aphrodisiac used in antiquity by the Greeks and Persians. The yellow color is due to carotenoids ANTI-AGE. It is rich in essential oils that protect stomach, intestines and facilitate sweat
e. Ginger	Has power fat and rich in anti zingiberene, ginger and shogolo
f. Mustard	Helps digestion and kidney function
g. Juniper	Purifies body and increases drainage effect. The berries contain resin, tannins and terpenes which stimulate digestion and slow down the fermentation of the food gut
h. Fennel	Is rich in active ingredients, contains phytoestrogens
i. Chilly	It is the queen of hot species. Accelerates metabolism burning substances likely to become fat contains capsaicin, an oily substance that gives the spicy flavor. Is also an antidepressant because it stimulates the production of serotonin which limits the hunger. It stimulates gastric juices and helps digestion
h. Rosemary	It is an excellent antioxidant, rich in polyphenols, contains phenolic acids, flavonoids, and an essential oil, a majority antimicrobial action and stimulating a cardio-vascular and central nervous system. It contains 1.8 cineol, camphor, alpha-pinene, camphene, borneol, this oil is obtained by distilling the flowering twigs, has a variability in its chemical composition, by region of origin. Extracts of rosemary have demonstrated a capacity similar to that of two food preservatives, the butylate hydroxytoluen (E321) and butylate - hydroxianisol (E 320) Experimental studies have also shown that rosemary extracts (containing mainly hydrogen and fleshy carnosol) favour the synthesis of Nerve Growth Factor (NGF), a vital element for growth and maintaining function of nerve tissue

Fig. 1 presents all foods and their contribute to the daily diet.

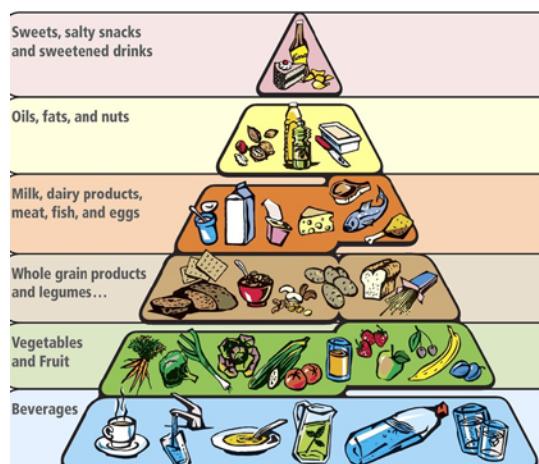


Fig. 1 - The pyramid foods: it represent the ideal distribution of the calories supplied to human organisms to live among the three different sources of energy fats, carbohydrates, proteins (all foods must contribute to the daily diet, but in decreasing amounts as you climb from the base to the vertical)

Tab. 6 present the different carcinogens, the product that contain and effect for health.

Tab. 6 - Carcinogens in food

1.	Quinones	Are widespread in human diet
2.	Quercetin	Are similar flavonoids. Are mutagens in different test systems
3.	Potatoes glycoalkaloids (solanine and chaconne substances)	Are cholinesterase inhibitors. When potatoes are exposed to light these glycoalkaloid reach levels that can be lethal to human
4.	Leguminous plants such as lupine	Content potent teratogens
5.	Seeds dried fruits (Alpha- alpha)	Contain canavanine a highly toxic arginine analogue that is incorporated into protein in place of arginine
6.	Peroxide	Are appreciable % of dietary fatty acids, and removal of each two-carbon unit generates one molecule of hydrogen peroxide
7.	Nitrite, nitrate and nitrosamines	Human cancers in stomach and oesophageal maybe related to nitrosamine and other compounds formed from nitrite and nitrate in diet
8.	Terpene lactones are in many plants.	They are a major toxin in the white sap of <i>Lactuca vitruos</i> , which has been used as a folk remedy.
9.	Rancid fat	Fat accounts for over 40% of the calories diet and the amount ingested oxidised fat may be appreciable. Unsaturated fatty acids and cholesterol in fat are easily oxidized, particularly during cooking
10	Sterulic acid and malvanic acid	There are toxic cycloprophenoid fatty acids present in cottonseed oil and other oils from seeds of plants in the family Malvaceae
11.	The broad (fava) bean a common food of the Mediterranean region	Contains the toxins at a level of about 2% of the dry weight
12.	Fucoumarines such as psoralen derivatives	Are potent light-activated carcinogens and mutagens and are widespread plants of the Umbellifere family such as celery, parsnips, figs, and parsley. Oil of bergamot is very rich in psoralen and used in the leading suntans lotion in France. (Damages to DNA are induced by the ultraviolet component of sunlight which is also a carcinogen and producing oxygen radical)
13.	Hydrazines	Are carcinogens and mutagens, are present in mushroom
14.	Safrol, methyleugenol	Are present in many edible plants, are carcinogens in rodents and several of their metabolites. Black pepper contains small amounts of safrole and large amounts of 10% by weight related compound piperine

### The body mass index (BMI)

Tab. 7 presents the mode for calculation the different type obesity.

Tab. 7 - The degree of obesity

Degree of obesity= Actual body weight/ Ideal Body Weight	Weight state	Value of IMC kg/m <sup>2</sup>
Up to 1.10 = normal	Weight normal	18.5-24.9
1.25 = mild obesity (22Cal/kg ideal body weight)	Under weight	<18.5
1:35 = average obesity (18 Cal/kg ideal body weight)	Under weight	17-18.4
1.50 = Net obesity (14 cal/kg ideal body weight)	Moderate Weakness	16-16.9
1.50 = Net obesity (14 cal/kg ideal body weight)	Ponderously Weakness	<16
1.50 = Net obesity (14 cal/kg ideal body weight)	Over weight	25-29.9
plus 1.50 = significant obesity (10 cal/kg ideal body weight)	Obesity: Mild (1degree)	30-34.9
	Moderate (2degree)	35-39.9
	Severe (3 degree)	>40



The body weight detected in the individual is related to height for the calculation of body mass index IMC or BMI = Body Mass Index or weight/height. There are many indexes proposed, but those most commonly used is the index: "QUETELET". This is equal of the weight (in kg) divided by the square of height (in m) x  $IMC = p/h^2 = \text{index}$  that fully expresses the concept of weight proportionated to height. The IMC is used to classify individuals into normal weight, underweight and overweight. Instead is significance in extreme cases of individuals with highly developed muscles, a high weight can correspond to a reduced amount of fat. The concept of role weight does not correspond to an ideal of beauty, but is related to a good state of nutrition and health.

Fig. 7 (a) and (b) represents the method of measurement the BMI (Index) and Energy expended in (kcal). It is important to understand the two different parameter of a) BMI (body mass index) and b) MME (Metabolism Material Energy), that influence body weight.

a) BMI = Body Mass Index (Fig. 2)

b) MME= Metabolism of Materials and Energy is defined as the set of transformations of matter (nutrients) and energy that are engaged in a living organism (Fig. 3).

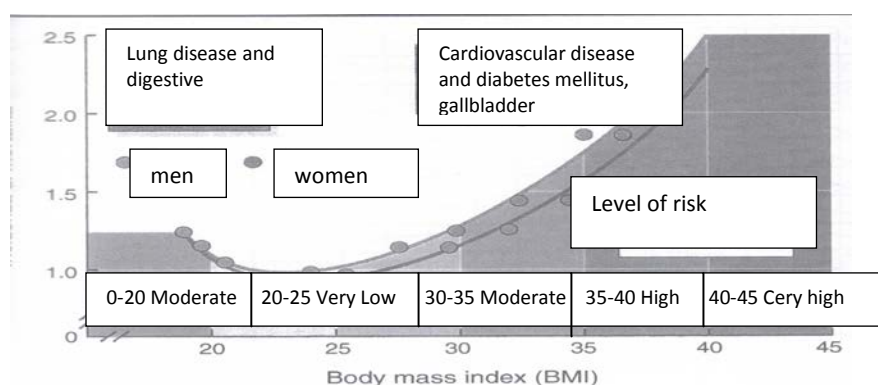


Fig. 2 -The body mass index

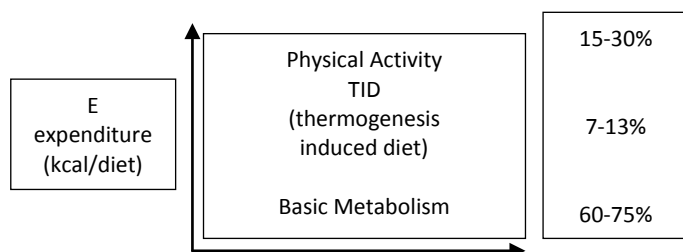


Fig. 3 - The metabolism of energy

### Energy

There are many ways of measuring the amount of energy released in or required for a chemical reaction. The most meaningful expression of biochemical energy is free energy. This term is defined as the energy available for doing useful work. Chemical reactions occur spontaneously when substances containing relatively high amounts of energy are converted into substances having less energy (Tab. 8). The oxidation of glucose which initially requires an energy of activation, takes place in many steps. At some of these steps, small amounts of energy are released. Some energy so released is used to drive the anabolic reactions of the organisms. Some energy is used to keep the heart beating, move food through the digestive tract and move the person from one place to another. The problem that living organisms have solved is the release of large amounts of energy in small units. Plants and animals are able to store and use the energy of metabolic reaction largely because of the compound adenosine triphosphate (ATP). This compound represents the principal "currency of most living organisms. The energy food is stored by the conversion of adenosine diphosphate to adenosine triphosphate, and the reverse reactions used to drive energy-requiring reactions.

The energy requirement is defined on the basis of energy expenditure and the latter is the result of three elements:

1. Energy cost for the basic metabolic rate (MB) in a sedentary adult is 60-75% of daily energy expenditure is expressed as the amount of energy per unit of time: kcal/min, kcal/day.
  2. Energy cost for the performance of physical activity: goodwill depends heavily on the type of frequency and intensity of activities undertaken by the individual (12-15% for a sedentary person) may be higher (30%) in the case of athletes.
  3. Energy cost for the diet-induced thermogenesis or food (TID) is 7-13% of total energy expenditure.
- It is important to note that the human organism can use only one type of energy, chemical energy, that is contained in nutritional energy, which is then transformed into:
- a) mechanical energy, for muscle work use;
  - b) thermal energy, used to maintain a constant body temperature;
  - c) electricity, for transmission used in the nervous and cardiac electrical impulse events.
- Energy released from oxidation of nutrients accumulates energy in a high-energy compound (ATP=adenosine triphosphate) from whose hydrolysis 12,5 kcal for mol ATP are liberated).

Tab. 8 - Consumption of calories to lose weight

Calorie Deficit Consumption cal 400 = g 50 of fat Consumption cal 7,100 = g 1,000 of anticipated fat loss	Anticipated loss in kg for 7 days	Number of weeks to lose 10 kg
992	0.890	11
896	0.800	12
776	0.700	14
680	0.610	17
536	0.480	20

Tab. 9 presents the role of different foods in diet.

Tab. 9 - Division of food in an overall diet

1. Food permits: Low-salt milk, skimmed milk, or skim. Broth, soups, vegetable soup. Boiled or grilled lean meat: veal, beef, rabbit pole. Banned fried. Lean fish poached or boiled. Excluding canned fried fish. Fresh or cooked vegetables, oil, grease or spicy sauces. Fresh fruit, cooked, preserved without sugarmill
2. Food tolerated: Ham, sausage, herring, anchovies, salmon, i.e. are for months in very small quantities. Bread and bread sticks: maximum 100g per day. Steamed potatoes affected: maximum 200g per day. Milk maximum 0.5l. Up to 20 g fat g. Food should be prepared without fat. Liquid up to 1 l for day of water, 50-60 mL(wine, coffee, milk, tea). Little dose
3. Forbidden foods: Milk fat, fatty cheeses fermented and made of flour, semoline, tapioca. Fatty fish (cod, salmon, eel). Fish preserved in oil. Fatty oils, hot sauces, mayonnaise. Potatoes, beans, peas, lentils, chickpeas. Sweets of any kind. Candied fruits, dates, dried figs, canned fruit, bananas, almonds, hazelnuts and chestnuts

Tab. 10 present type of foods for a slimming diet.

### Ten rules for well staying in shape (in and no out)

1. Use of light foods, preferably uncooked\natural and seasoned with 1 tablespoon of vinegar or lemon and a pinch of spices. Food by natural color, high quality small quantity and distributed in plate by elegance and refined design help to taste the food so nice and give of satiety sense. Foods of blue and violet color content anticyanidine.
2. Use of tea (green tea 1 cup) or half fruit or 1 (smoothies of parsley tomatoes, carrots) unsweetened
3. To move for at least 30-40 minutes a day with fast motion (sports, walking at a fast pace, take out the dog for a walk).
4. Use a dial plate 20-25 cm in size for each meal plan, but the food in the dial plate must be made with care, order, color and the spaces between them to give the impression space.
5. To eat foods that have the height in the put no more than 2.5 cm.
6. The food must be chewed for 28/30 times in the first time to swallow.
7. Not to eat standing up or in car and never in a hurry.

## Salute

Tab. 10 - Recommended foods for a slimming diet

1. Milk: Whole fresh or powdered skimmed 0.5 liters
2. Grass products: 1 tablespoon vegetable oil or 1 table spoon of margarine, or 2 table spoon of olive oil mixed with vinegar (or lemon) and chilly (all day)
3. Meat: Beef, chicken lamb, white meat, no more than 2 meals for week
4. Fish: Mackerel, fresh salmon, herring, not more than 3 times a week. Method of cooking meat and fish should be boiled, cooked on the grill or oven. Caution: Do not use fat as an authorization daily
5. Farinaceous (liquids or other foods): 1 potatoes, 1 slice of polenta, g 100 beans, g 100 peas, g 100 dried lentils (weighed after cooking) g 70 rice, g 70 spaghetti, 70 g fettuccine weighed after cooking (preferably to include the lunch meal)
6. Fruits: 1 orange, tangerine or 1 medium sized or 1 glass of orange or grapefruit juice, unsweetened, 1/2 citrus 1/2pcitrus or medium-size or half-cup of strawberries (to choose from in the day)
7. Vegetables: Cabbage, carrots, chicory, endive, green cavils, pumpkin, spinach, thistle turnip, watercress
8. Can eat as much as: Asparagus, cabbage, Brussels sprouts, carrots, cauliflower, celery, chicory, cucumbers, lettuce tomatoes juice, pumpkin
9. Can drink with no reasonable limit: Black coffee 2-3 cups a day, light a tea 1 cup a day, vegetable broth, water (1 liter per day)
10. Foods and drinks to avoid: alcohol, bacon, pretzels, bananas, cookies, crackers, croissants, butter, small cakes, caramel, cream, fat cheese, nuts, jellies, honey cakes, ice cream, whole milk, jam, olives, pizza, french fries, meat and smoked fish, soft drinks, sweets and syrups, sugar and yoghurt

8. Not eat after 19.30 in the evening.
9. The quantity of 1/4 aspirin taken before 10 pm is better for the person from 40 age up and that have circulator and cardiovascular problems.
10. Never use loose clothing but not too tight ones that block the circulation, and have a little sense of humor or small dose of positivity helps to get better. It is necessary, in the free time to do an activity that you like (music, art, writing, listening, playing, painting or other, but influence for stress limitary).

*Attention:* Do not forget that cooking can destroy vitamins and important elements contained in raw food, through a process of transformation which can be dangerous.

The basic diet is performed:

1. Eat fruit as a snack.
2. When to eat something a bottle of required.
3. Eating everything planned for each meal.
4. If you change for one day a diet, these is not problem, the next day to resume the diet.
5. Do not go to sleep soon after eating, maybe move have a walk.
6. In different time and separately (volumetric diet) use: corn and soybeands, decrease quantity and change life style.

### *Breakfast*

1. Coffee or tea skimmed milk or low fat yoghurt (preferably without sugar).
2. Fruit mid morning and mid afternoon: the best 1 peach or 2 apricots, cherries or 10-15 grapes (no bananas).

### *Lunch and Dinner*

1. Cooked vegetables, raw vegetables + protein + slice of bread or 80 g of pasta or rice (vegetables with little or no oil, lemon oil, seasoning, spices or vinegar), cooked the food to steam, use the broths.
2. No potatoes and limit tomatoes.
3. Protein: Cheese preferably goat or sheep about 70 g, eggs no more than 1egg in a week.

Please note that it is very important not to be hungry later, always ready to have both raw and cooked vegetables.

Drink 2 liters of water a day. No alcoholic beverages and avoid sugary drinks.

### Advice to give to the mono-diet purified

A great way to follow is a mono-diet that consists of just a single food (e.g. a type of fruit) or family of foods (vegetables or cereals) from a minimum of a meal to a maximum of three consecutive days. The key issue is that the fruit must be of the specific season. A diet of apples or grapes is monosystem purification, apples help for body loss weight. Instead, the grape is an ideal fruit of hypocaloric diet, used of revitalizing the mind and body. It contains a lot of sugar immediately assimilated (glucose, fructose and mannose) and B vitamins that help metabolism and energy. Other vitamins are (A, PP, C), that fight free radicals. The grape has a rich collection of minerals to counteract stress e and abbot-being.

Many studies were found for those using for a short-term these product : a white grape or an apple for example: for every meal for 3 meals for 7-15 days a reduction of the effective weight will be granted. The apple (used for esthetical form): it is rich in fibbers that contributed to the elimination of slag feeds, cleaning intestine help to flatten the stomach. It also contains flavonoids with powerful antioxidant qualities and has anti-ageing effect. Or use more vegetables for a period of 7-15 days for 3 times amount of days (beans, a day peas, pearl barley). The weight loss was between 3-5 kg. So is still valid, the saying: "An apple a day keeps the doctor away", diet recommended by your medical, but knowing the calories of food that each person uses is a necessity that awakens the consciousness and is a crucial parameter for the control of body weight. In this case it is so important: Prevention is better than cure.

### Conclusions

Today we live in times of economic crisis. Diets can have good effects on our health. The excess foods (food not utilize in diet) can be used for the poor countries where the level of their production is very low. Instead, part of the food wastes can be used to obtain an important product or specific carburant which can be used in the "New Model Eco-Cars "that fight environmental pollution. Some examples of useful of wastes food are:

- a) oil products wastes can be turned into biodiesel fuels;
- b) banana wastes can produce methane gas;
- c) coffee fund can increase cars fuel power;
- d) the milk serum can be converted as an excellent fuel material for the production of bioethanol;
- e) algae seaweed can be used to convert normal algae in gasoline additives;
- f) whiskey can produce fuel butanol, whose features are better than ethanol.

This article about human food and drink through times teaches us that the ideal diet should be simple and moderating quality and quantity factors (advice to be given practice every day for at least 30 minutes - 1 hour of sports per day, exercise aerobic are 300 cal for our organism, such as walking, trenching, gymnastic walking with speed pitch, basketball, volley, tennis), and psychological factor; relationship between health and environment, small amounts of positivity, helps to feel better and live longer. These factors all together are means to improve the quality of health and to extend life.

It is important to think of the principles of dietetics (IX century) recommending that: "Those who eat less, eat more..." because they live longer.<sup>1</sup>

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