

NUTRITIVE, NUTRACEUTICAL, MEDICINAL AND ENERGETIC VALUE OF FRUITS AND VEGETABLES

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ABSTRACT - The nutrient content is not as important as the ratio between the compounds, their quality, their availability and their digestive use. Last but not least, the psychical satisfaction and the pleasure of consumption are also important. The main goal of fruits and vegetables consumption is to assure certain nutritive and catalytic needs, whereas other foodstuff groups assure the energetic needs. **The dietetic value** is a natural prophylactic (preventive) or curative quality of certain foodstuffs. It may also be acquired for the dietetic foodstuffs, by applying some technologies and the rigorous abidance of the hygienic-sanitary norms, namely some recipes approved by the specialists. **The nutraceutical value.** Many vegetal products have entered and are still entering the human alimentation (for instance, nettle, dandelion, etc), as supplements with an auxiliary role in alimentation (vitaminizing, depurative* and sometimes, therapeutic one). Initially, their texture or taste were not very pleasant and were not consumed very frequently. Their auxiliary role prevailed over the proper alimentary role, being eaten in order to have a healthy body. **The medicinal value** is subordinated to the nutraceutical value and certain foodstuff might have medicinal qualities, one of the possible functions of food being also the therapeutic one. There is also an important ethno-botanical tradition of the folk medicine from all the countries that have kept from old times the knowledge about the healing features of fruits and vegetables, picked up from nature or cultivated.

Key words: alimentary, nutritive and nutraceutical value, vegetables, fruits

REZUMAT - Valoarea nutritivă, nutraceutică și medicinală a legumelor și fructelor. Nu contează atât conținutul alimentelor în nutrienți, cât mai ales, raportul existent între acești compuși, calitatea acestora, disponibilitatea și utilizarea lor digestivă. Nu în ultimul rând contează satisfacția psihică și plăcerea consumului. Scopul principal al consumului de legume și fructe este acoperirea unor necesități nutritive și catalitice, în timp ce necesitățile energetice sunt asigurate, cu precădere, de alte grupe de alimente. **Valoarea dietetică** este o calitate

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naturală profilactică (preventivă) sau curativă a anumitor alimente. Ea poate fi și dobândită la alimentele dietetice, prin aplicarea unor tehnologii și cu respectarea riguroasă a normelor igienico-sanitare, respectiv a anumitor rețete aprobate de medicii specialiști. **Valoare nutraceutică.** Numeroase produse vegetale au intrat și încă mai intră în alimentația umană (de exemplu, urzicile, păpădia etc.), ca suplimente cu rol auxiliar în alimentație (vitaminizant, aperitiv, depurativ*, dar, uneori, și terapeutic). Textura sau gustul lor nu erau, inițial, foarte plăcute, ele nefăcând parte dintre alimentele consumate frecvent. Aveau o utilizare în care acest rol auxiliar prevala față de rolul alimentar propriu-zis, fiind consumate nu ca un scop în sine, ci pentru a avea un organism sănătos. **Valoarea medicinală** este subordonată valorii nutraceutice, unele alimente putând avea și calități de medicament, una dintre funcțiile posibile ale unui aliment fiind și cea terapeutică. Există și o importantă tradiție etnobotanică a medicinei populare din toate țările, care păstrează, din vechime, cunoștințele despre însușirile vindecătoare ale fructelor și legumelor, culese din natură sau cultivate.

Cuvinte cheie: valoare alimentară, nutritivă, nutraceutică, legume, fructe

The alimentary value. In order to be an aliment, a product must have at least three basic qualities: *innocuousness* (to be hygienic and unpolluted), *nutritive value* and *positive sensorial qualities* (good for taste) (Watson, 2001).

Diaconescu (1998) assesses that a food product has nine functions (Diaconescu, 1998): *Innocuousness* aims at the *hygienic-sanitary function* (1). *The nutritive value* aims at the *nutritive* (2), *plastic* (3), *energetic* (4) and *catalytic* (5) functions. We might also add here the *genesis-protection function* (6) and the *therapeutic* (7) one. *The positive sensorial qualities* are correlated with the *psycho-sensorial and aesthetic function* (8) and with the *symbolic function* (9).

We must mention that *the main purpose of the vegetable and fruit consumption is assuring some nutritive and catalytic needs*, whereas other foodstuff groups assure the energetic qualities (Watson, 2001).

The nutritive value. Nutrients (*nutricium* – nourishing, from Latin) or trophines (*trophe* – food, from Greek) are the substances from foods assuring a normal deployment of the biological processes from the human body and participate into the metabolic processes. To maintain a good health we need 50 nutrients that fall into six basic groups: glucides, protides, lipids, vitamins, minerals and water. They say that the most important trophines/nutrients are proteins with the necessary essential amino acids, lipids with the corresponding essential fatty acids, useful mineral salts, vegetal fibres and vitamins (Segal et al., 1983).

The nutrient content is not as important as the ratio between the compounds, their quality, availability and digestive use. Last but not least, the psychical satisfaction and the pleasure of consumption are also important.

The dietetic value is a natural prophylactic (preventive) or curative quality of certain foodstuffs. It may also be acquired for the dietetic foodstuff, by the application of some technologies and the rigorous abidance of the hygienic-sanitary norms, namely some recipes approved by the specialists. The goal of the

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food diet is the protection of the internal organs, first of those that participate directly or indirectly to digestion, of the blood-vascular system, etc.

Fruits and vegetables have a natural dietetic value through their significant content in minerals, alimentary fibres, pectic substances, essential amino acids, polyunsaturated fatty acids, vitamins, antioxidants (polyphenols, sulphur compounds, resveratrol), phytoncides (natural antibiotics), etc. It must not be regarded as something absolutely positive, because no exaggeration is well received (Favier et al., 1995).

According to Gonțea (1970) and Dumitrescu (1987), vegetables and fruits normally occupy about 14-17 % of the caloric value of the food ratio. Children, pregnant or breastfeeding women, as well as the workers from polluted or toxic sectors, should consume the maximum ratio (17%). They do not recommend a consumption exceeding 1.5 kg/day, since the intestinal transit may be troubled by an excessive fibre supply (Dumitrescu, 1987; Gonțea, 1970).

The nutraceutical value. Numerous vegetal products have entered and are still entering the human alimentation (for instance nettle, dandelion, etc), as supplements with an auxiliary role in alimentation (vitaminizing, stomachic, depurative* and sometimes therapeutic). Their texture or taste being not very pleasant, they were not consumed very frequently, being eaten in order to have a healthy stomach and body.

Among vegetables, salads, endives, spinach, garlic, onion, horseradish and broccoli (in fact, the entire cabbage group), green peppers, tomatoes, dill, thyme, basil and root crops (*Table 1*), artichoke, peppergrass, etc, and among fruits, walnuts, black currants, blackberries, savine and wild roses are only a few examples. The spicy-aromatic plants and spices represent on all the meridians a source of substances and active principles with an acknowledged value (Andreotti et al., 2006; Banu et al., 1971; Banu et al., 2000 ; Battino et al., 2004; Beceanu et al., 2003 ; Beceanu et al., 2003).

Among the tropical products, we enumerate the citric fruits (especially lemons, grapefruit, bitter oranges and bergamots), ginger, curcuma (from curry), pimento, papaya, etc.

Several processed products with nutraceutical role are red wine, paprika, green pepper pastes, black currant liquor, tomato products, blackberry products, edible walnut and grape seed oils, etc (Barberan and Robins, 1997).

At present, more and more nutraceutical foodstuffs are spread (non-alcoholic drinks, spice mixtures, sauces, especially prepared products) that include in their recipes certain components or natural substances with a medicinal effect, namely *tonic, stimulating, digestive or protector/antioxidant*, extracted from the best known and appreciated cultivated plants or from the spontaneous flora (Dejica, 2001; Florlani et al., 2003; Segal et al., 1986).

Table 1 - Dietetic and medicinal value of the main root crops (example)

Species	Main dietetic, medicinal and alimentary features
Carrots	Digestive, hepatic, diuretic, vitaminizing, anti-anaemic, depurative, detoxifying and emollient effect; dietetic product for children, sick people or workers in the toxic/radioactive environment
Early radishes	Vitaminizing, re-mineralizing effect; early vegetables
Radishes	Vitaminizing, re-mineralizing effect; anti-lithiasis, hepatic, pectoral product. It must be consumed all the year round
Beet	Re-mineralizing, general tonic, antibacterial, depurative, diuretic effect
Root of celery	Stimulating, general tonic, diuretic, glycaemia reducer effect; winter consumption
Root of parsley	Diuretic, tonic-stomachic, stimulating, anti-anaemic, vitaminizing, re-vitalizing, detoxifying effect; aromatizing stuff used in the canned food industry and gastronomy
Parsnip	Tonic, stomachic, depurative, detoxifying effect

*depurative = it cleans and eliminates toxins from the body, having a purifying role

The medicinal value is subordinated to the nutraceutical value and some foodstuffs may have medicinal qualities, one of the possible functions of a foodstuff being the therapeutic one. There is also an important ethno-botanical tradition of the folk medicine in all the countries, which has preserved from old times the knowledge about the healing features of fruits and vegetables, picked up from nature or cultivated. The entire group of the *Alliaceae* vegetables (garlic, onion, parsnip, etc) contains organic compounds with sulphur that intensify the redox cycle of glutathione and activate specific immunity types (Table 2). Their bioactivity includes an antioxidant, antibacterial, anti-carcinogenic, immunostimulating and liver protective potential. Garlic prevents heart diseases (atherosclerosis, hypercholesterolemia and high blood pressure) and cancer. Garlic is also considered an efficient remedy against the intestinal parasites (Olinescu et al., 1990; Picard, 2008; Proust, 2008).

Thyme is a selective disinfectant, irreplaceable in the intestinal infections. The large diversity of species of cabbage, broccoli, heads of cabbage (white, red and savoy), cauliflower of all colours and the Brussels sprout have an anti-radical activity proven by their remarkable contents in polyphenols, flavones and condensed tannins.

The anthocyanic pigments from the black grapes (and from many red/violet fruits) are used in the prophylaxis of many diseases, where the free radicals are involved for ameliorating the flexibility and reducing the permeability of capillaries for retina protection (the ocular vascularity). Flavonoides are the bioactive substances from citric fruits, tea and wine that have an anti-inflammatory activity fortifying the human body against allergies, viruses and the factors inducing tumours.

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Table 2 - Main phytoncides from the horticultural products cultivated in Romania

Name	Type of compound	Horticultural species	Action
alicyne	sulphur compound	garlic, onion	Bcd, Bst, Fcd, Fst
tetrahydroalicyne	sulphur compound	onion	Bcd, Bst, Fcd, Fst
dimethyl thiosulfinate	sulphur compound	onion	Bcd, Bst, Fcd, Fst
tomatidine	steroidal alkaloid	tomato	Fcd, Fst, (Bst)
sinigrine	sulphur glycoside	horseradish, radish, cabbage	Bcd (Bst)
pinene	cyclic terpene		Bst (Bcd)
derivatives of the cinnamic acid	phenolic substances		Bst (Bcd)
derivatives of the benzoic acid	phenolic substances	most of them are fruits and vegetables	Bst (Bcd)
flavans	phenolic substances	pigmented in yellow, red-violet or complementary hues	Bst (Bcd)
flavones and isoflavones	phenolic substances		Bst (Bcd)
anthocyanans	phenolic substances		Bst (Bcd)

Bcd=bactericide; Bst=bacterio-static; Fcd=fungicide; Fst=fungi-static

The health problems, related to the digestive system, such as constipation, or the nutrition ones, such as obesity, may be solved only by an adequate nutrition based on fruits and vegetables.

The accelerated aging, the cardio-vascular and degenerative diseases, many types of cancer (pulmonary, colon, stomach, prostate, breasts, etc.) may be prevented due to the antioxidant effect of carotenoids (β carotene, lycopene, etc), tocopherols, L-ascorbic acid, polyphenols, capsaicin, resveratrol and other constituents from the horticultural products. These also contain volatile oils, phytoncides, sulphur glycosides, etc (Dumitrescu et al., 1991).

Acting synergistically, beside other components known or in course of identification, the active principles may not and must not be purified because they might partially or totally lose their natural quality, fact demonstrated by the pharmacognosis specialists. They make appeal to additional treatments based on the cure of grapes, apples, blackberries, black currants, broccoli, carrots, etc. They know vegetables and fruits with diuretic, hypoglycaemic, hypotensive, anti-atherosclerotic effects that act against kidney diseases or stomach ulcers.

There are also exaggerations, when people assess the miraculous effect of these types of nutrition or treatments.

The energetic value does not confer in itself a special quality to foodstuffs. On the contrary, *processing, transformation and excessive refining that retains*

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only the caloric edible part creates irremediable nutritive prejudices. They come to the hardly understanding situation when, after refining, the separate elements are given back to some foodstuffs that are called “dietetic”. There are also special categories of “hypocaloric products”, among which some rely on *non-nutritive additives* (synthetic sweeteners, fibres, gums or extraction pectines, etc).

The classification by the energetic value falls into four categories: a) walnuts, peanuts, almonds and olives, avocados, beside some traditionally dehydrated assortments, such as raisins, figs, dates, have a *high* energetic value (thousands of Kcal/kg); b) grapes, late cherries, potatoes, peas and garlic have an *important* energetic value; c) most of the products may be considered to have a *medium* energetic value; d) cucumbers, pumpkins, tomatoes, radishes, mushrooms, the vegetables from which we consume only the leaves have a *reduced* energetic value.

The alimentary and dietetic value of the fresh products have no rival but their period of consumption is in many cases only of a few weeks or months. Outside the season, we have only two alternatives for consumption, the importation products or the canned ones. Nut family, shrub fruits as well as vegetables and aromatic plants are much more valuable for consumption in a fresh state (*Table 3*).

Table 3 - Contents of ascorbic acid and minerals in some wild fruits from the Neamț area (Beceanu et al., 2001-2003; Beceanu et al., 2003)

Product	Ascorbic acid (mg/100g of fresh product)	Total of mineral contents (g%)	K (mg/1g)	Ca (mg/ 1g)
Blueberries	45-61	1.0-1.4	522-550	6-9
Wild strawberries	55	Undetermined	Undetermined	Undetermined
Raspberry	39-59	Undetermined	Undetermined	Undetermined
Cherries	21-37	0.56-0.61	Undetermined	Undetermined

The industrial conservation has a differentiated impact from the alimentary and dietetic viewpoint, depending on the method. Many assortments (for instance, tomato or green pepper concentrates) are products with a significant dietetic value.

The household conservation still enjoys in many countries a good fame and its products are a basic attraction of the regional ethnic or rural tourism. The traditional household methods are ecologic by definition but sometimes we may notice the persistence or even the appearance of some less healthy practices (smoking, use of the acetylsalicylic acid = aspirin, etc). At the same time, these products are very non-homogenous from one household to another. While some of them represent real culinary masterpieces and examples of alimentary hygiene, other may hardly be consumed.

Table 4 - Nutritive value of some fresh and processed products from vegetables and fruits (according to Favier)

Product/ Content (g/100g)	Moisture	Proteins	Available glucides	Soluble glucides	Starch	Fibres	Lipids	SFA	MUFA	PUFA	Edible part %
Dry apricots without stones	23	4	39.3	39.3	0	13.7	0.6	traces	0.26	0.12	100
Fresh apricots	86.7	0.8	10	10	traces	2.1	0.1	traces	traces	traces	93
Dry plums	39	2.5	39.8	39.8	0	16	0.3	traces	0.2	0.06	83
Fresh Reine Claude plums	82	0.8	12	12	0	2.3	0.2	traces	traces	traces	96

Product/ Content (mg/100g)	Na	K	Mg	P	Ca	Fe	β carotene	B1	B2	B6	C	E	PP
Dry apricots without stones	14	1520	52	131	55	5.2	4.7	0.01	0.16	0.26	8	4.5	3.2
Fresh apricots	2	315	11	20	16	0.4	1.5	0.04	0.05	0.07	7	0.7	0.6
Dry plums	12	950	40	95	50	2.9	0.45	0.1	0.2	0.13	2	2.3	1.7
Fresh Reine Claude plums	1	243	8	25	13	0.4	0.18	0.05	0.03	0.05	5	0.5	0.5

Product/ Content (g/100g)	Moisture	Proteins	Available glucides	Soluble glucides	Starch	Fibres	Lipids	SFA	MUFA	PUFA	Edible part %
Fresh white grapes	79.3	0.6	16.1	16.1	0	0.9	0.7	traces	traces	traces	94
Fresh black grapes	80.7	0.6	15.5	15.5	0	0.4	0.7	traces	traces	traces	94
Black grapes (raisins)	15.5	2.6	65.8	65.8	0	6.7	0.5	0.16	0.14	0.14	100

Product/ Content (mg/100g)	Na	K	Mg	P	Ca	Fe	β carotene	B1	B2	B6	C	E	PP
Fresh white grapes	2	250	7	22	19	0.3	traces	0.04	0.02	0.1	4	0.7	0.3
Fresh black grapes	2	320	4	16	4	0.3	0.06	0.04	0.02	0.1	4	0.7	0.3
Black grapes (raisins)	23	783	31	85	40	2.4	0.01	0.11	0.14	0.22	4	0	0.94
Product/ Content (g/100g)	Moisture (g/100g)	Proteins	Available glucides	Soluble glucides	Starch	Fibres	Lipids	SFA	MUFA	PUFA	Edible part		
Almonds	5	19	4.5	2.8	1.7	15	53.5	4.2	36.6	10	39%		
Chestnuts	51.7	3	36.3	6.7	26.9	6	2.7	0.47	1	1.1	83%		
Peanuts	5	13	9	6	3	7.5	62	4.6	48.7	5.8	40%		
Walnuts	3.3	14.5	10.5	8.5	2	5.9	63.8	5.2	11.6	44.2	43%		
Product/ Content (mg/100g)	Na	K	Mg	P	Ca	Fe	β carotene	B1	B2	B6	C	E	PP
Almonds	6	800	250	470	250	4.2	0	0.21	0.78	0.11	traces	24	3.3
Chestnuts	9	500	33	74	40	0.9	0	0.2	0.1	0.33	traces	1.2	0.5
Peanuts	3	600	160	310	188	3.7	0.02	0.5	0.13	0.57	1	25	1.1
Walnuts	7	480	159	359	93	2.5	0.04	0.4	0.14	0.67	3	4.1	1.1
Product/ Content (g/100g)	Moisture	Proteins	Available glucides	Soluble glucides	Starch	Fibres	Lipids	SFA	MUFA	PUFA	Edible part		
Pasteurized pear nectar	82.3	0.2	15.7	15.7	0	0.3	0.1	traces	traces	traces	100		
Pasteurized apple juice	87.4	0.1	11	11	0	traces	traces	0	0	0	100		
Pasteurized grape natural juice	83.1	0.4	15	15	0	traces	traces	traces	traces	traces	100		

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Product/ Content (mg/100g)	Na	K	Mg	P	Ca	Fe	β carotene	B1	B2	B6	C	E	PP
Pasteurized pear nectar	3	75	4	6	5	0.1	5	0.01	0.02	0.01	2	Un-determined	0.1
Pasteurized apple juice	2	120	5	7	6	0.3	traces	0.02	0.02	0.05	traces	traces	0.15
Pasteurized grape natural juice	2	140	10	14	17	0.3	15	0.03	0.03	0.02	traces	traces	0.24
Product/ Content (g/100g)	Moisture	Proteins	Available glucides	Soluble glucides	Starch	Fibres	Lipids	SFA	MUFA	PUFA	Edible part %		
Fresh tomatoes	93.8	0.8	3.5	3.5	traces	1.2	0.3	traces	traces	0.14	97		
Canned peeled tomatoes	93.8	0.9	3	2.9	0.1	1	0.1	traces	traces	0.06	100		
Pasteurized tomato natural juice	93.5	0.8	4	4	traces	0.5	0.1	traces	traces	traces	100		
Boiled red pepper	90.7	1	5.8	5.7	0.1	1.9	0.3	traces	traces	0.17	80		
Boiled green pepper	92.2	1	2.6	2.4	0.2	2.2	0.3	traces	traces	0.17	80		
Fresh green, red, yellow peppers	91.6	0.9	4.9	4.8	0.1	2	0.3	traces	traces	0.15	85		
Boiled pepperts	91.5	1	4.8	4.7	0.1	2	0.3	traces	traces	0.17	85		
Boiled eggplants	93.3	1	3.1	2.8	0.2	2	0.2	0.03	0.02	0.08	77		
Fresh eggplants	92.7	1	3.1	2.8	0.3	2.4	0.2	-	-	0.09	83		

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Product/ Content (mg/100g)	Na	K	Mg	P	Ca	Fe	β carotene	B1	B2	B6	C	E	PP
Fresh tomatoes	5	226	11	24	9	0.4	0.6	0.06	0.05	0.08	18	1	0.6
Canned peeled tomatoes	101	239	12	20	16	0.7	0.30	0.05	0.03	0.06	13	1	0.71
Pasteurized tomato natural juice	280	230	10	18	13	0.5	0.25	0.05	0.03	0.1	14	0.5	0.7
Boiled red peppers	2	173	12	22	9	0.4	3.35	0.03	0.03	0.27	126	0.8	0.7
Boiled green peppers	6	153	10	17	9	0.4	3.25	0.01	0.02	0.24	72	0.84	0.2
Fresh green, red, yellow peppers	3	191	12	22	9	0.4	1.30	0.02	0.02	0.32	146	0.8	0.6
Boiled peppers	2	160	10	20	8	0.4	1.25	0.01	0.02	0.26	100	0.8	0.4
Boiled eggplants	3	210	10	19	8	0.3	0.04	0.06	0.03	0.08	2	0.03	0.6
Fresh eggplants	3	262	13	21	10	6.3	0.05	0.04	0.03	0.08	2	0.03	0.6
Product/ Content (g/100g)	Moisture	Proteins	Available glucides	Soluble glucides	Starch	Fibres	Lipids	SFA	MUFA	PUFA	Edible part		
Boiled peas	78	5.3	9.2	Un-determined	Un-determined	6.1	0.4	0.1	traces	0.2	40		
Fresh peas	74.5	6	12	Un-determined	Un-determined	6	0.7	0.13	0.07	0.35	35		
Frozen peas	79.9	5.4	8.7	Un-determined	Un-determined	4.7	0.5	0.1	traces	0.3	100		
Thermal-sterilized haricots	92.6	1.3	3.4	3.4	1.5	0.1	traces	traces	0.05	Un-determined			
Thermal-sterilized green beans	92	1.3	3.1	0.8	2.3	2.5	0.1	traces	traces	0.05	58		
Boiled green beans	90.4	1.8	3.9	2.5	1.4	3	0.2	0.06	traces	0.1	96		
Fresh green beans	90.3	2.1	3.6	2.2	1.4	1.4	0.2	0.06	traces	0.1	90		
Frozen green beans	89.6	2	4.1	2.4	1.7	3.6	0.2	traces	traces	0.11	100		
Boiled and frozen green beans	90.8	1.6	2.8	1.3	1.5	4	0.1	traces	traces	traces	100		

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Product/ Content (mg/100g)	Na	K	Mg	P	Ca	Fe	β carotene	B1	B2	B6	C	E	PP
Boiled peas	3	190	26	113	25	1.5	0.30	0.25	0.11	0.09	14	0.2	2
Fresh peas	2	300	34	126	26	1.9	0.38	0.4	0.14	0.16	32	0.2	2.2
Frozen peas	3	197	26	91	24	1.6	0.36	0.26	0.1	0.1	18	0.1	1.7
Thermal-sterilized haricots	262	120	14	17	34	0.8	0.15	0.02	0.07	0.04	5	Un-determined	0.2
Thermal-sterilized green beans	307	107	13	22	43	1.6	0.26	0.02	0.05	0.51	2	0.16	0.2
Boiled green beans	3	240	20	40	40	1.2	0.33	0.06	0.07	0.06	10	0.2	0.6
Fresh green beans	4	243	28	38	56	1	0.34	0.08	0.1	0.14	16	0.24	0.7
Frozen green beans	4	204	20	33	47	0.8	0.28	0.08	0.1	0.12	11	0.2	0.5
Boiled and frozen green beans	10	122	16	23	46	0.7	0.17	0.05	0.08	0.06	8	0.11	0.43

Product/ Content (g/100g)	Moisture	Proteins	Available glucides	Soluble glucides	Starch	Fibres	Lipids	SFA	MUFA	PUFA	Edible part
Cabbage boiled in water	92.7	1	3	3	-	2.4	0.3	-	-	0.15	82
Fresh cabbage	90.6	1.4	4	4	-	3	0.3	0.04	0.01	0.15	80
Brine cabbage	91.4	1.3	1.7	-	-	2.2	0.3	0.1	-	0.2	100
Boiled cauliflower	92.7	2	1.8	1.6	0.2	2.6	0.3	0.05	0.02	0.15	60
Fresh cauliflower	91.9	2.4	2.3	2	0.3	2.4	0.3	0.05	0.02	0.15	60
Frozen cauliflower	92.5	2	2.1	1.8	0.3	2.3	0.3	-	-	0.14	100

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Product/ Content (mg/100g)	Na	K	Mg	P	Ca	Fe	β carotene	B1	B2	B6	C	E	PP
Cabbage boiled in water	3	140	9	29	37	0.4	12	0.03	0.02	0.1	33	0.7	0.2
Fresh cabbage	10	250	13	36	52	0.5	15	0.05	0.03	0.15	57	0.9	0.38
Brine cabbage	550	215	11	30	36	0.5	0.02	0.03	0.06	0.17	17	0.1	0.17
Boiled cauliflower	8	200	10	40	16	0.4	36	0.05	0.05	0.17	38	0.11	0.4
Fresh cauliflower	14	319	15	48	20	0.5	40	0.1	0.07	0.22	50	0.17	0.6
Frozen cauliflower	24	193	12	35	22	0.5	18	0.05	0.07	0.12	47	0.12	0.43
Product/ Content (g/100g)	Moisture	Proteins	Available glucides	Soluble glucides	Starch	Fibres	Lipids	SFA	MUFA	PUFA	Edible part %		
Boiled carrots	90.5	0.8	5	4.7	0.3	27	0.3	0.05	0.02	0.12	85		
Fresh carrots	89.2	6.8	6.6	6.4	0.2	2.6	0.3	0.05	0.02	0.12	98		
Thermal- sterilized carrots	92.2	0.6	4.5	4.1	0.4	1.7	0.3	0.06	0.02	0.14	63		
Boiled beet	88	1.5	7.6	7.2	0.4	1.7	0.1	-	-	-	80		
Fresh beet (<i>B. V. var.</i> <i>Cicla</i>)	92.4	2.1	2.7	0.5	2.2	1	0.2	-	-	-	92		
Boiled celery	94.8	0.8	1.2	1.2	traces	2.2	0.1	traces	traces	traces	80		
Fresh celery	88	1.5	2.4	1.9	0.5	5	0.3	Un- determined	Un- determined	Un- determined	73		

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Product/ Content (mg/100g)	Na	K	Mg	P	Ca	Fe	β carotene	B1	B2	B6	C	E	PP
Boiled carrots	37	169	9	31	29	0.5	8.80	0.06	0.02	0.13	2	0.5	0.5
Fresh carrots	35	286	10	16	27	0.3	10.00	0.1	0.05	0.16	7	0.5	0.6
Thermal-sterilized carrots	310	121	6	18	23	0.7	6.30	0.02	0.03	0.08	2	0.5	0.3
Boiled beet	64	279	22	24	14	0.7	0.02	0.03	0.03	0.03	5	0.04	0.3
Fresh beet (B. V. var. Cicla)	170	378	81	43	80	2.3	4.81	0.07	0.13	0.1	35	0.03	0.4
Boiled celery	81	265	13	27	43	0.3	0.06	0.04	0.04	0.07	6	0.19	0.31
Fresh celery	100	321	12	63	43	0.7	0.02	0.05	0.06	0.17	8	0.36	0.8

Product/ Content (g/100g)	Moisture	Proteins	Available glucides	Soluble glucides	Starch	Fibres	Lipids	SFA	MUFA	PUFA	Edible part %
Boiled spinach	91.3	2.8	0.8	0.7	0.1	3	0.3	0.06	0.01	0.14	80
Fresh spinach	91.7	2.7	0.8	0.7	0.1	2.6	0.4	0.08	traces	0.2	80
Frozen spinach pieces	91.7	2.8	1	0.9	0.1	3	0.3	traces	traces	0.13	100

Product/ Content (mg/100g)	Na	K	Mg	P	Ca	Fe	β carotene	B1	B2	B6	C	E	PP
Boiled spinach	57	313	46	42	112	2.4	4.46	0.07	0.18	0.18	10	1.8	0.5
Fresh spinach	65	529	58	52	104	2.7	4.05	0.1	0.22	0.2	40	1.8	0.7
Frozen spinach pieces	56	380	41	43	114	2.4	4.42	0.08	0.16	0.18	28	1.8	0.5

Product/ Content (g/100g)	Moisture (g/100g)	Proteins	Available glucides	Soluble glucides	Starch	Fi- bres	Lipids	SFA	MUFA	PUFA	Edible part
Boiled onion	89.9	1	6.1	6	traces	1.6	0.2	traces	traces	0.07	90
Fresh onion	89	1.3	7	7	traces	1.8	0.2	traces	traces	0.07	92

Product/ Content (mg/100g)	Na	K	Mg	P	Ca	Fe	β carotene	B1	B2	B6	C	E	PP
Boiled onion	4	118	11	31	23	0.3	0.004	0.04	0.02	0.1	5	0.1	0.2
Fresh onion	6	170	10	33	25	0.3	0.009	0.06	0.02	0.14	7	0.14	0.3

Product/ Content (g/100g)	Moisture (g/100g)	Proteins	Glucides available	Soluble glucides	Starch	Fibres	Lipids	SFA	MUFA	PUFA	Edible part %
Hotchpotch	86.6	2	8.5	3.6	4.9	1.7	0.3	0.06	traces	0.15	70%

Product/ Content (mg/100g)	Na	K	Mg	P	Ca	Fe	β carotene	B1	B2	B6	C	E	PP
Hotchpotch	122	214	20	42	24	1	1.35	0.05	0.05	0.06	5	0.5	0.61

SFA = Saturated fat acids; MUFA = Mono unsaturated fat acids; PUFA = Poly-unsaturated fat acids

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If we make a comparative study on the quantitative values referring to the nutrients (trophines) from fresh or processed vegetables and fruits, starting from data supplied by Favier (1996), we will notice more aspects (*Table 4*):

1. In dehydrated fruits, there are much higher values both for proteins, glucides or fibres and for some vitamins, as compared to fresh fruits; despite all these, there are some vitamins, which are diminished by dehydration, among which we mention vitamin C and most of the vitamins B.

2. The nut family fruits have an exceptional nutritive value, both as concerns the mineral content and the content in mono- and polyunsaturated fatty acids, liposoluble vitamins and other valuable components.

3. Nectars and juices are partially denatured processed products, as compared to the natural content of the fresh raw material with very important components such as vegetal fibres, vitamins or the mineral content; moreover, adding foreign components to the fruit is allowed in nectars.

4. A general view over the processed products from vegetables, as compared to the fresh products, leads us to the conclusion that the diverse conservation methods diminish very clearly the contents in trophines (nutrients). However, we must point out their value, even partially nutritive, which is irreplaceable outside the season, when we cannot enjoy the fresh products; in fact, this is the purpose of conservation by thermal sterilization, freezing, pickling, etc, to assure a human nutrition under conditions close to the natural ones, but unable to attain them (from case to case) (*Table 5*).

Table 5 - Modification of the content in ascorbic acid for some products by industrialization (According to Beceanu et al.)

Name of product	Ascorbic acid (mg/100 g product)
Fresh cauliflower	84.6
Fresh red pepper	76.26
Fresh green pepper	81.40
Cauliflower in vinegar	15.84
Chilli peppers in vinegar	39.60
Cucumbers in vinegar	3.52
Pickles	12.7
Chilli peppers in vinegar	39.6
Quarters of capsicum in vinegar	56.99
Chilli pepper paste	4.62
Asparagus in water	52.8
Haricots	0.24

CONCLUSIONS

Vegetables and fruits are a foodstuff category, which is noticed by its unique content, as compared to other food sources, in vegetal fibres, mineral elements, vitamins and trophines (nutrients).

We might speak of the medicinal and nutraceutical importance of these products, which are more and more studied and used in the latest years.

Through conservation, the horticultural products may partially lose their alimentary value.

There are conserved products, such as dry fruits, that are real food concentrates. We might say the same thing about the vacuum concentrated products. They are irreplaceable foodstuffs during winter.

At the opposite pole, there are the partially denatured products, including as concerns their nutritive aspect, as compared to the fresh ones, among which we enumerate juices and nectars. Although partially valuable as concerns their nutritive value, foodstuffs are worthy of our attention.

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