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REVIEW REGARDING THE IDENTIFICATION OF VEGETABLES WITH HIGH QUANTITIES NITRATES IN ROMANIA

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Abstract*: By eating plants or drinking water containing high contents of nitrates or nitrites, the nitrogen enters in the body, it combines with hemoglobin, resulting in a stable compound methemoglobin, so that the bodies present specific phenomenon anemia. Nitrates and nitrites are used as preservatives in the food industry; in such corned nitrosamines were identified health risk to consumers. To reduce the concentration of residual nitrites in meat products it was questioned the use of vegetables as natural sources of nitrite and bring added value to the food. The paper presents the research of our country on nitrate and nitrite content, nutritional value, agro cultivars used and methods used in the culture of vegetables in our country. Since the nitrates and nitrites are found mostly in vegetables that consume leaves and plant parts it finds more raw sap (root, leaf petiole, language) shows a group of vegetables valued as containing average content or high nitrates and nitrites.*

Keywords: Methemoglobin, natural preservatives,, nitrates, nitrites.

1. Introduction

One of the plant nutrients is nitrogen. It is found in soil organic matter (humus or organic waste) or mineral compounds (nitrates, nitrites, ammonia etc.)

Administered in the form of chemical or organic fertilizers contribute to increased production, but can be leached, reaching groundwater or driven by water currents above the ground, can be reached water in lakes and rivers, polluting them. When it is accumulated in large quantities it is accumulated in plants. By eating plants or water consume which containing high quantities of nitrates and nitrites, enters on the human body, it combines with hemoglobin results methemoglobin. In contrast to hemoglobin, which is combined with oxygen in the lung, which then gives it tissues, methemoglobin is a stable compound; as a result, part of the hemoglobin is converted to methemoglobin and bodies presented specific phenomena anemia - sometimes very serious - that may increase mortality of young bodies - children and animals. [20].

Nitrates toxic action on man shows when consuming more than 200-300 mg. N as NO_3 on 100 g dry for 24 ore. Fertilization with nitrates - decrease Mo in plant content. (Fritz et al, cited by Lixandru Gh., [11]. Literature cites the case of people

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living on a lake in North America, lake polluted by nitrogen from agricultural land nearby. Fertilizers where nitrogen is applied once the crop over the required dose. Residents drank water from the lake and as a result, infant death increased from 2 ‰ to 5 ‰. When fertilizers were applied fractionated, then infant mortality fell within the area. [7].

As noted previously, nitrate and nitrite content of plants depends on the amount of nitrogen in the soil. Research conducted by Alexandrina Vasu [21] found 20-30 % of hemoglobin of lactating dairy cows blocked as methemoglobin when on fertile soils were applied high nitrogen fertilizer doses. Thus, although there were obtained high yields of forage, they nitrate content and livestock production was affected.

Under the *law tolerance*, any vegetation factor in terms of quantity / intensity shows a minimum (an area where there is deficiency), then an optimum and, when the amount / intensity continues to increase, it becomes toxic and then became lethal. In what concerns nitrogen, optimum plant does not correspond to the optimum for the consumer, because the content of nitrates and nitrites in plant can be toxic to the consumer. It must therefore know at what level (at which point) of the curve tolerance is achieved acceptable concentration for the consumer. So it must know the content of nitrogen in the soil.

Total nitrogen content in the soil concerned agronomy specialists since the nineteenth century. This content is the content of humus and mineralization conditions. humus content and total nitrogen in the main soil types in our country are shown in Table 1.

Table 1. Humus content and total nitrogen of the main soil types in our country after Ionescu-Șișești Gh., Staicu Ir., [10]

Soil Type	**Humus content in soil (%)**	**Total nitrogen content from soil (%)**
Sol-brown steppe	2-4	0,190
Brown Chernozem	3-5	0,210
Chernozem chocolate	5-7	0,230
Chernozem	6-8	0,278
Chernozem degraded (leachate)	5-7	0,290
Reddish-brown soil Forest	2-4	0,162
Podsol from Gaesti	2-3	0,118

Plants accumulate different nitrate (NO_3), plant tissue accumulation is dependent on genetic factors, environment (humidity, temperature, radiation, light exposure period) and agricultural (dose and chemical form of nitrogen compounds using, summer use of herbicides). [12]

By appropriate agro-technical measures can increase soil nitrogen content, can raise all kinds of soil fertility. This is the case in vegetable growing, where large

amounts of fertilizer are used, both organic and mineral, so the probability that plants have a high content of nitrate is increased.

Growing conditions also intervene in this sense in greenhouses and solariums amount of manure administered reach 80-100 t / ha, while in field is 40-45 t / ha. Following lettuce grown in greenhouses has a higher content of nitrates compared to the cultivated field. [6, 13]

Nitrates and nitrites are used as preservatives in the food industry because: 1) release nitric oxide (NO) with myoglobin forms nitrozmioglobina, offering meat and meat products pink color, very appreciated by consumers; 2) controls the oxidation of lipids; 3) antimicrobial effect; 4) enhance the flavor of meat and meat products.

The use of nitrates for preserving meat is more limited because they are stable and the release of NO is produced by fermentation processes. Reduction of nitrate to nitrite under the action of the natural enzymes present in meat or under the action of the bacteria that possess nitrate reductase, added later in the flesh [9, 16]. Currently, the use of starter cultures possess nitrate reductase is the most common method of preserving meat products, nitrite, nitrate and not being true conservation ingredient.

Since 1971 nitrites in cured meat nitrosamines were identified health risk to consumers. Nitrosamines compounds, potentially carcinogenic, are formed under specific conditions of pH and temperature, from the reaction of secondary amines with nitrite ion. If there corned sufficiently high concentrations of residual nitrite cooked at t> 130^{o}C, the probability that there are nitrosamines is higher. [19]. For this reason, researchers have put the issue of reducing the concentration of residual nitrites in meat products by using natural sources of nitrite provide, by their composition a higher value to food.

Thus, to avoid the consumption of nitrate and nitrite in dangerous quantities for human health by Order No.1 / 2002 of the Ministry of Health regarding food safety [23], were established maximum limits for nitrates allowed in some fresh fruit and vegetables for marketing and human consumption. (Table 2).

Table 2. Maximum levels of nitrates allowed in some fresh fruit and vegetables for marketing and human consumption. (mg NO_3 / kg fresh product). [23].

Product	**Cultivated in**	
	Field	Greenhouse
Peppers (bell peppers, green peppers, kapia, hot)	150	400
Potatoes	300	-
Cucumbers	200	400
Dehydrated onion	80	-
Cauliflower	400	400
Courgettes	500	-
Carrots	400	-

Lettuce	2.000	3.000
Red beets	2.000	-
Spinach	2.000	3.000
Tomatoes	150	300
Cabbage	900	-
Eggplant	300	400
Apples	60	-
Pears	60	-
Watermelon red	100	-
Grapes	60	-

Table 3 shows the nitrate content of several basic production vegetable plants.

Table 3. The content of nitrates in the basic production (mg / kg crude – grass product, unprocessed) [22]

High (up to 5000)	**Medium (300-600)**	**Low (80-100)**
Lovage (*Levisticum*)	Cauliflower	Brussels sprouts
Cress (*Lepidium sativum*)	Courgettes	Garden peas
Lettuce *(Lactuca sativa ssp. capitata)*	Pumpkin	Beans
Spinach	Japanese radish	Potato
Beet	*Brassica napus var. Napobrassica*	Tomato
Peas	Parsnip	Onion bulbs (*Allium cepa L.*)
Cabbage *(Brassica oleracea* var. *Acephala)*	Horseradish	Melon (*Cucumis melo*)
Green onion	Head cabbage	Watermelons (*Citrulus sp.*)
Radishes	Carrot *(Daucus carota ssp. sativus)*	Berry fruits (boabe)
	Cucumbers	

Generally, the vegetables accumulated large amounts of NO_3. In Romania, the highest NO_3 concentrations were observed in lettuce, spinach, root [12] and tomatoes [17].

The fruits young, very young cucumbers, harvested once formed, green tomatoes and young tissues generally have higher nitrate concentrations [14].

Large quantities of nitrates are found mostly in vegetables that consume leaves (Table 3) and in parts of the plant where the raw sap finds much (root, leaf, petiole and limb). [22].

2. Material and method

To identify the potential of nitrate and nitrite accumulation in vegetables grown in greenhouse, solarium or field in Romania, there were used dates from the literature of our country during about ten years. [1, 2, 3, 4, 8, 14]

3. Results and Discussion

Chirică Barbu Mileva et al. [4] monitored the quality characteristics of some cultivars of tomato products in solarium and greenhouses supplying markets in Bucharest. Table 4 presents some results of analyzes performed.

Table 4. Analysis of nitrates, phosphorus and potassium in tomato fruits harvested at three periods. Averages on the cultivar [4].

	Culture	**Cultivar**	**$N\text{-}NO_3$ ppm**	**$P\text{-}PO_4$ ppm**	**K, ppm**
The first measurement - The beginning of harvest (20 May 2012)					
1	Solarium	Siriana F1	146.7	156.3	973
2	Solarium	Arletta F1	138.3	175.8	086
3.	Greenhouse	Siriana F1	144.3	170.2	1008
4.	Greenhouse	Katerina F1	145.2	165.3	1102
A second determination - Maximum harvest (05.June.2012)					
1	Solarium	Siriana F1	128.2	196.5	1950
2	Solarium	Arletta F1	104.0	198.7	1870
3	Greenhouse	Siriana F1	109.3	200.1	1960
4	Greenhouse	Katerina F1	119.3	189.3	1890
A third determination - End of harvest (15.June.2012)					
1	Solarium	Siriana F1	98.3	220.4	1489
2	Solarium	Arletta F1	100.7	210.5	1503
3	Greenhouse	Siriana F1	87.6	219.3	1574
4	Greenhouse	Katerina F1	101.3	215.3	1687
Maximum permissible limits according to the literature			**C.M.A. – 300 ppm**	**200-400 ppm**	**1000-2000 ppm**

It is noted that the nitrates decreased quantify which is attributed to the appropriate fertilization and metabolism of this compound during the ripping.

Phosphates increase during the process, and potassium content increased to the second measurement, and then lowers, while remaining at values higher than initial period.

Soluble carbohydrate content (%), vitamin C (fresh produce), lycopene (ppm) and carotene (fresh produce) is presented in Table 5.

Table 5. The content of soluble carbohydrates, vitamin C, lycopene and carotene in tomato fruits grown in greenhouses and solariums. [4]

Culture	**Cultivar**	**Soluble carbohydrates %**	**Vitamin C mg/100 g f.p.**	**Carotene f.p.**	**Licopene (ppm)**
Greenhouse	Katerina F1	4.79	15.2	8.24	24.98
Greenhouse	Siriana F1	4.78	12.8	7.95	22.37
Solarium	Arletta F1	4.81	12.4	7.52	13.00
Solarium	Siriana F1	4.58	14.2	8.12	10.92

These data indicate the nutritional value of tomatoes, showing that these vegetables as sources of nitrate are also a source of nutrients and vitamins.

Tables 4 and 5 shows the variability of the content of mineral elements, carbohydrates, vitamins and provitamins, depending on the cultivar.

Neaţă Gabriela et al., [14] analyzing some vegetables from the markets of Romania, found quantities of nitrates and nitrites which are shown in Table 6.

Table 6. Contents of nitrate and nitrite in some vegetables from the markets of Romania [14]

No.	Product	ppm NO_3^-	M.A.L. NO_3^-	ppm NO_2^-	M.A.L. NO_2^-
1.	Lettuce cultivar iceberg *	1878+/-79	3000	0.12+/-0.02	0.5
2	Lettuce cultivar Mona *	1567+/-56	3.000	0.18 +/-0.08	0.5
3	Lettuce cultivar Marula **	789+/-92	2.000	0.23 +/-0.07	0.5
4	Tomatoes Amanda*	267+/-13	300	0.12 +/-0.05	0.5
5	Tomatoes Tovi Roca*	195+/-14	300	0.21 +/-0.06	0.5
6	Tomatoes Lady Rosa*	258+/-15	300	0.18+/-0.06	0.5
7	Tomatoes Menhir*	289+/-15	300	0.23 +/-0.04	0.5
8	Tomatoes Siriana F1 **	98+/-17	150	0.19 +/-0.06	0.5
9	Tomatoes Arletta F1**	112+/-19	150	0.22 0.08	0.5
10	Carrots De Nantes	323 +/- 7	400	0.25+/- 0.10	0.5
11	Carrots Narbonne	253+/-12	400	0.26+/-0.08	0.5

* Culture in the solarium or in green house ** Culture in field

It is noted that all species that have been made analysis containing both nitrates and nitrites. In field crops, nitrate and nitrite content is generally low.

Biochemical characteristics of tomato paste, juice and other products marketed in some European countries are shown in Table 7.

Table 7. Biochemical characteristics of tomato paste, juice and other products sold in our country [8]

Variant	Carbohy-drates **%**	% Acidity	% Vitamin C, mg / 100 g fresh weight	Lycopene mg / 100 g fresh weight
Ketchup, Bulgaria	4.2	0.6	37.25	166.4
Pizza juice, Italy	4.8	0.5	43.25	328.7
Spaghetti juice, Romania	3.9	0.7	45.13	175.4
Tomato pasta (Olimpia), 3 %	4.5	0.5	36.89	345.2
Tomato pasta (Sultan), 24 %	4.3	0.6	32.45	287.3
Pomodore for pizza	4.3	0.6	44.56	214.5
Pasta Maxim 22-24 %	4.7	0.7	50.25	214.7
Tomato juice, Romania	4.2	0.5	43.12	78.3
Peeled tomato	4.2	0.8	52.14	89.3

Table 8. Chemical characteristics of tomato paste, juice and other products sold in our country [7]

Variant	**pH**	**N-NO_3^- ppm**	**P ppm**	**K ppm**	**Ca ppm**	**Mg ppm**	**Na ppm**
Ketchup, Bulgaria	4.2	60.7	86.5	1970	168.4	213.7	70.2
Pizza juice Italy	4.2	58.9	80.7	2110	176.5	243.5	67.5
Spaghetti juice Romania	4.0	60.2	98.7	2450	210.2	324.5	68.2
Tomato pasta (Olimpia), 33%	3.9	142.0	1631.0	10400	1234.5	634.2	124.7
Tomato pasta (Sultan), 24 %	3.7	115.9	1767.0	22400	1154.8	598.3	146.7
Pomodore for pizza	4.0	102.6	95.7	4200	978.4	367.2	79.2
Pasta Maxim 22-24 %	3.9	95.0	1942	9000	1067.8	432.6	116.8
Tomato juice, Romania	4.2	56.9	98.7	2740	123.7	256.9	65.3
Peeled tomato	4.1	95.6	115.34	134.5	134.5	267.5	70.4

From the tables 7 and 8 apparent high nutritional value of tomato products from industrialization of tomatoes and also presents nitrates N-NO_3 contents.

Research conducted on the quality of carrot cultivars used in Dobrogea, [1] refers to the agrochemical characteristics as well as biochemical and yields obtained. Table 9 presents agrochemical characteristics and Table 10 - biochemical characteristics.

Table 9. Agrochemical Characteristics of some cultivars of carrot used in Dobrogea [1]

Variant	Cultivar	Content ppm		
		$N\text{-}NO_3^-$	$P\text{-}PO_4$	K
Ct	De Nantes	78	268.31	2450
V1	Belgrad F1	76	318.32	2980
V2	Marion F1	101	298.50	2540
V3	Canada F1	95	246.21	2380
V4	Florida F1	98	265.10	235

Table 10. Biochemical Characteristics of carrot cultivars used in Dobrogea [1]

Variant	Cultivar	Carbo-hydrates %	% Acidity	% Vitamin C, mg / 100 g fresh weight (malic acide)	Carotene mg / 100 g fresh weight
Ct	De Nantes	5.8	0.46	185	8.50
V1	Belgrad F1	5.9	0.52	293	7.20
V2	Marion F1	6.2	0.65	250	9.12
V3	Canada F 1	8.2	0.57	199	10.60
V4	Florida F1	7.1	0.61	260	9.80

Table 11. The yields of carrot cultivars used in Dobrogea [1].

Variant	Cultivar	Yield t/ha	Procent	Dif. +/-	Signification
Ct	De Nantes	17.6184	100.00	-	-
V1	Belgrad F1	17.7704	100.86	+ 0.152	ns
V2	Marion F1	16.2592	92.28	- 0.0892	0
V3	Canada F1	18.1888	103.34	+ 0.5704	ns
V4	Florida F1	17.9824	102.06	+0.364	ns

From Tables 9, 10 and 11 there is a nitrate content below the limits set out in Ord. No. 1 of 3 January 2002.

Research on biological culture of carrots was the subject of Câmpeanu Gh. et al. [3]. The result carrots quality analyzes presented in Tables 12 and 13.

Table 12. Nutrient content of carrots in unchanged form. [3]

Variant	$N\text{-}NO_3^-$ Ppm	$P\text{-}PO_4$ ppm	K ppm
Crop growing stage intermediate (carrots the size of a pencil)– 08.June.2012-			
Ct	115	64.4	2020
1. 4 kg. cattle manure / m^2	117	108.0	2300
2. 6 cattle manure / m^2	151	110.0	2220
3. 8 cattle manure / m^2	126	92.8	2140
4. 2 kg. chicken manure / m^2	154	96.8	1860
5. 3 kg. chicken manure / m^2	158	71.2	2060
6. 4 kg, chicken manure / m^2	174	64.8	2100
Final harvest – 13.97.3012			
Ct	141	313.6	2340
1. 4 kg. cattle manure / m^2	107	385.2	2980
2. 6 cattle manure / m^2	167	387.6	3440
3. 8 cattle manure / m^2	187	312.8	2220
4. 2 kg. chicken manure / m^2	183	292.4	2660
5. 3 kg. chicken manure / m^2	166	298.8	1880
6. 4 kg, chicken manure / m^2	308	176.8	1600

From Table 12 shows that the largest amounts of $N\text{-}NO_3$ variants are fattened with manure from chickens and $P\text{-}PO_4$ and K variants fertilized with cattle manure. These elements are in greater quantities in the final harvest.

Table 13. Biochemical characteristics of final harvesting carrots. [3]

Variant	Sugar %	Vitamin C mg/100 g fresh product	Acidity %
Ct	5,468	0,015	0,1157
1. 4 kg. cattle manure /m^2	5,531	0,0225	0,1447
2. 6 cattle manure / m^2	5,843	0,015	01519
3. 8 cattle manure / m^2	5,593	0,025	0,1302
4. 2 kg. chicken manure / m^2	5,718	0,015	0,1447
5. 3 kg. chicken manure / m^2	5,781	0,0225	0,1302
6. 4 kg, chicken manure / m^2	5,593	0,0225	0,1013

The data in Table 13 indicates a high nutritional value in all variants fattened.

Influence of fertilization system on the quality of cucumbers grown in southern Romania was studied by Gh. Câmpeanu et al. [2]. Variants of the experience are shown in Table 14.

From Table 15, it follows that at cucumbers, the highest content of N-NO_3, P-PO_4 and K variants found in classic variants, especially the cultivar Mirabelle F1. Triumph cultivar F1 evidenced by the high content of K in under the influence of fertigation.

Table 16 highlights the most high carbohydrate and soluble solids in organic fertilization variants, the higher acidity under the influence of classical fertilization and the highest content of vitamin C in fertigation variants.

The conclusions drawn from Table 3 are that nitrates are found in greater quantities in plants that consume the leaves, and plant parts where there is plenty of raw sap (root, leaf petiole and limb), consider we can appreciate vegetables that are medium or high content of nitrates and nitrites.

Table 14: Experimental variants [2].

Variant	Fertilization	Cultivar	Fertilization scheme
11	Organic	*Triumf F1*	20 t/ha manure
12		*Mirabelle F1*	
21	Classic	*Triumf F1*	- Fertilizer Complex: 15-15-15, 250 kg / ha applied to crop establishment. - Two fertilization, 100 kg / ha with the same fertilizer, wide three six weeks after transplanting.
22		*Mirabelle F1*	
31	Fertigation	*Triumf F1* *Mirabelle F1*	- Fertigare S (Starter) - 15 N; 30 P_2O_5; 15 K_2O - with after transplanting to encourage root formation area. - Fertigare I – 14 N; 11 P_2O_5; 25 K_2O – to promote vegetative growth after transplanting on; - Fertigare II – 24 N; 8 P_2O_5; 16 K_2O – to foster enjoyment.
32			

I used vegetable group in [5].

Vegetables from cabbage group:

They have, in general, an average content of nitrates.

-White cabbage, head cabbage *Brassica oleracea L. White,* var.*capitata* L. f. *alba* DC

- Red cabbage *Brassica oleracea var. capitata* L.-f .*rubra* L

- Savoy cabbage, kale, *Br. oleracea* L.,. convar.*capitata* (L.) Alef. var. *sabauda* L.

- Brussels spyouts, Brussels cabbage *Brassica oleracea* L. var *gemmifera* DC

- Kale, scoth kale, curlies, cabbage for leaves *Brassica oleracea* L., convar *acephala* (D.C.) Alef. var. *sabellica* L

- Chinese cabbage *Brassica rapa* l., ssp. *pekinensis* (lour) Hanelt; ssp. *chinensis* (L) Hanelt.

- Cauliflower *Brassica oleracea* L., var. *botrytis* (L.) Miller, subvar. *cauliflora* Alef.

- Broccoli *Brassica oleracea* L., convar. *botrytis* L. var. *cymosa, Duchesne* (1875); sin. var. *italica* Plench (1808)

- Kohlrabi, turnip rooted cabbage, kale *Brassica oleracea* L., convar. *caulorapa* (D.C.) Alef., var. *gongylodes* L.

Table 15. Agrochemical characteristics of harvesting cucumbers [2].

Var.	Fertilization	Cultivar	Content. ppm								
			N-NO3			P-PO4			K		
			Min..Max	Medium	%	Min..Max	Medium	%	Min..Max	Medium	%
V_{11}	Organic	Triumf F_1	75..102	87	100.00	146.23...168.12	154.53	100.00	888...932	920	100.00
V_{12}		Mirabelle F_1	88...110	95	100.00	114.56...136.15	124.56	100.00	995...1120	1060	100.00
V21	Classic	Triumf F_1	198...265	252	289.65	162.12....185.54	173.62	112.53	2245...2580	2400	260.86
V22		Mirabelle F_1	185...245	233	245.26	198.23....224.20	214.52	172.22	1996...2170	2060	194.33
V_{31}	Fertirigation	Triumf F_1	140...168	153	175.86	165.12....189.23	173.00	112.17	2010...2156	2100	228.26
V_{32}		Mirabelle F_1	101...119	114	120.00	159.56....225.86	200.13	160.67	1850...2010	1850	174.52

Table 16. Biochemical characteristics of cucumber harvest [2]

Var	Fertilization	Cultivar	Soluble carbohydrates %			Acidity %			Vitamin C, mg ascorbic acid /100g f.p.			Dry matter %		
			Min..Max	Media	%	Min..Max	Media	%	Min..Max	Media	%	Min..Max		%
V_{11}	Organic	Triumf F_1	2.9..3.06	3.05	100.00	0.27...0.32	0.30	100.00	18.55..18.85	18.65	100.00	3.08..3.14	3.12	100.00
V_{12}		Mirabelle F_1	2.89..3.1	3.02	100.00	0.25...0.29	0.28	100.00	18.70..19.15	18.95	100.00	3.16...3.28	3.25	100.00
V21	Classic	Triumf F_1	2.68..2.86	2.78	91.14	0.35..0.42	0.39	130.00	18.07..18.20	18.15	97.32	2.98..3.04	3.01	96.47
V22		Mirabelle F_1	2.75..2.88	2.85	94.37	0.38...0.41	0.40	142.85	18.12..18.45	18.35	184.69	2.92..3.02	2.98	91.69
V_{31}	Fertirigation	Triumf F_1	2.36..2.52	2.48	81.31	0.33...0.37	0.35	116.66	19.55..19.86	19.70	105.63	2.85..2.92	2.85	91.34
V_{32}		Mirabelle F_1	2.26..2.32	2.29	75.82	0.29...0.32	0.31	110.71	19.12..19.35	19.26	101.63	2.70..2.80	2.74	84.30

Varieties underlined that consume leaves, we believe - based on Table 3 - that have a higher content of nitrates;

Root vegetables:

It believes that they have an average content of nitrates.

- Yellow parsnip, carrot *Daucus carota* L. conv. *sativus* (Hoffm.) Hajek
- Parsley, parsley root *Petroselinum crispum* Mill conv. *radicosum* Mill.
- Parsnip *Pastinaca sativa* L. convar. *hortensis* Ehrh.
- Celery, celeriac root - *Apium graveolens* L., convar. *rapaceum* Mill.
- Gardenbeet, beetroot *Beta vulgaris* var**.** *canditiva* Alef. In Table 3, without specifying variety, beets vegetables are included in the group with high content of nitrates.
- Radish *Raphanus sativus* L. convar. *sativus* radish month. In Table 3, radishes month in group vegetables are high in nitrates content.
- Kőrner *Raphanus sativus* L. convar. *Niger* (Mill) - summer and winter radish
- Swede, rutabaga *Brassica napus* var. *napobrassica* L.
- Turnip, edible turnip (syn. Chinese turnips, pears land, stubble turnips, turnip) *Brassica napus,* convar. *rapifera* L. (sin. *B. campestris* L. subsp. *rapifera* Metz. **s**in. *Brassica rapa* L- *esculenta* Coss şi Gam.)
- Sweet patato *Ipomea batatas* Poir.

Bulbous vegetable plants:

- Onion *Allium cepa* L. In Table 3, onion bulbs are included in the group contained with low nitrate and green onions vegetables are included in the group with high content of nitrates.
- Garlic common garlic *Allium sativum* ssp. *vulgare* L.
- Common leek, leeks *Allium Porum* L.

Cucurbit vegetable plants

- Slicing, cucumber pikling, cucumber *Cucumis sativus* L. In Tab.3. – Medium contents of nitrites
- Watermelon *Citrullus vulgaris* L. sin. *C. lanatus* (Thlumb) Mansf. In Table 3 - low content of nitrates
- Gourd, zucchini *Cucurbita pepo* L. convar. *giromoontiina* Greb, sin. var. *Oblonga* Sér.În Table 3 - average content of nitrates.
- Crown gourd, zucchini patison (syn. Bonnet king) *Cucurbita pepo* var.. *patissoniana* GREB sin. *radiata* NOIS.
- Pumpkin, edible pumpkin (syn. Common pumpkin) *Cucurbita maxima* Duch. In Table 3 - Average nitrates content.
- Winter squasb, muscat pumpkin (syn. Pies) *Cucurbita moschata* Duch.

Vegetable herbs

There are plants with high content of nitrates (v. Tab. 2, 3 and 4)

- Cabbge heading lettuce, lettuce *Lactuca sativa* L.
- Endive, chicory *Cichorium endivia* L. ssp. *Endivia*
var. *crispum* - var.
var. *latifolium* Lam. – scarola or garden leaved chicory
- Spinach *Spinacia oleracea* L.
- Orache, mountain spinach, pig weeds *Atriplex hortense* L.
- Ribbed celery *Apium graveolens* L., ssp. *dulce* (Mill.) Lemket Rothm.- ribbed celery; convar. *secalinum* Alef. – smallage, celery leaves
- Swisschard spinach beet, ribbed beet *Beta vulgaris* L., ssp. *vulgaris*, convar. *Vulgaris*-
var. *Flavescens* D.C. var. *vulgaris* – chard leaf
- Cardon,chard *Cynara cardunculus* L.
- Sweet fennel, florence fennel *Foeniculum vulgare* Mill., ssp. *dulce* (Pesl.) Janch., convar. *azoricum* (Mill.) Thell.
- New Zealand spinach *Tetragonia tetrgonoides* (Pallas) O. Kuntz. Sin. *Tetragonia expansa* Murr.
- Basella (sin. Malabar spinach) *Basella rubra* L.
- Cornsalad, hauch, lamb's lettuce (syn. valerianela, field salad, lamb salad) *Valerianella olitoria* Maench., sin. *Vallerianella locusta* L.
- Cooltankard, borage *Borrago officinalis.*

Aromatic and spicy vegetable plants.

The leaves that are consumed are high in nitrates, but given that use small amounts poses no danger to consumers' health. The species that are consumed seeds were not mentioned in this paper.

- Commondill, dill *Anethum graveolens* L., ssp. *hortorum* Alef.
- Leaf parsley *Petroselinum crispus* (Mill.) A.N. Hill., ssp. *crispum* convar. *crispum* leaves persil
- Summer savory, annual savory, savory *Satureja hortensis* L.
- Chervil *Antthriscus cerefolium* (L.) Hoffm., ssp. *cerefolium*
- Basil O*cimum basilicum* L.
- Garden cress - *Lepidium sativum* L.
- Marjoram (syn. Marjoram, maioran) *Majorana hortensis* Moench.
- Coriander (syn. white pepper) *Coriandrum sativum* L.

Perennial vegetable plants

Perennials for roots

- Horse-radish *Armoracia rusticana* Lam., sin. *Cochlearia armoracea* L., sin. *Armoracia lapathifolia* Gilb.
- Salsify (syn. cinnamon white) *Tragopogon porrifolius* L.

- Earthpuff, topinambur, Jerusalem artichokes, artichokes, (syn. turnip earth, earth apple, potato artichoke) *Helianthus tuberosus* L.

Perennial vegetable plants for bulbs, false stems, leaves.

- Egyptien onion, onions of Egypt (sin. rocambole onion, catawissa) *Allium cepa* L., f. *bulbiferum* Rgl.; *Allium cepa* f. *proliferum*
- Shallots (syn. Vlas, onion shallots *Allium ascalonicum*L.
- Japanese bunching onion, winter onion *Allium fistulosum* L.
- Great-header garlic, pearl onions (syn. Rakkyo) *Allium ampeloprasum* L. f. *homolense* A. et G.., sin *Allium chinense* L.
- Common chives, lawn onion (syn. Pure) *Allium schoenoprasum* L. Since the leaves are consumed, we believe it has a high content of nitrates.
- Chinese chives, chinese onion *Allium tuberosum* L.
- Garlic of Egypt (sin. rocambolle) *Allium sativum* ssp. *Sagitum*
- Asparagus *Asparagus officinalis* L. It believe that is high in nitrates content, like all young tissues.

The following species have a high content of nitrates Since there are consumed the leaves.

- Rhubarb (syn. Rhubarb, rabarber) *Rheum rhabararum* L., (sin. *R. undulatum* L., sin. *R. rhaponticum* L., sin. *R. Siibiricum* Pall.)
- Cynara artichoke *Cynara scolimus* L.
- patience dock, garden sorrel - (syn. Curly dock) *Rumex patientia* L.
- saudoch, Sorrel *Rumex acetosa* L.
- Dandelion *Taraxacum officinale* Web. (sin. *Taraxacum hortanse* Hort.)
- Nettle *Urtica dioica* L.

Species that follows, are not used in large quantities and there are no health risk to consumers.

- Lovage *Levisticum officinale* Koc.
- Tarragon *Artemisia dracunculus* L.
- Garden sage, sage (syn. Sage) *Salvia officinalis* L.
- Peppermint (syn. Good mint) *Mentha piperita* Huds.
- Millisbalm, common balm, melissa (syn. balm, thyme) *Melissa officinalis* L:
- Water cress, cress (syn. Cress pond) *Nasturium officinale* (L.) Brown., sin. *Roripa nasturium aquaticum* (L.) Hayek
- Rosemary (syn. Mirtin, dendrites) *Rosmarinus officinalis* L.
- French thime, thyme *Thymus vu*lgaris L.

4. CONCLUSIONS

Based on results of research carried out in our country show the following important conclusions:

1. Tomato, nitrates fall during the harvest (April 20th-15. June) phosphates grow, potassium has the lowest value at first harvest and the highest level to the second harvest (05.June).

2. The content of nutrients, carbohydrates, vitamins and pro-vitamins will vary depending on the cultivar.

3. Nitrates and nitrites contents are low in field culture compared with culture in greenhouse and solarium.

4. Existing products from the Romanian Market, from processing tomatoes have high nourishing value and contain nitrates.

5. At carrot both biochemical and agrochemical composition vary depending on the cultivar. There was a high nutritional value in all variants fertilized; the nitrate content is below the limits set out in Ord. No. 1 of January 3, 2002 the Ministry of Health. The largest amounts of $N\text{-}NO_3$ variants are fertilized with manure from chickens and $P\text{-}PO_4$ and K in variants fertilized with cattle manure. These elements are in greater quantities in the final harvest.

6. At cucumbers, the highest content of $N\text{-}NO_3$, $P\text{-}PO_4$ and K variants found in classic fertilized, especially the cultivar Mirabelle F1. Triumph cultivar F1 evidenced by the high content of K under the influence of fertigation; the highest content of dry matter and soluble carbohydrates found in organic fertilization, the higher acidity under the influence of classical fertilization and the highest content of vitamin C in variants with fertigation.

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