

Analysis of the Composition of Macro and Micro Elements of Certain Proportions of Carrot, Turnip and Radish Leaves

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Abstract This carrot in the article (*Daucus carota* L), turnip (*Brassica rapa* L) and radish (*Raphanus sativus* L.) plants of leaves mutual some of the proportions macro and micro elements composition analysis In particular, this plant of leaves botanist classification, chemical composition and human health for benefits studied. Sample in the content chemical elements amount induction connected plasma optical emission spectrometry in the way was found. Research during turnip leaf macro and micro elements according to the most wealth known It was. Especially turnip The leaves contain the highest levels of K (400-550mg/100gr), Ca (200-300mg/100gr) many occurs on a carrot leaf and micronutrients include iron (2-3.5mg/100gr) and there is (0-.3-0.5mg/100gr) presence because of blood harvest to be support Radish leaf and mineral and biological active substances with detoxification and liver in the activity This is useful. positive results through village farm waste as carrot, turnip and radish from the leaves in the future ecological clean to products convert opportunity gives. With this one in line this from waste healer food - food additives, pharmaceuticals in the field, and cosmetics tools also wide in taking use possible. These through and waste reduce according to wide extensive efforts are also achieved and green chemistry principles, and ecological stability obligations Research results in low impact has plant based on ingredients turnover bioeconomy and prevention health storage approaches input the necessity emphasizes.

Keywords Carrot, Turnip, Radish leaves, Macro and micro elements, Green chemistry, Potassium, Calcium, IBP-OES method

1. Introduction

Today on the day whole in the world big to the problem rotating healthy food and human health for necessary was natural food products to multiply big importance being given to everyone known. In particular, the population healthy to eat was need increasing progressing, natural plants and natural food to their products and from them removable vitamins, minerals, biological active from compounds organization found food to the additions was demand to increase take is coming [1].

Plants not only root vegetables, maybe often consumption undoable leaf parts are also valuable chemical to the content has are, they are human health for necessary was many substances source is considered [2].

In particular, in Uzbekistan wide cultivated carrot (*Daucus carota* L.) turnip (*Brassica rapa* L.) and radish (*Raphanus sativus* L.) folk farm and food in the industry important place catcher from plants is considered. In practice this of plants mainly root vegetable consumption is done, but their leaves and still enough at the level unrated without waste as However, scientific research this It shows that carrots, turnips and radish leaves in the composition big in quantity human organism for necessary macro and micro elements in water solvent vitamins (vitamin C, group B) vitamins), minerals, antioxidants to the feature has phytochemical compounds high in quantity occurs (Table 1) [3].

Carrot (*daucus carrot*) - very ancient from the times our people between healer vegetable as applied bride to everyone known and famous. This useful of the plant not only root vegetable maybe his/her The leaves are also popular. in medicine very many diseases in treatment and prevent in receiving Carrots are used. annual or two annual plant cultural type and, that is consumption for sowable

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type two annual Carrots are ethereal. oily plants in a row Up to 1.9% in fruits, plant on the leaf and up to 0.13% ether oil, as well as geraniol, dautsene, bisaboden, sesquiterpene caratol alcohol, daukol, azaron and other compounds Available in carrot root and one row carotenoids, vitamins K, B₁, B₂, PP, C, pantothenate acid and inositol and phytosterols, phosphatides, enzymes, sugars, flavonoids, microelements, fiber, potassium, calcium, iron and other many biological active rich in nutrients. Their combination human skin restore, see improve immunity reinforcement and heart and blood vein system in support important role plays [1,4].

Radish (*Raphanus sativus L.*) cabbages to the family belonging two annual plant. 5 thousand of them year before Egypt, Greece and In Rome planted. Current at the time in the world all in countries cultivated is coming. Contains average 1.92% protein, 1.58% sugar, 1.55% fiber, 8–29 mg vitamin C and other vitamins available. Article exchange and food digestion improves. Radish Uzbekistan central in the regions July end August at the beginning, south in the regions is cultivated in Uzbekistan. radish Margilan and Andijan quick-cooking varieties state to the list included. Productivity Margilan grade 350 - 360 s/ up, Andijan variety and up to 480 - 500 s/ harvest giving is coming. Radish of the tree leaves usually waste as throw away sent, but they biological active rich in nutrients valuable raw material The leaves are green colorful, sharp tasty is, the plant high photosynthesis to the activity has part is considered. People in medicine radish leaves organism cleanser, anti- inflammatory antibacterial and immunity reinforcing tool as Radish is used. leaves own in the composition organic acids, vitamins, minerals and phytochemical compounds gathered. Radish Vitamin C (ascorbic acid) in the leaves acid) 80– 100 mg/%, strong antioxidant, immunity increases inflammation Vitamin A (carotene) in the form of) – 3–5 mg/100 g boron, see ability and skin health improves [5].

Vitamin K – blood coagulation process Vitamin B group (B₁, B₂, B₆, folate) – substances exchange Calcium (Ca) – bone and tooth strength Iron (Fe) – hemoglobin synthesis for Important. Potassium (K) – heart activity supports, swelling Flavonoids (quercetin, kaempferol) – antioxidant, anti - inflammatory against impact Glucosinolates (sinigrin, raphanin) – antibacterial and antitumor properties has. Humidity amount – 85–90%, proteins – 2.5–3.0%, carbohydrates – 3–5%, fibers – up to 1.5–2% occurs [6,7,8].

2. Page Layout

Sample worker solution preparation. In advance dried, ground, 0.001 g accuracy on the scales pull taken (Navigator™, OHAUS®) 1 g sample porcelain in the crucible dry ash to take in the method muffle in the oven (Nabertherm, Germany) 500 °C until to heat with ash was taken. In this initially 95 °C up to 30 minutes, 120 °C up to 60 minutes, 300 °C up to 120 minutes and 550 °C up to 60 minutes heated and 5 hours

550 °C at temperature hold stood up. Harvest was Add 3 ml of 70% HNO₃ (Sigma Aldrich, USA) of ICP-MS grade to the ash and 2 ml of 60% H₂O₂. pouring, white smoke harvest to be until it's over chimney in the closet to heat on the plate heated. Cooled 100 ml solution polypropylene measurement to the flask transferred, ultra clean water with to the line delivered. This worker from the solution syringe using a filter (0.45 μ m) filtered analysis for used [9].

3. Page Style

Standard solutions Preparation of 2% HNO₃ of 68 elements at a concentration of 10 mg/l standard solution (Highpuritystandards, USA), 2% HNO₃ of 4 elements at a concentration of 1000 mg/l standard solution (CPAchem, Sweden), 70% HNO₃ (Sigma Aldrich, USA), 5% HNO₃ of 20 elements at a concentration of 1000 mg/l standard solution (CPAchem, Sweden), 70% HNO₃ (Sigma AccuStandard, USA) solutions 2% of 69 elements using HNO₃ in standard worker solution prepared and dilution way with 6 more types standard worker solutions prepared. Empty sample from a 2% HNO₃ solution as used. Above standard worker from solutions used for 69 elements without calibrator line harvest Calibrator R² of the lines values above 0.995 in case analysis continue was carried out.

Analysis performed by Thermo Fisher Scientific (USA) working issued iCAP PRO X Duo ICP-OES induction connected plasma in an optical emission spectrometer done The method was increased. creation, analysis the results analysis to do QTegra in the ISDS program done. Analysis The parameters are listed in Table 1 [10].

Table 1. Analysis method parameters

Parameter	Settings	
	Pump pipe	Sample for Tygon® yellow / white
Pump speed	45 rpm / min	
Spray camera	Glass cyclonic	
Nebulizer	Glass concentric	
Nebulizer gas flow	0.6 L min ⁻¹	
Cooling of gas flow	12.5 L min ⁻¹	
Assistant gas flow	0.5 L min ⁻¹	
Central pipe	2mm	
RF power	1150 W	
Repetition	5 times	
Analysis time	Axial	Radial
	15 sec	15 sec

4. Results and Discussion

Turnip leaf in the content macro and microelements Amount is g/100g.

Table 2. Sample in the content chemical elements by IBP-OES method determination results, mcg /100 g

Analyte (Measurement) shape)	Turnip+carrot 1:1	Turnip+radish 3:1
Al 396.152 (Aqueous, axial-iFR)	16632.46±60	25356.09±128
As 189.042 (Water, axial-iFR)	17.24±5	27.61±5
Au 267.595 (Aqueous, axial-iFR)	<LOD	<LOD
B 249.773 (Aqueous, axial-iFR)	2546.54±18	2213.65±11
Ba 455.403 (Aqueous, axial-iFR)	829.24±10	837.03±11
Be 313.042 (Aqueous, axial-iFR)	<LOD	<LOD
Bi 223.061 (Aqueous, axial-iFR)	<LOD	<LOD
Ca 396.847 (Watery, radial-iFR)	1795803.67±7190	2039291.04±11003
Cd 228.802 (Aqueous, axial-iFR)	17.02±0	29.46±1
Ce 413.765 (Aqueous, axial-iFR)	<LOD	<LOD
Co 238.892 (Aqueous, axial-iFR)	22.59±2	33.75±1
Cr 283.563 (Aqueous, axial-iFR)	70.67±0	768.38±2
Cs 852.113 (Aqueous, axial-iFR)	1898.29±352	1831.17±171
Cu 324.754 (Aqueous, axial-iFR)	691.18±6	711.49±5
Dy 400.045 (Aqueous, axial-iFR)	<LOD	<LOD
Earth 323.058 (Water, axial-iFR)	<LOD	<LOD
Eu 381.967 (Aqueous, axial-iFR)	<LOD	<LOD
Fe 259.940 (Aqueous, axial-iFR)	26665.68±53	37572.49±264
Ga 294.364 (Watery, axial-iFR)	<LOD	<LOD
Gd 335.047 (Aqueous, axial-iFR)	<LOD	<LOD
Ge 265.118 (Watery, axial-iFR)	<LOD	<LOD
Hf 339.980 (Aqueous, axial-iFR)	<LOD	4.14±2
Hg 184.950 (Aqueous, axial-iFR)	3.27±11	11.21±4
Ho 345.600 (Water, axial-iFR)	<LOD	<LOD
In 325.609 (Water, axial-iFR)	115.11±10	118.13±9
Ir 224.268 (Watery, axial-iFR)	13.98±7	7.52±2
K 766.490 (Water, radial-iFR)	3995505.29±20845	4196522.15±37694
La 333.749 (Water, axial-iFR)	13.73±1	15.24±1
Li 670.776 (Water, axial-iFR)	1720.39±11	1199±13
Lu 261.542 (Watery, axial-iFR)	<LOD	<LOD
Mg 285.213 (Watery, radial-iFR)	414845.68±4800	603719.47±9633
Mn 257.610 (Aqueous, axial-iFR)	4318.49±46	5259.86±18
Mo 202.030 (Aqueous, axial-iFR)	89.01±1	101.93±1
Na 589.592 (Aqueous, radial-iFR)	698679.86±1690	1205983.78±8904
Nb 316.340 (Water, axial-iFR)	21.33±7	29.49±2
Nd 378.425 (Aqueous, axial-iFR)	46.61±19	37.76±15
Ni 221.647 (Aqueous, axial-iFR)	<LOD	<LOD
Os 225.585 (Water, axial-iFR)	16.19±3	15.96±9
P 185.942 (Water, radial-iFR)	329981.6±360	504399±1078
Pb 220.353 (Aqueous, axial-iFR)	67.95±7	65.06±8
Pd 340.458 (Aqueous, axial-iFR)	<LOD	<LOD
Pr 390.844 (Water, axial-iFR)	<LOD	<LOD
Pt 203.646 (Aqueous, axial-iFR)	164.72±5	221.51±20
Rb 214.383 (Aqueous, axial-iFR)	651.36±446	1219.66±178
Re 227.525 (Aqueous, axial-iFR)	369.49±8	441.64±6
Rh 343.489 (Watery, axial-iFR)	<LOD	<LOD
Ru 240.272 (Water, axial-iFR)	<LOD	<LOD

Analyte (Measurement) shape)	Turnip+carrot 1:1	Turnip+radish 3:1
Sb 206.833 (Watery, axial-iFR)	<LOD	<LOD
Sc 361.384 (Aqueous, axial-iFR)	<LOD	<LOD
Se 196.090 (Aqueous, axial-iFR)	<LOD	<LOD
Si 251.611 (Aqueous, axial-iFR)	871.38±13	2008.07±25
Sm 363.429 (Aqueous, axial-iFR)	6.65±11	79.14±2
Sn 189.989 (Aqueous, axial-iFR)	430.47±10	1102.37±6
Sr 407.771 (Aqueous, axial-iFR)	25241.61±108	33165.8±277
Ta 268.517 (Aqueous, axial-iFR)	<LOD	6.95±5
Tb 350.917 (Water, axial-iFR)	<LOD	<LOD
Te 238.578 (Aqueous, axial-iFR)	<LOD	<LOD
Th 283.231 (Watery, axial-iFR)	86.6±9	101.88±5
Ti 334.941 (Aqueous, axial-iFR)	374.21±10	467.55±4
Tl 190.856 (Water, axial-iFR)	<LOD	<LOD
Tm 342.508 (Aqueous, axial-iFR)	6.95±2	12±2
U 367.007 (Water, axial-iFR)	25.08±21	42.46±15
V 309.311 (Aqueous, axial-iFR)	193.67±9	253.19±14
W 239.709 (Water, axial-iFR)	<LOD	<LOD
Y 371.030 (Water, axial-iFR)	<LOD	<LOD
Yb 328.937 (Watery, axial-iFR)	<LOD	<LOD
Zn 213.856 (Aqueous, axial-iFR)	3715.24±40	4634.72±27
Zr 343.823 (Aqueous, axial-iFR)	<LOD	5.49±0

* Note: <LOD – result detection from the minimum small

Medicinal of plants micro and macroelement composition of course, growing soil to the composition is related to. Turnip in the content macro and microelements amount inductive connected plasma mass spectrometry method with was determined (Table 2).

In Uzbekistan cultivated turnip on the leaves macro and microelements composition is given. It is visible It is clear that the leaves all macro and microelements more. Leaf in the composition calcium 895.56±2.45 mg/100g, potassium 698.45±0.62 mg/100g more in quantity, silver 0.26±0.01 mg/100g and gold 0.32±0.01 mg/100g less quantity our vision possible.

The most many minerals, turnip on the leaves calcium and potassium amount was. Calcium children, pregnant and breastfeeding women by bones and of teeth development [11]. Calcium children for 800 mg per day, adults and pregnant women 1200 mg recommended for Turnip also, human health for useful was other many valuable minerals own inside takes, for example, Potassium [12] high amount in the body hypertension control to make, iron absorption and body fluid balance catch functions will do [13,14,15].

5. Conclusions

This in the article In Uzbekistan cultivated carrots from plants (*Daucus carota* L), turnip (*Brassica rapa* L) and radish (*Raphanus sativus* L.) leaves botanist classification, distribution, chemical composition, macro and micro elements discussion was done. Turnip on the leaf macro and

microelements amount YuSSX in the way identified and analysis was done. In this Macronutrients: 2010 mg/100g K (Potassium) and 965 mg/100g Ca (Calcium), 67 mg/100g vitamin B1 (Thiamine), 21 mg/100g vitamin PP and 532 mg/100g quercetin flavonoid and 231 mg/100g salicyl acid phenol compounds many in quantity that was identified.

Food as plants parts consumption because of health storage ministry by state standard requirements working was released. According to this ash amount, humidity to the amount their vital nutritional (minerals, fiber, vitamins, phenolic compounds and antioxidants) are great attention In particular, various kind useful to the features has phytochemical substances existence because of turnip leaves consumption to do natural medicinal value with health to save provides. First annual on the leaves calcium and potassium the most many a mineral that occurs was detected. On the leaves at total flavonoid levels quercetin and high in apigenin was. In vitamins in the water solvent vitamins amount many that from outside accessible vitamins encourages and daily need satisfies. Currently food natural accordingly storage, artificial from additions escape and this with new products working to release to optimize contribution add for turnip leaf functional products to the ranks add for enough is considered rich.

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DISCLOSURE

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