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# DETERMINATION OF THE AMOUNT OF MINERAL ELEMENTS IN THE ROOT OF "ZINGIBER OFFICINALE ROSE" BY THE METHOD OF "X-RAY FLUORESCENT SPECTROMETRY"

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## Abstract
In this article, the amount of mineral elements in the chemical composition of the root of the medicinal plant Zingiber officinale Rose was determined by X-ray fluorescence spectrometry using Spectro Xepos 111 (SShA) and its biological properties. It is reported that it has bactericidal, antiseptic, antibacterial properties.

**Keywords:** Zingiber officinale Rose, vitamin K, ascorbic acid, carbohydrate, cellulose, amino acid, tocopherol, potassium, phosphorus, magnesium, iron, calcium, zinc, bactericidal, antiseptic, antibacterial, immunity.

## Introduction:
Today, in the world, planting and breeding promising types of plants, extracting substances with high biological activity from their composition and creating new medicines based on them are developing rapidly. Since ginger plant root extract is known from the literature to boost immunity, it is used in the prevention and treatment of colds and flu. used in medicine to prevent colds. Abu Ali Ibn Sina used the root of the ginger plant as a medicine that improves mood, gives energy to a person, and stops vomiting and diarrhea. Ginger plant root extract or crushed root powder has analgesic, invigorating and antibacterial properties. It is recommended to eat it when the muscles, muscles ache, when the tendon or flesh is stretched, when the tissues are damaged. Its root is very useful, improves blood circulation, effectively helps in the process of losing weight. It lowers blood pressure along with blood thinning. A person who consumes a tea of ginger plant root extract or ground powder of the root will have better memory. It also increases the power of digestive organs such as

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stomach, liver, intestines and spleen, strengthens sexual power, refreshes a person, and accelerates the melting of fat layers in muscles. This tea warms the body well, protects against cold, so it is especially pleasant to drink it on cold and wet days.

## Theoretical part

Zingiber officinale Rose (Medicinal Ginger, Ginger lekarstvennyy), widely used in medicine and folk medicine; Zingiber zerumbet Rose (Zingiber zerumbet Rose) is a perennial cane-like plant with a thick root-stem, growing up to one meter, belonging to the monocotyledonous class, the ginger family, and forming clusters of yellow-pink flower buds (Fig. 1). Due to the aesthetic appeal of the plant and its adaptability to hot climates, it is widely distributed in tropical and subtropical regions and is used as landscaping around houses. It is grown in South and Southeast Asia. 3. The composition of ginger root is rich in essential oils, the dried root is fragrant and tasty [1-2].

**Figure 1.** Zingiber officinale Rose herb and root

The chemical composition of ginger root contains useful elements. Ginger root contains up to 70% organic compounds, as well as camphene, cineole, bisabolene, borneol, citral, linalool, essential amino acids, carbohydrates, fats, 1.5 to 3% essential oils and cellulose. Ginger is very rich in vitamins (V-group vitamins, ascorbic acid, tocopherol, vitamin K should be highlighted). C, V1, V2 drugs. It also contains potassium, phosphorus, magnesium, iron, calcium, zinc and other micro and macro elements [1-2].

Chemical composition of raw ginger root Nutritional value per 100 g (3.5 oz), Energy 333 kJ (80 kcal), 79% water, Carbohydrates 17.77 g, Sugar 1.7 g, Fat 0.75

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g, Protein 1, 82 gr, Vitamins Amount (12% DV), Thiamin (B1) 2% 0.025 mg, Riboflavin (B2) 3% 0.034 mg, Niacin (B3) 5% 0.75 mg, Pantothenic acid (B5) 4% 0.203 mg, Vitamin B6 12% 0.16 mg, Folate (B9) 3% 11 µg, Vitamin C 6% 5 mg, Vitamin E 2% 0.26 mg, Calcium 2% 16 mg, Iron 5% 0.6 mg, Magnesium 12 % 43 mg, Manganese 11% 0.229 mg, Phosphorus 5% 34 mg, Potassium 9% 415 mg, Sodium 1% 13 mg, Zinc 4% 0.34 mg.

Zingiber officinale Rose the powdered root of the ginger plant is known for its beneficial properties, such as raising and maintaining immunity, it is used in the prevention and treatment of colds and flu. prevents colds in the internal organs, relieves the stomach from rest and the hand.

Zingiber officinale Rose oil (Fig.2) rejuvenates the human body, can be a powerful antioxidant. Protects the immune system, improves vision and concentration (attention). refreshes and gives strength in severe fatigue. also helps to lose excess weight in the body. Useful properties of ginger oil: Restores the immune system, acts as an antibacterial agent, anti-inflammatory, calms, fights cholesterol, improves the digestive system, has antiseptic properties, fights impotence, reduces spasms, blood - cleans the vessel walls, relieves constipation, refreshes.

**Figure 2.** Zingiber officinale Rose root oil extract.

Zingiber officinale Rose oil also has its place in cosmetology. With the help of this oil, it is possible to get rid of blemishes and rashes on the skin. one of its other useful properties is that it keeps the water balance in the skin, softens the skin and gives softness. Ginger oil is found in many hair care products, and ginger oil prevents hair loss and dandruff. Zingiber officinale Rose oil helps with excess weight and cellulite. for this, a few drops of ginger oil are added to food and consumed. [3].

Zingiber officinale Rose root powder mixed with honey is a harmless local product that can be used as a natural treatment and preventive measure for the

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first signs of colds and flu. The memory of a person who consumes ginger root powder tea is enhanced. It also increases the power of digestive organs such as stomach, liver, intestines and spleen, strengthens sexual power, refreshes a person, and accelerates the melting of fat layers in muscles. This tea warms the body well, protects against cold, so it is especially nice to drink it on cold and wet days. [3].

In the following years, the notions that mineral elements are necessary for plants gradually began to appear. One of the founders of this concept is agronomist A.T. Bolotov (1770). He proposed the idea that mineral particles in the soil are the main nutrients for aquatic plants. A. T. Bapotov also developed methods of applying fertilizers to the soil and showed that there are 53 types of fertilizers necessary for agriculture. Yu. Libix proposed the law of the minimum and the laws of return. According to these laws, if the mineral elements necessary for plants in the soil are not at a minimum, they will not be useful. In the law of return, it is explained that as much as the plants take from the soil with their crops, they must return the same amount. Otherwise from year to year the fertility of the soil, therefore, the productivity also decreases. Liebich's points are generally correct. Productivity can be increased as a result of proper implementation of agrotechnical activities and timely provision of soil with mineral elements. The experiments conducted by I. Knop and Yu. Sachs in 1859 also disproved the "humus theory". According to them, only 7 elements: nitrogen, phosphorus, sulfur, potassium, calcium, magnesium and iron, plants can be grown in water. Thus, they proved that it is possible to grow plants by vegetative means (soil, water, sand) and confirmed the theory of mineral nutrition. P.A. Kostichev, V.V,Dokuchaev, K.K.Gedroyts, D.N.Pryanishnikov and other scientists further developed the idea of nutrition of plants with roots. [4].

Plants have the ability to absorb all the elements shown in the periodic table in small or large amounts from the natural environment. However, it has been determined that only 19 of these elements are important for plants and cannot be replaced by other elements. These are carbon, hydrogen, oxygen, nitrogen, phosphorus, sulfur, potassium, calcium, magnesium, iron, manganese, copper, zinc, molybdenum, boron, chlorine, sodium, silicon and cobalt. 16 of them belong to the group of mineral elements. Because carbon, hydrogen and oxygen are supplied to the plant in the form of $SO_2$, $O_2$ and $H_20$. Plants receive water and all mineral elements from the soil through the roots. Mineral substances are found in soil solution, humus, organic and inorganic compounds, and adsorbed to soil

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colloids. The uptake of ions depends not only on plants, but also on the concentration of that ion in the soil, its movement in the soil, and soil reactions. Four elements make up 95% of the elements in the body of plants: carbon, hydrogen, oxygen and nitrogen. These elements are also called organogens. Because they form the basis of organic substances (proteins, fats, carbohydrates) in the plant body.

Mineral elements are divided into three groups based on their amount in the body of plants:

1) macroelements; 2) microelements; 3) ultramicroelements. 1) Macroelements include all elements (N, P, K, Ca, Na, Mg) whose quantity in plants is 10-2 percent more. 2) Microelements include elements (Mn, B, Cn, Zn, Mo, etc.) whose amount in plants is $10^{-3}$ - $10^{-5}$ percent. 3) Ultramicroelements include elements that are very small ($10^{-6}$ percent or less) and whose function has not been determined (Ce, Se, Ca, Hg, Ag, Au, etc.) in the plant [4 ].

The lack of any microelement in plants causes it to be damaged by various bacterial, rotting and other diseases, that is, microelements increase the resistance of agricultural crops to various diseases. In particular, microelements increase the ability of plants to resist adverse effects of the external environment (cold, high temperature, soil salinity and drought). Therefore, it is necessary to know the importance of certain microelements in the normal nutrition of plants, their forms in the soil, and what types of plants absorb a lot in which phases of development. [4-6].

## Discussion of results

Zingiber officinale Rose. in the determination of the amount of mineral elements in the root of the plant was determined using the X-ray fluorescence spectrometry method on the Spectro Xepos 111 (SShA) device. Technical parameters of the device: 120/230 V voltage, 150 W power. was carried out using For this, the root of the plant is ground into powder, and 5 g is taken into special vials for X-ray analysis, and the powder of the root of Zingiber officinale Rose plant is placed in the vials, which are separately installed on a circular disk. The device analyzes for 20 minutes. After analyzing the results. The results are automatically displayed on the computer connected to the device. The results of these studies show that Zingiber officinale Rose. 56 elements and 9 of its compounds were determined in the root of the plant, and the root content is mainly Aluminum oxide $Al_2O_3$ (2.174 %), Aluminum Al (6.714 %), Silicon oxide

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$SiO_2$ (3.553 %), Silicon Si (15.58 %), Calcium oxide CaO (11.22 %), Calcium Ca (89.56 %), (0.7402 %), Potassium K (13.52 %), Phosphorus oxide $P_2O_5$ (7.284 %), Scandium Sc (64.01), Sulfur S (1.329 %) and its elements it became known that the amount of compounds is more than others.

## Summary

1. Zingiber officinale Rose. The amount of mineral elements in the root of the plant is determined by "X-ray fluorescent spectrometer Spectro Xepos 111, technical specifications: 120/230V, power 150W. 56 elements and 9 of its compounds were determined in the root of the plant when it was studied in the instrument of the laboratory (SShA). Zingiber officinale Rose. Plant root contains Aluminum oxide $Al_2O_3$ (2.174 %), Aluminum Al (6.714 %), Silicon oxide $SiO_2$ (3.553 %), Silicon Si (15.58 %), Calcium oxide CaO (11.22 %), Calcium Ca (89.56 %) ), (0.7402 %), Potassium K (13.52 %), Phosphorus oxide $P_2O_5$ (7.284 %), Scandium Sc (64.01), Sulfur S (1.329 %), it was found that the amount of some compounds of the elements is more than other elements.

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