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Research Article

MINERAL ELEMENTS OF RUBIA TINCTORUM L PLANT ROOT AND USE IN MEDICINE

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Ibragimovich Ibodulloxon Abdimalikov
Tashkent Medical Academy, Termiz Branch, Uzbekistan

Shuhrat Xujamurodov
Termiz State University Academic Lyceum, Uzbekistan

Saboxat Ziyodullayevna Raxmonova
The 8th General Education School Of The City Of Termiz, Surkhandarya Region, Uzbekistan

Bozorov Ogabek Tolib Ugli
Tashkent Medical Academy Termiz Branch 2nd Year Student, Uzbekistan

Arziyeva Shaxnoza Ruziboyevna
Tashkent Medical Academy Termiz Branch 1st Year Student, Uzbekistan

ABSTRACT

In this article, the biological properties of the root of Rubia tinctorum plant and the amount of mineral elements in its chemical composition are determined using the X-ray fluorescence spectrometry method using the Spectro Xepos 111 (SSliA) device, and the information about the use of the root of the Rubia tinctorum plant in medicine is highlighted.

KEYWORDS

Rubia tinctorum L, anthracene, alizarin, ruberythric acid, galiosin, puipurin, xanthopurpurin, pseudopurpurin, rubiadin-glucoside, ibericin, urinary tract stone, kidney stone.

INTRODUCTION

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Today, comprehensive measures are being taken to organize scientific research at a high level and to supply the national pharmaceutical market with high-quality drugs in the direction of developing the creation of effective drugs based on local raw materials. Based on the measures implemented in this area, a number of important practical results are being achieved in terms of organizing the development of competitive drugs based on natural plant raw materials. Studying the biology of Rubia tinctorum plant species and creating raw material bases for the preparation of cheap and high-quality import-substitute drugs by separating natural medicines from local raw materials are of urgent importance. Such a preparation can be isolated from the medicinal plant Rubia tinctoni and used in medical practice and folk economy.

Literature analysis and methodology

Rubia tinctorum L belongs to the rubicaeae family. It is found in Ukraine, Moldova, the southeast of the European part of Russia, in the Caucasus, Azerbaijan, Gmzia, Armenia, Dagestan and Central Asia. In Uzbekistan, it grows mainly along streams, among bushes, along canals, in fields and gardens [1-2].

Rubia tinctonim is a perennial herb with a height of 30-150 cm. The rhizome is long, creeping, branched, cylindrical, thick, jointed, many-headed. The stem is several, four-lobed, jointed, coarse and looped. covered with feathers. The leaf is oval-ovate, shiny, the veins on the lower side are covered with rough hairs with loops, and they are arranged in bundles of 4-6 on the stem with a very short band. The flowers are small, greenish-yellow in color, collected in a semi-umbrella growing from the axils of the leaves, forming a flower cluster. The calyx is not clearly known, the corolla is 5, united, funnel-shaped, the paternity is 5, the maternal node is 2-digit, located below. The fruit is a 1-2-seeded, globular, first red, then black wet fruit. It blooms in June-August, the fruit ripens in August-September, the underground part of Rubia tinctorum L. Fig. 1 [3-4].

Fig. 1. Rhizome and powder of Rubia tinctorum plant.

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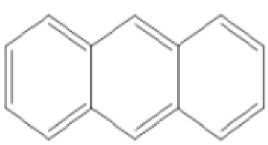
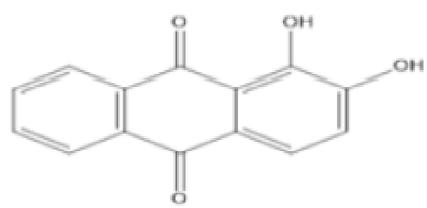
The finished product of the Rubia tinctorum plant consists of rhizomes and root pieces. The thickness of rhizome pieces is 2-18 mm, the upper side is painted in reddish-brown color. When you cut it crosswise, the bark layer is red-brown, and the wood part is red. The product has a characteristic weak smell, sweeter at first, and then a slightly sour and bitter taste. The rhizome turns the water brownish-red, the moisture content of the harvested Rubia tinctorum plant is 13%, total ash is 10%, other parts of the plant (stem, leaf, etc.) are 1.5%, organic impurities more than 1% and mineral impurities more than 1%, the amount of anthraglycosides (those combined in glycoside oil) in the product should not be less than 3% [1-4].

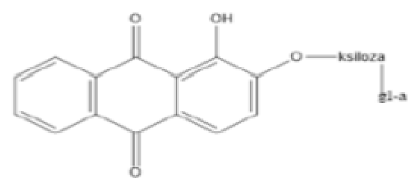
The rhizome of Rubia tinctorum contains 5-6% of anthracene compounds (alizarin, ruberythric acid, galiosin, purpurin, xanthopuipurin, pseudopurpurin, rubiadin-glucoside, munistin, lucidin, ibericin, etc.).



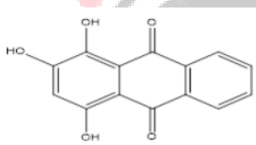
Anthracene



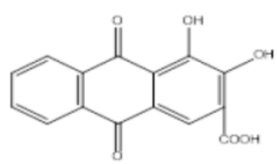
Alizarin



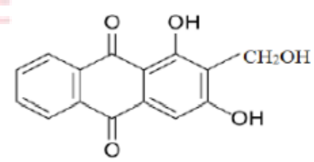
berythric acid



Purple

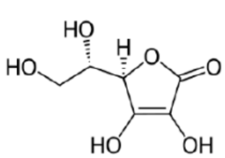


Pseudopurpurin

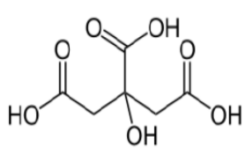


lucidin

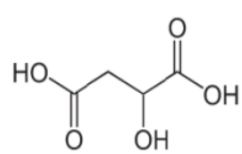
In addition to anthracene products, organic acids in plant roots contain up to 15% of sugars, proteins, pectin substances, ascorbic acid, and citric, olenic, and tartaric acids.



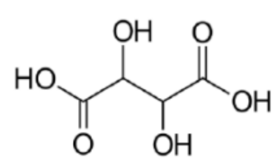
ascorbic acid



citric acid

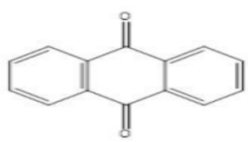


malic acid

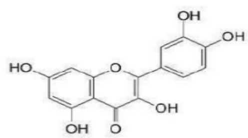


tartaric acid

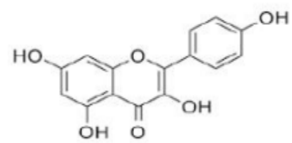
The root of Rubia tinctorum plant contains carbohydrates, phenolic acids and compounds, coumarin, anthraquinone, triterpenoids, flavonoids (quercetin, kaempferol, apigenin).



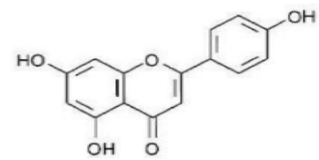
antiroxinon



kversiten



kempferol



apigenin

The plant Rubia tinctorum has antispasmodic and diuretic effects in medicine and softens kidney stones (phosphates). Therefore, medicinal preparations are used in ureteral stones, kidney stones, gallstones and gout.

In addition to the medicinal use of the Rubia tinctorum plant, silkworms and cotton grown in our Republic are dyed with recycled yarn, carpets, fabrics, and materials as a natural dye. leads to an increase (Fig. 2).

Fig.2. Yarn dyed with natural chemicals extracted from the Rubia tinctorum plant.

In the following years, the notions that mineral elements are necessary for plants began to emerge. One of the founders of this concept is agronomist A.T. Bolotov (1770). He put forward the idea that mineral particles in the soil are the main food for aquatic plants. A.T. Bapotov also developed methods of applying fertilizer 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 law of reversion. According to these laws, if the mineral elements necessary for plants in the soil do not reach the minimum, then the soil will not be useful. In the law of return, it is explained that as much as the plants take mineral substances from the soil with their crops, it is necessary to return as much instead. Otherwise, the fertility of the soil, and therefore the productivity, will decrease year by year. Libich's thoughts are generally correct. Productivity can be increased as a result of proper agrotechnical activities and timely provision of soil with mineral elements. The experiments conducted by I. Knop and Yu. Sakslam in 1859 also disproved the "humus theory". In my opinion, if there are 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 methods (soil, water, sand) and confirmed the theory of mineral nutrition. The idea of plant nutrition through roots was further developed by P.A. Kostichev, B.B. Dokuchaev, K.K. Gedroys, D.N. Pryanishnikov and other scientists [4-9].

Plants have the ability to absorb all the elements shown in the periodic table in small or large amounts from the natural environment. However, so far, only 19 of these elements have been found to be of great importance for plants, as they cannot be replaced by other elements. These are carbon, hydrogen, oxygen, nitrogen, phosphorus, sulfur, potassium, calcium, magnesium, iron, manganese, copper, nickel, molybdenum, boron, chlorine, sodium, silicon and cobalt. 16 of them belong to the group of mineral elements. Because carbon, hydrogen and oxygen are received by the plant in the form of CO_2, O_2 and N_2O. 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 colloids. The absorption of ions does not depend only on plants, but also on the concentration of this 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 the elements (N, P, K, Ca, Na, Mg) whose quantity in plants is more than 10^{-2} percent.

2) Microelements include elements (Mn, B, Cu, Zn, Mo, etc.) whose amount in plants is 10^{-3} - 10^{-5} percent.

3) Ultramicroelements include elements that are very small (10^{-6} percent and less) and whose function has not been determined (Ce, Se, Ca, Ng, Ag, Au, etc.) in the plant [9].

Deficiency of a 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 plant's ability 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 elements are absorbed by plants in which phases of development.

RESULTS AND DISCUSSION

When determining the amount of mineral elements in the root of Rubia tinctorum L., it was determined using the X-ray fluorescence spectrometry method on the Spectro Xepos 111 (SShA) device. Technical specifications of the device: The device has a voltage of 120/230 V, a power of 150 W. was carried out using For this purpose, the root of the plant is ground into a powder and 5 g is taken into special containers for X-ray analysis, and the root powder of Rubia tinctorum L. is placed in the containers separately installed on a circular disk. The device analyzes for 20 minutes. After the analysis of the results, the results are automatically displayed on the screen through a computer connected to the device. The results of these studies show that the amount of 56 elements and 9 compounds of the root of Rubia tinctorum L. was determined. %), Silicon Si (15.58 %), Calcium oxide CaO (11.22 %), Calcium Ca (89.56 %), Potassium K (13.52 %), Phosphorus oxide P205 (7.284 %), Scandium Sc (64.01), It turned out that the amount of sulfur S (1.329) elements and its compounds is more than others.

CONCLUSION

The number of mineral elements contained in the root of Rubia tinctorum L. plant was determined by "X-ray fluorescent spectrometer Spectro Xepos 111, technical indicator: 120/230V, power 150W. 56 elements and 9 of its compounds were found in the root of the plant, and the amount of Aluminum oxide A1203 (2.174 %), Aluminum A1 (6.714 %) in the root of Rubia tinctorum L. was determined. Silicon oxide SiO2 (3.553 %), Kgetpyu Si (15.58 %), Calcium oxide CaO (11.22 %), Calcium Ca (89.56 %), Potassium K (13.52 %), Phosphorus oxide P205 (7.284 %), Scandium Sc (64.01), Sulfur S (1.329) elements, it was found that the number of certain compounds is more than the basic elements.

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