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VITAMINS AND ALKALOIDS IN SOME MEDICINAL PLANTS (ACHILLEA MILLEFOLIUM L., CAPPARIS SPINOSA L., HYPERICUM PERFORATUM L.) AND THEIR EFFECTS ON HUMAN HEALTH

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Annotation

This article provides information on the morpho-physiological characteristics, chemical composition, especially the amount of alkaloids and vitamins, and their function in the body, as well as thorn bushes, hole field, yarrow plants, which are considered medicinal plants.

The article deals with the botanical and morpho-physiological characteristics of the plant Achillea Millefolium L., one of the medicinal plants used in scientific medicine, systematics, some biologically active substances in the chemical composition, especially vitamins and alkaloids, their function in the body and their role in human health. details are given.

The following article describes the role of Capparis spinosa L. in modern taxonomy, its distribution, the structure and properties of the most common alkaloids and vitamins in the plant, and its biochemical functions in the human body.

The article concludes with a detailed description of the morpho-physiological characteristics of the plant Hypericum Perforatum L., its chemical composition, especially the amount of alkaloids and vitamins and their function in the body and their role in human health.

Keywords: Achillea Millefolium L., Capparis Spinosa L., Hypericum Perforatum L., Pharmaceutical composition, alkaloids, vitamins, medicines, healing properties

Introduction

Mankind has long been in need of medicinal plants, and these needs are still relevant today.

No. PQ-4670 of the President of the Republic of Uzbekistan dated April 10, 2020 "On measures for the protection, cultivation, processing and rational use of available resources of wild-growing medicinal plants" In recent years, the country has been carrying out consistent reforms in the field of protection of medicinal plants, rational use of natural resources, the establishment of plantations for the cultivation of medicinal plants and their processing.

Of the more than 4,300 plants belonging to our local flora, 750 species are medicinal, of which 112 species are registered for use in scientific medicine, of which 70 species are actively used in the pharmaceutical industry. Plants such as Achillea Millefolium L., Capparis spinosa L., Hypericum Perforatum L. have a special place in the list of similar plants. (Paragraphs 31,42,43 of the Appendix Table of Decision No. PQ-4670).

Main Part

Yarrow (Achillea Millefolium L.) is widespread in temperate regions of the Northern Hemisphere in Asia and Europe and North America, and in the desert and mountainous regions of Uzbekistan. It is a perennial plant 0.2–1 m tall (0.66–3.28 feet) and grows flat. The leaves are evenly distributed along the stem and are double-stalked, 5–20 cm long, almost hairy, and contain kaulin, which is sticky. The flowers are located in a large, compact thyroid inflorescence at the top of the stem, each cluster consisting of 1 or more flower heads. The inflorescence has 20-25 yellowish-white (rarely pink) light flowers. The fruit is flat, ovoid, gray pistachio.

Chemical composition of yarrow (Achillea Millefolium L.) includes biologically and chemically active substances carotene, vitamins K and C, alkaloids axillein and betonicin, up to 0.8% essential oil, matricarin isomer, millefin lactone, 0.31% choline, asparagine, resin, astringent, bitter (proxamazulene-axillin) and other substances. The essential oil contains 1-4% of hamazulen (the main part is formed from proxamazulene during the extraction of essential oil), thyme, camphor, borneol, carioffillen, up to 10% of cineole, formic, acetic and valeric acids. One of the most common vitamins in plants is vitamin C.

The taxonomy of yarrow (Achillea Millefolium L.) is shown in Table 1.

Table 1

Section	Magnoliophyta
Classis	Magnolipsida
Ordo	Asterales
Family	Asteraceae Dumort.
Category	Achillea L
Typus	Achillea Millefolium L

Kavul is also called Kavar by our people. Experts date the name to the Dashti Kavir Desert in Iran. Because pumpkin is the most common plant in the area. It has been cultivated in France, Spain, Italy, Algeria and Cyprus, Greece and North America. It grows naturally in the mountainous areas of the country. In particular, it can be found in Zaamin, Gallaorol, Forish, Sharof Rashidov of Jizzakh region, Bulakbashi of Andijan region, Chust and Kosonsoy districts of Namangan region, in the foothills of Tashkent region.

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The leaves are light green, waxy, elliptical and banded. The side of the leaf is not very large, thorny. Kavul grows from May to October. It blooms piece by piece. The flower opens in the morning and closes in the evening. The pumpkin blooms with a long band next to the leaves. The flower is up to 3 cm in circumference, with long hairs in the middle of the white-pink flowers. Kavul is a sun-loving and drought-tolerant plant. It grows in one place for more than 15 years. It can be propagated from seeds, from a part of a bush. After ripening green, ovoid, and cucumber-like fruits, the tulip pattern opens. It can withstand temperatures down to -8°C. The chemical composition of Capparis spinosa L. includes carotene, vitamins K and C, cytohydrin alkaloids, essential oil, resin, additives and other substances from biologically and chemically active substances.

The taxonomy of Capparis spinosa L. is shown in Table 2.

Table 2

Section	Magnoliophyta
Classis	Magnolipsida
Ordo	Dilleniidae
Family	Cappariceae Juss.
Category	Capparis L
Typus	Capparis spinosa L.

Hypericum Perforatum L. is a perennial herbaceous plant up to 30-100 cm in height. The leaves are simple. Long ovate, flat-edged. The flowers are golden-yellow, clustered in a thyroid gland. The fruit is a three-chambered, multi-seeded pod that opens when ripe. Hypericum Perforatum L Ukraine, Belarus, Moldova, the Baltic states. Occurs in the forested, forest-desert zone of the European part of Russia and Western Siberia, the Caucasus and Central Asia.

According to the chemical composition, 10-12.8% of additives, 0.1-0.4% of atratsen products (hypericin, pseudohypericin, etc.), flavonoids (hyperoside, rutin, quercetrin, isocversitrin, quercetin, myricetin, etc.) 0.1 -0.33% essential oil, 55mg% carotene, 1151.8mg% vitamin C, 34 mg% choline, very small amount of alkaloids and up to 10% resin. Although very small, the alkaloid galantamine is widely used in medicine.

The taxonomy of Hypericum Perforatum L. is shown in Table 3.

Table 3

Section	Magnoliophyta
Classis	Magnolipsida
Ordo	Dilleniidae
Family	Hypericaceae
Category	Hypericum L.
Typus	Hypericum Perforatum L.

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Systematic Classification and Content of Certain Medicinal Plants

Table 4

№	Typus of plants	Category	Family	Contains alkaloids
1	Kovar Capparis spinosa L.	Capparis L.	Cappariceae Juss.	Stachydrine
2	Hypericum Perforatum L.	Hypericum L.	Hypericaceae	galantamine
3	Yarrow Achillea Millefolium L.	Achillea L.	Asteraceae Dumort.	achilleine and betonitsine

As can be seen from the table above, these medicinal plants contain important alakloids.

Alkaloids are basic nitrogenous organic compounds found in plants, rarely in animals, and have basic properties. Among them, morphine was first isolated (1806) by the German pharmacist Serturner from opium. Scientists then concluded that plants contain not only chemical compounds with neutral and acidic properties, but also substances with basic properties.

In the 19th century, strychnine, quinine, caffeine, atropine, ephedrine, and others were isolated. In the 1960s, more than 1,000 naturally and artificially derived alkaloids were known. Alkaloids are active substances that regulate plant life. Most alkaloids are colorless crystals that are chemically heterocyclic compounds with nitrogen atoms in the ring. Simple alkaloids contain about 10, while complex ones contain more than 50 carbon atoms. Alkaloids form crystalline salts with sulfuric, chloride, salicylate, oxalate, and other acids; this process is used to clean and remove them. The element that gives alkaloids an alkaline property is nitrogen. In the field of alkaloids, academicians from Uzbekistan The work of S.Y. Yunusov and O.S .Sodiqov with their students in this area is significant. According to the law discovered by S.Y. Yunusov, Alkaloids accumulate in early spring in the above-ground parts of the plant, in autumn in the seeds of annuals, and in perennials onions, roots and seeds in terms of quantity.

Hegnauer (1960) divided alkaloids into three types: true alkaloids, pseudoalkaloids, and protoalkaloids. The term dry alkaloid is derived from the nomenclature of natural products and falls into the fourth category:

a) True alkaloids: Secondary metabolites that have heterocyclic nitroxenu and the amount of carbon is derived in part or in whole from a protein amino acid.

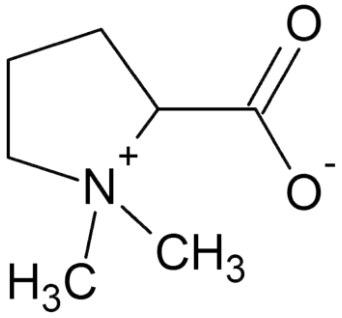
b) Pseudoalkaloids: Secondary metabolites containing nitroxenu but never biosynthesized from amino acids are not formed as a result of the triple formation of

nitroxen in the form of ammonia to terpene, steroids, polycetides, monosaccharides, or acidic fats.

c) Protoalkaloids: Secondary metabolites that do not form a heterocyclic system and are formed from a protein amino acid. Many of these compounds have an amino group, an amide, and so on.

d) Secoalkaloids: Alkaloids derived from true alkaloids, but we believe that an open-chain nitrogen group is formed using heterocyclic aniellu. Stachydrine alkaloids belong to the group of true alkaloids (figure 1).

In Mesoamerica, a variety of alkaloids have been used in traditional Mayan medicine since ancient times. Psychotropic substances, both alkaloids and alcohol, have been used for medical purposes and rituals for more than two thousand years.



Fugure 1. Stachydrine

Derivatives of the alkaloid Stahydrin are used in medicine for various purposes. For example:

Functions and benefits of stachidrin hydrochloride (HCl)

1. Stahydrin hydrochloride can be used to boost immunity and antibacterial agents.
2. Stachydrine hydrochloride can be treated with delayed or suppressed menstruation.
3. Stachydrine hydrochloride can be used as a tonic in menopause.
4. Stachydrine HCl helps a woman's breasts to improve naturally.
5. Stachydrine hydrochloride powder can be used to slow the heart rate, treat arrhythmias, reduce the volume of antinginal and myocardial infarction.
6. Stachydrine hydrochloride can treat kidney failure, improve kidney function.
7. Stachydrine hydrochloride has a significant diuretic effect.

Stahydrin 1% ~ 30% 10: 1/20: 1 ratio solutions are used for the following purposes:

1. Has a stimulating effect on the uterus, which can significantly increase the contraction of uterine muscles;
2. With the function of increasing coronary flow and nutrient blood flow to the myocardium;
3. Can treat acute renal failure, has a significant diuretic effect;

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4. With the function of enhancing immunity and antibacterial properties.

For the treatment of irregular menstruation caused by stasis in women blood clotting, dysmenorrhea, amenorrhea. To treat tumors, it is difficult to urinate with constant heat.

It can also be used in the treatment of skin wounds and carbuncles caused by harmful heat, as well as in the cleansing effect of heat and toxins. For the treatment of amenorrhea (absence or suppression of the stomach), dysmenorrhea (painful menstruation) and postpartum abdominal pain due to bleeding, hemostasis and vaginal stagnation, etc. is used. Stachydrine is especially important in the treatment of angina.

Galantamine helps to conduct excitation at nerve-muscle synapses. Entering the blood-brain barrier, in appropriate doses facilitates the conduction of impulses at the cholinergic synapses of the central nervous system and enhances excitation processes, increases the smooth tone of muscles and the secretion of the stomach and sweat glands. Used in the treatment of poliomyelitis in children.

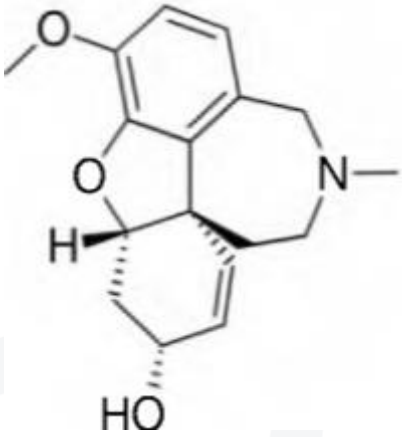


Figure 2. Galantamine

Achillein is used in the treatment of gastrointestinal diseases (ulcers and gastritis and inflammation of the mucous membranes), as an appetite suppressant and anticoagulant (intestinal, uterine and hemorrhoidal bleeding), as well as in bleeding from the nose, gums and wounds. used to stop. Achillein belongs to the group of pyrrolizidine alkaloids (Figure 3).

Pyrrolizidine alkaloids (PA) are a group of naturally occurring alkaloids based on the structure of pyrrolizidine. Pyrrolizidine alkaloids are produced by plants as a protective mechanism against insect bites. More than 660 PA and PA N-oxides have been detected in more than 6,000 plants, about half of which exhibit hepatotoxicity. They are most common in plants of the families Boraginaceae, Asteraceae, Orchidaceae and Fabaceae. Less common in convulsions and poaceae, and in at least one species of lamiaceae. It is estimated that 3% of flowering plants in the world

contain the alkaloids pyrrolizidine. Honey may contain the alkaloids pyrrolizidine. To date, there is no international regulation of PA in food, unlike herbs and drugs. Unsaturated pyrrolizidine alkaloids are hepatotoxic, meaning they damage the liver. The disease associated with PA consumption is called pyrrolizidine alkaloidosis.

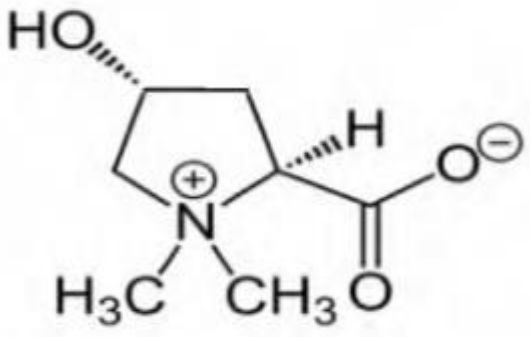
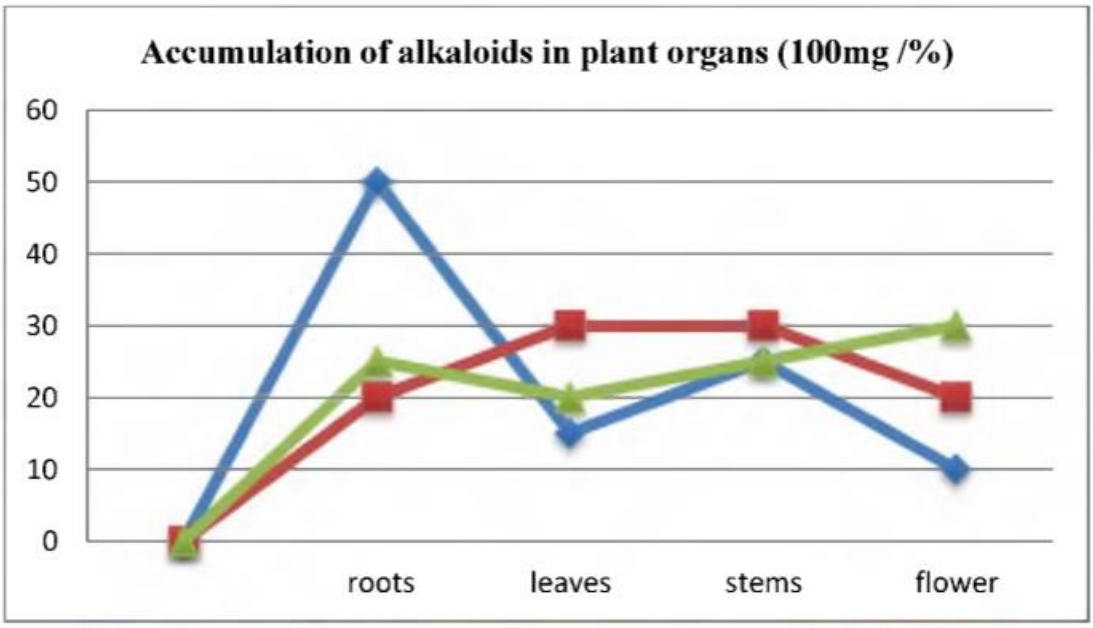


Figure 3. Achilleine

Alkaloids are among the most potent natural substances in the field of pharmacology. They are used to stimulate the central nervous system, sedatives, expectorants, hemostasis and other properties. They accumulate in different amounts in different vegetative and generative organs of plants.



Blue- *Capparis L* Green- *Hypericum L* Red- *Achillea L*

It is worthwhile to define the concept of vitamins before talking about the vitamins that belong to the biologically active substances found in plants Achillea Millefolium L., Capparis spinosa L., Hypericum Perforatum L.

Vitamins (Latin vita - "life" + amine), drugs - organic compounds necessary for the vital functions of a living organism and normal metabolism. They have different chemical structures. Ancient Chinese books, and later the writings of Hippocrates, reported that people became ill as a result of nutrient deficiencies. The scientific study of vitamins began in the 18th century. The English physician J. Lind (1757), the French physiologist F. Majandi (1816), the Russian physician NI Lunin (1880), the Dutch physician Eikman (1897), and the English scientist F. Hopkins (1906) made significant contributions to the study of W. . Vitamins are not synthesized in the body, a person receives the necessary vitamin with various nutrients. Hypovitaminosis occurs when there is a lack of vitamins in the diet, and avitaminosis when there is no vitamin at all. The main source of vitamins are plants. Microorganisms also play an important role in vitamin production. The biological significance of vitamins is that they have a regulating effect on metabolism. Vitamins enhance chemical reactions in the body, affect the body's absorption of nutrients, promote the normal growth of cells and the development of the whole organism, enter the body of enzymes and ensure their normal function and activity. Vitamins are involved in energy metabolism (B, B2), amino acids (B6, B12 B.) and fatty acids (pantothenic acid), photosynthesis (vitamin A), blood clotting (vitamin K) and calcium absorption (vitamin D). Thus, when the body lacks or lacks any vitamins, the metabolism is disrupted. Lack of vitamins in food reduces a person's ability to work, reduces the body's ability to withstand diseases and adverse environmental influences. Vitamin deficiency is caused not only by a lack of vitamins in the diet, but also by a violation of their absorption in the intestine, their delivery to the tissues and their conversion into biologically active forms. However, overdose of some vitamins can lead to hypervitaminosis. In recent years, the chemical structure of more than 30 vitamins has been fully studied, and many have been synthesized.

Initially, the vitamin was conditionally denoted by the capital letters of the Latin alphabet: A, B, C, D, E, P.... Later, the only name of international standardization on the chemical structure of the vitamin was adopted. Vitamins are divided into water-soluble, fat-soluble and vitamin-like compounds. Fat-soluble vitamins include A, D, E and K, water-soluble vitamins include B complex vitamins and C, PP. In addition to vitamins, there are provitamins, which are converted into vitamins by various changes in the body. Provitamins include carotene (provitamin A) and some sterols (ergosterol) that are converted to vitamin D. A person's daily vitamin needs depend on the general condition of the body, lifestyle, health or disease. Vitamins A, B, B_2, C, D, PP are especially important for human life.

Function of Vitamin C: Vitamin C - reduces the strength of allergic conditions, strengthens blood vessels, increases the body's resistance, improves the condition of connective tissue. Ascorbic acid (vitamin C) is important in metabolism, the assimilation of connective tissue, and the maintenance and repair of these tissues. At the same time, it keeps the skin smooth and protects it from rapid aging. In addition, ascorbic acid is involved in blood transfusion and is also involved in the production of certain hormones. Vitamin C has protective properties against viral and bacterial infections. Vitamin C helps in the proper distribution of pigment in the skin. Vitamin C. Ascorbic acid is necessary for the formation of intracellular collagen, has the property of strengthening the structure of teeth, bones and capillary walls. Participates in oxidation-reduction reactions, tyrosine metabolism, conversion of folic acid to folic acid, carbohydrate metabolism, lipid and protein synthesis, iron metabolism, cellular respiration, activates the synthesis of steroid hormones. Reduces the need for vitamins B_1, B_2, A, E, folic acid, pantothenic acid, increases the body's resistance to infections; improves the absorption of iron, helps it to accumulate in a reduced form. Has antioxidant properties.

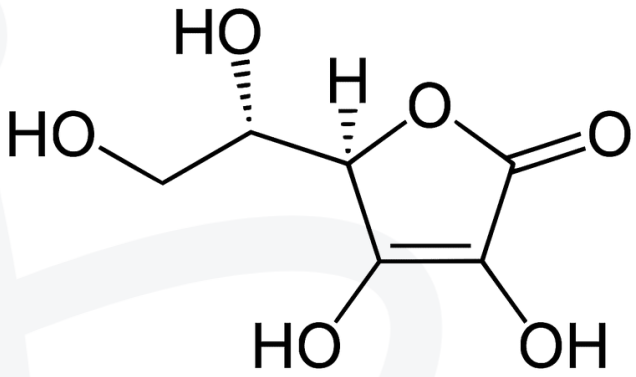


Figure 4. Vitamin C or L-Ascorbic acid

Vitamin C deficiency can cause discoloration of the skin and fatigue. Lack of vitamin C in the body leads to a breakdown of the structure of the joints and bones, as well as leprosy. Ascorbic acid is not formed or accumulated in the body. The daily requirement of a person in this vitamin is 60-100 mg.
These herbs also contain vitamin K.

Phylloquinone (vitamin K) is one of the main factors in blood clotting. When the body is deficient in vitamin K, bleeding from various organs (nose, gums, gastrointestinal tract) is observed. Phylloquinone is found in lettuce, cabbage, spinach, and the green part of yarrow. Vitamin K is the group name of lipophilic (fat-

soluble) and hydrophobic vitamins required for the synthesis of proteins that maintain a normal level of blood coagulation. It is chemically a derivative of 2-methyl-1,4-naphthoquinone. It plays an important role in the metabolism of muscle and connective tissue, as well as in the healthy functioning of the kidneys. In all of these cases, the vitamin is involved in the absorption of calcium and the interaction of calcium D.

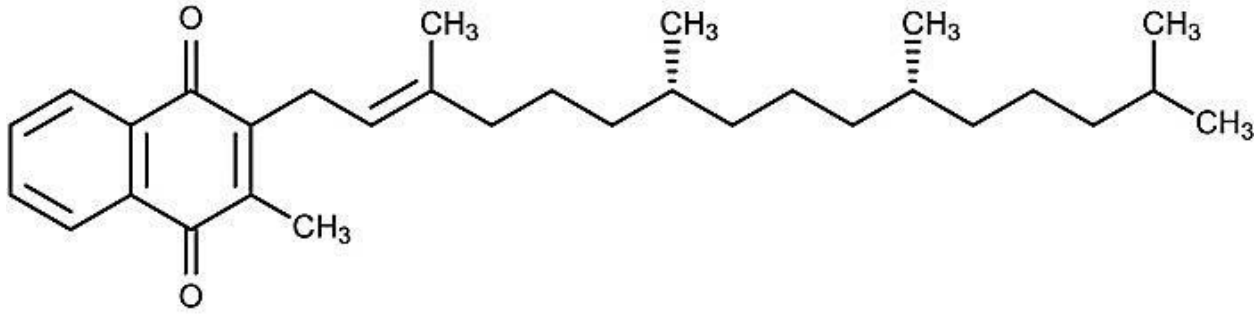


Figure 5. Vitamin K_1 – Phylloquinone

Vitamins are reduced when fruits, vegetables and medicinal plant products such as yarrow are stored for a long time and cooked improperly. The most volatile of the vitamins is ascorbic acid, which is degraded by sun, hot and humid air. When preparing herbal tinctures as a medicine, vitamins should be soaked in boiling water and the lid should be closed to preserve ascorbic acid. Vitamins should be taken only on the advice of a doctor, as they have a strong biological effect.

Today, biopolymers (proteins and peptides, nucleic acids and nucleotides, lipids, polysaccharides) and phytohormones, including bioregulators (enzymes, vitamins, hormones), as well as biologically active compounds prepared by synthesis, such as drugs, growth agents, herbicides much is being studied. It is important to synthesize them chemically, to determine their structure, to reveal the relationship between the structure and biological properties of these substances, to study the chemical aspects of the biological effects of biopolymers, as well as natural and synthetic bioregulators. If the body lacks any biologically active substances, such as vitamins, it can lead to various diseases.

In conclusion, these alkaloids are the most important biologically and chemically active substances in medicinal plants. Alkaloids are not only involved in physiological processes in plants, but they are also important for all living organisms. The galantamine alkaloid in the plant Hypericum Perforatum L. is especially important in the treatment of gastrointestinal diseases, especially colitis. The main goal of conservative therapy is to alleviate the symptoms of the disease and bring the patient into a state of remission for a long time.

Ulcerative colitis can only be completely cured by surgery, but surgical intervention also does not guarantee complete recovery. In ulcerative colitis, frequent and small amounts of food, drinking enough water, taking vitamin complexes, and the galantamine alkaloid are very important.

Therefore, it is important today to establish plantations rich in alkaloids and to find ways to extract pure and large amounts of alkaloids from them.

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