Onions and garlic in herbal medicine and homeopathy. Publication 4: Some results of studying the mechanisms of action of biologically active substances, raw materials and phytopharmaceuticals

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This work continues a series of publications devoted to some members of the genus Allium used in herbal medicine and homeopathy - Allium cepa L. (onion) and Allium sativum L. (common garlic). The first publication was devoted to the use of these plants in folk and traditional medicine in Russia and other countries of the world [13]. The second publication contained experimental and literary data on the chemical composition of onions and garlic [25].

The purpose of this study is to analyze and summarize information about the pharmacological activity and the characteristics of the action of biologically active substances (BAS) raw materials of onions and garlic, as well as preparations from them.

It is very interesting, from our point of view, to compare the spectrum of "clinical" use of the studied objects in folk and traditional medicine with indications for the use of official phytopharmaceuticals obtained from onions and garlic, registered in the Russian Federation (especially taking into account the degree of study of the biological activity of the entire spectrum BAS found in raw materials and producing plants).

1. SEED GARLIC

The medical, biological and pharmacodynamic studies begun in the 30s of the XX century and continuing to this day make it possible to state with certainty that garlic, as well as preparations based on it, have high pharmacological activity. To date, a number of publications have shown that garlic biologically active substances act in a complex, complementing and regulating each other's action.

It has been established that the entire sum of the active components of garlic, like other medicinal products (MPs) of natural origin, has a physiological effect on the body; side effects are much less common in comparison with synthetic drugs.

The literature describes the following types of pharmacological action of garlic and various biologically active substances from it: bactericidal [3, 5, 6, 8, 9, 11, 12, 14, 16, 17, 29, 31, 35, 34, 37, 38, 44, 48], fungicidal [6, 9, 14, 30, 34, 35, 37, 38, 44, 48], hypoglycemic [16, 26], hypocholesterolemic, hypolipidemic [5, 16, 18, 26, 30, 42, 45], antithrombotic [26, 30], locally irritating [16, 23, 30, 32,

44], anticarcinogenic, antimutagenic [16, 30, 32, 44], antioxidant [15, 28, 30, 42, 44, 45, 47, 51], anti-inflammatory [8, 30, 44], hypotensive [6, 12, 16, 26, 48], stimulating appetite, enhancing the secretory activity of the stomach [5, 8, 12, 48], intestines, liver; diuretic [6, 12], diaphoretic [16], expectorant [9, 14, 16, 17, 44], analgesic, antispasmodic [8, 44, 48].

1.1. Bactericidal, antibacterial, antiviral action

Garlic phytoncides have a wide spectrum of bactericidal action. In addition to Professor B.P. Tokien, who discovered the phenomenon of phytoncidity in 1929, are considered the pioneers in this field by the Soviet scientists A. Filatova and A. Tebyakin, who in 1931-1933. discovered a strong antimicrobial effect of onions, garlic and some other food plants on bacteria that are pathogenic for humans. I. V. Toroptsev and Kamnev I.E. proposed a bactericidal preparation from garlic in the form of powder and solution. Etc. Janovic received garlic extract - sativin. In 1944–45, American scientists extracted the bactericidal drug allicin from garlic and suggested its chemical nature. In 1948, a synthesis of the active bactericidal substances of garlic was carried out in Switzerland [34]. The fact turned out to be very interesting,

In 1956, in a number of works it was shown that the components of phytoncides are compounds formed during the main metabolic processes (photosynthesis, respiration, etc.) [37].

Later observations on volatile phytoncides of garlic showed that the bactericidal effect is determined, among other things, by sulfide compounds and other active volatile components. Some researchers associate the mechanism of antibacterial action of allicin [25] with its ability to block sulfhydryl groups of enzymes, but other authors suggest that this alone cannot fully explain the mechanism of antimicrobial activity [11].

Volatile phytoncides kill in the first minutes of the experiment staphylococci, streptococci, typhoid bacteria, dysentery bacillus, bacteria that cause rotting of corpses of animals and plants, and many other microorganisms. Already a 15-minute exposure to fresh aqueous garlic extract weakens the tubercle bacillus, and after 30 minutes it undergoes drastic changes and dies. At the same time, the relative harmlessness of volatile phytoncides of onion and garlic for mammals and humans was shown [34].

An antibacterial effect has been found in an aqueous extract of garlic against Helicobacter pylori [29]. According to O.D. Barnaulova, 0.5% infusion of garlic within 5 minutes kills typhus pathogens, 3% infusion acts bacteriostatically on pathogens of typhoid, paratyphoid, cholera, dysentery, diphtheria, on diplococci, staphylococci, E. coli [3].

Experiments on the study of therapy of influenza infection with garlic preparations

showed that garlic juice and garlic alcohol preparation - sativin in experiments in vitro destroyed the influenza virus PR-8, but did not have a retarding effect on the multiplication of the virus in developing chicken embryos. Volatile fractions and garlic juice also did not delay the development of influenza infection in mice. Garlic juice injected into the nasal passages of mice 1 hour before infection and for 3 days after infection did not protect mice from influenza [37].

According to O.D. Barnaulov, the effectiveness of garlic preparations in the treatment of influenza is still associated with phytoncidal activity. In addition, it is caused by stimulating the production of antibodies, reducing the titer of the virus in the blood, thinning and separating sputum, and improving the drainage function of the bronchi [3]. When the components of garlic oil are exhaled through the lungs, pulmonary secretions are liquefied and their exit is facilitated [48]. Garlic phytoncides, when applied topically, are absorbed into the wound and have an antiseptic stimulating effect without causing side effects [36].

Sitosterol, aescin, and garlic garlic are herbal antibiotics and are used in the treatment of ureteral infections in children, as well as in the treatment of bacterial and amoebic dysentery [30].

1.2. Fungicidal action

In an atmosphere of volatile phytoncides or in contact with garlic juice, microscopic fungi, for example, molds, die [34]. In total, the fungistatic and fungicidal action of phytoncides of onion and garlic against 13 strains of fungi pathogenic for humans has been established; as a result, onion and garlic preparations are often practically used in a number of fungal diseases as an adjuvant [27].

When studying the fungicidal activity of garlic essential oil, it was found that the greatest activity was shown by ajoene, which at a concentration of 20 μg / ml completely inhibited the growth Aspergillus niger and Candida albicans. Ajoenand its analogs actively inhibit the growth of microorganisms such as Candida, Trychophyton, Microsporium, Epidermophyton, etc. According to G.I. Slepko et al.,they can be used even in the treatment of systemic mycoses caused by Candida albicans, Cryptococcus neoformans, Aspergillus flavus, Aspergillus fumigatus, Coccidioides, Paracoccidioides, Hystoplasma, Blastomyces [thirty].

1.3. Anticarcinogenic effect

The anticarcinogenic effect of garlic extracts is due, according to the latest data, to the presence of ajoene [41] and other sulfur-containing compounds in them. A significant body of information has already been accumulated on the anticarcinogenic effect of garlic extracts. In a patent application from Germany, it is proposed to use ajoene and its derivatives as cytostatic and cytotoxic drugs [29, 30].

When tested on human FS4 fibroblasts, hamster kidney cells, and a tumorigenic lymphoid cell line from Burkitt's lymphoma, ajoen showed a cytostatic effect at a concentration of 2-50 μg / ml. An inhibitory effect of garlic and onion oils on the growth of skin tumors has been shown.

mice: garlic extract in the experiment suppressed the effect of the carcinogen 12O-tetradecanoylphorbol-13-acetate on the skin [30]. Garlic extract reduces the toxicity of cyclophosphamide (CPA), increasing the lifespan of mice by 70% when they are injected with a chronic lethal dose of CPA, while significantly reducing the level of liver lipid peroxidation caused by CPA [30].

The results of a number of studies [32] show that garlic and onions have a onion moderate inhibitory effect on growth
human lymphoblastoid cells of the Raji line (Burkitt's lymphoma) at concentrations of 50-200 μg / ml. Statistically reliable data have been published that in countries where a lot of garlic is consumed, cancer is much less common [2, 21, 30].

Tests of the activity of garlic and onion phytoncides in the treatment of precancerous conditions that are not amenable to conventional conservative treatment methods showed that garlic phytoncides, which were injected under the epidermis, observing strict sterility, have the greatest activity. Acute epidermitis developed at the site of application of the drug, and intensive epithelialization was noted on the 8-11th day. Of 74 patients with precancerous conditions, a pronounced positive effect was observed in 63. The author notes that the activity of phytoncides does not last long, so they should be used immediately after extraction [2].

The study of the effect of the synthetic alliin preparation, which is the oxide-S-allyyl-L-cysteine, free of accompanying substances present in the preparation from garlic bulbs, on the growth of transplanted tumors, as well as on induced rat tumors, showed that under the influence of alliin, no only resorption of tumors, but even a pronounced inhibition of their growth. Some scientists (Di Paolo and Carruthers), on the basis of their research, consider alliin, allicin and onion extract preparations unpromising from the point of view of their use in tumor chemotherapy [2].

There is evidence that the inulin contained in garlic bulbs is capable of influencing the course of carcinogenesis through the immune system [30]. Thus, despite the rather contradictory data of experimental and clinical studies on the anticarcinogenic properties of garlic biologically active substances, preparations from this plant have found application, which is still limited, in the treatment and prevention of precancerous and cancerous diseases [2].

1.4. Antimutagenic action

The anti-mutagenic effect of garlic has been linked to allicin, which is partially responsible for reducing radiation-induced mutagenesis in Salmonella test strains. Antimutagenic activity of an aqueous extract of garlic is manifested in relation to ionizing radiation, peroxides, adriamycin, N-methyl-N-nitronitrosoquonidine. Garlic extract reduces the lethal effect of γ-rays in E. coli [30].

1.5. Antioxidant effect

There is a large amount of data in the literary sources that

bulbs of garlic and onions have antioxidant activity [51]. It is assumed that this type of action is associated with the presence of sulfur-containing components in garlic, including allicin (bulbs) [47, 51] or ajoene (in garlic extract) [30].

In the process of biosynthesis squirrel v maintaining oxidative the reduction potential of the cell is played by sulfur-containing compounds. In particular, the level of sulfhydryl groups plays an important role in protecting the body from radiation. H-groups act as acceptors of free radicals that are formed in the body as a result of radiation [15].

The antioxidant effect is greatly enhanced by the presence of selenium in garlic, an important component of the antioxidant system. The selenium content in fermented garlic powder reaches 0.2 mg per 100 g of product [30].

Extract garlic enhances activity v tissues mice glutathione peroxidase, a selenium-containing enzyme that plays an important role in the antioxidant defense of the body [30]. The extract also reduces the intensity of peroxidation processes by increasing the antioxidant protective potential in the liver and aorta cells of rabbits receiving cholesterol for 4 months [42, 45].

The alcohol-soluble fraction of garlic reduces the level of lipid peroxidation in rat liver cells. Sulfur-containing components, in addition, give a noticeable hepatoprotective effect in liver damage by carbon tetrachloride [30].

In addition to allicin, the antioxidant effect of garlic, apparently, can be provided by other substances, since no strict correlation was found between the amount of allicin in garlic bulbs and the degree of antioxidant activity.

1.6. Anti-inflammatory action

According to Slepko G.I., garlic and onion oil, ajoene, and diallyl disulfides are inhibitors of 5-lipoxygenase and cyclooxygenase, which provide the biosynthesis of leukotrienes and prostaglandids. The most active inhibitor is ajoene [30].

1.7. Anti-atherosclerotic properties

The anti-atherosclerotic properties of garlic are of great interest for practical health care. The obtained results of numerous clinical studies indicate the indirect and direct antiatherosclerotic action of garlic and its preparations [26].

1) Indirect action (influence on risk factors for atherosclerosis)The main risk factors for cardiovascular diseases are: age, hypercholesterolemia, hypertension, diabetes mellitus, smoking, male sex [26].

The lipid-lowering effects of garlic have been identified in more than 20 independent laboratory and clinical studies; cholesterol is reliably established

reducing the effect of drugs from this plant [30]. "Garlic" therapy also leads to a decrease in the level of triglycerides in the blood serum, which is a consequence of the ajoene inactivation of pancreatic lipase, which is an SH-enzyme. Allicin specifically inhibits acetyl-CoA synthetase [18, 30].

Laboratory studies on animals have shown that garlic, its main active compounds, as well as preparations from it, exhibit hypotensiveeffect that can at least partly be due to directrelaxing effect on smooth muscles. Allicin and ajoene open K^+- channels, causing membrane hyperpolarization, which leads to a decrease in the Ca current^{2+}
into the smooth muscle cell of the vessel and causes vasodilation as a result of a decrease in the level of intracellular calcium [26]. There is evidence that with prolonged storage of the garlic preparation, its antihypertensive effect decreases.

The deposition of lipids in the arterial walls and cholesterol metabolism are influenced by the B vitamins contained in garlic, which have a lipotropic effect, as well as ascorbic acid. Ascorbic acid in large doses lowers the level of cholesterol in the blood and increases its secretion by the liver [31].

Numerous studies have shown that phytosterols, incl. found in garlic [25], have a cholesterol-lowering effect, which is explained by the binding of fatty acids, which prevents the absorption of cholesterol. There are also other mechanisms of the anticholesterolemic action of phytosterols [31]. It is known that steroidal saponins, also found in garlic [25], interact with cholesterol to form a difficultly soluble complex that does not have hemolytic activity [31].

Literature data on the effect of garlic on blood glucose levels are rather contradictory [5, 26]. In animal models of diabetes, some studies have noted the hypoglycemic effect of garlic and its components (allylcysteine sulfoxide); however, other studies have not found any significant change in blood glucose levels in diabetic animals. There is also evidence that the preparation of garlic improved the lipid profile, but did not affect the fasting glucose level in the blood of patients with insulin-independent diabetes mellitus. There was no significant decrease in blood glucose levels in healthy volunteers when consuming garlic, who received food enriched with fats for 7 days [26].

Platelet aggregation and decreased fibrinolysis are risk factors for the development of thrombotic complications of atherosclerosis. Antithromboticthe effect is currently mainly associated with the presence of ajoene in garlic andallicin. The mechanism of suppression of aggregation by these compounds is associated, at least, with a decrease in the formation of thromboxane from exogenous arachidonic acid and a change in the physicochemical properties of the plasma membrane of platelets [26]. The antiaggregatory effect of ajoene is well studied and may be associated with its direct interaction with fibrinogen receptors.

Ajoen interacts with purified hemoprotein, which is involved in

platelet activation; in addition, ajoene modifies protein binding to ligands, acting as an effector [30]. Garlic, taken in various forms, suppresses spontaneous and induced platelet aggregation; at the same time, there is evidence that the induced aggregation when taking garlic preparations does not change [26]. The results of clinical studies indicate a sharp and long-term increase in fibrinolytic activity in the blood in patients receiving garlic preparations [26].

2) Direct antiatherosclerotic action

The direct effect on the vascular wall, preventing the onset and development of atherosclerotic lesions or causing its regression, can be divided into anti-atherogenic (prophylactic) and anti-atherosclerotic (therapeutic).

Studies on rabbits with atherosclerosis caused by feeding cholesterol for 2-4 months have shown that garlic oil (obtained by extracting the bulbs with ether followed by stripping the latter) and garlic homogenate reduce the area of atherosclerotic lesions in the aorta and coronary arteries by half, and the lipid content in the vascular wall - by 69%. In this case, the concentration of cholesterol in serum decreases very slowly. Thus, garlic has a direct anti-atherosclerotic effect, causing regression of experimental atherosclerosis, which is not associated with a decrease in blood cholesterol levels [26].

A large number of studies are devoted to the study of the anti-atherogenic (prophylactic) effect of garlic on experimental atherosclerosis. Atherosclerosis-like changes were induced in animals using cholesterol feeding, as well as a combination of cholesterol feeding and mechanical damage to the arteries. The use of garlic in different forms - fresh garlic, homogenate, juice, extract, powder, tablets, led to a significant decrease in blood cholesterol content, a significant increase in fibrinolytic activity; at the same time, collagen biosynthesis and its accumulation in the aorta were partially suppressed [26].

Thus, in experimental atherosclerosis, garlic reliably exhibits anti-atherosclerotic and anti-atherogenic effects [26].

1.8. Other types of biological action

In addition to the described pharmacological effects (pp. 1.1.-1.7.), Garlic, its preparations, as well as biologically active substances contained in fresh raw materials (flavonoids, thioglycosides, saponins, antibiotics, prostaglandins) cause a number of other biological effects. In particular, g-glutamyl peptides containing sulfur, which make up a series of so-called scordinins, have a tonic effect on the body [30].

The antispasmodic effect of garlic oil [48] is mainly due to the presence of essential oil in the bulbs. Sulfur-containing essential oils are also irritating to mucous membranes and skin [23].

Carbohydrates such as inulin, araban, glucan, galactan have

regulating effect on the absorption of active reactive compounds and can play the role of adjuvants. Inulin is capable of being a carrier of pharmacologically active compounds [30].

Some of the biologically active substances in garlic act as antidotes for lead poisoning. A significant decrease in the frequency of intoxication with the regular use of garlic in persons working under conditions of lead exposure has been noted [5, 21]. There is evidence that the substances remaining in garlic after its extraction with water or alcohol or after squeezing the juice (i.e., mainly proteins and pectin substances) also adsorb other heavy metals. In laboratory studies, mice that received a toxic dose of mercury during feeding excreted it and survived if they received this drug [30].

In the gastrointestinal tract, garlic inhibits the growth of putrefactive bacteria and fermentation processes that can cause gas and bloating. In the presence of pathogenic intestinal microflora, garlic normalizes the bacterial composition of the intestine, improves appetite and improves digestion by increasing the activity of the digestive glands and increasing the production of bile [48].

According to some reports [48], heat treatment of garlic during cooking does not impair its healing and antibacterial effect. According to other sources, phytoncidal activity is retained in crushed onions or freshly prepared garlic juice for no more than 20 minutes [34], and its heat treatment at 65–100 ° C or acid treatment at pH = 2 significantly reduces the antioxidant activity of garlic [51].

2. ONION

Currently, there are data on the following main types of pharmacological action of onion, to one degree or another confirmed by scientific research: antiseptic [8, 9, 10, 12, 14; 17, 23], anti-inflammatory [44], expectorant [10, 12, 44], wound healing, analgesic, sedative, tonic, tonic [9, 14, 23], stimulating appetite [10], sokogonny [5, 9, 10] , laxative [5, 9], antispasmodic, antihelminthic [5,12], antiparasitic [10], anti-tuberculosis, antitumor [2, 46], antioxidant [46, 49, 51], antimutagenic [32], immunostimulating [9], antiallergic, antiscorbutic [5, 31, 44], antisclerotic [10, 17], antidiabetic [14], hypoglycemic [5], hypolipidemic [9, 14], increasing potency, stimulating spermatogenesis [5, 9, 12, 17 , 44],

2.1. Bactericidal, fungicidal, antiprotozoal action

These types of pharmacological action are mainly due to phytoncides contained in large quantities in fresh onion bulbs, which are a means of natural immunity of higher plants and represent a whole complex of organic compounds. It has been shown that the bulb has an antiprotozoal effect 2–3 times more pronounced, according to

compared to the leaves (feather) of the onion. Different varieties of onions have a phytoncidal effect of different strengths. Volatile phytoncides of the Cheboksary and Spanish varieties kill 100% of the spores of the fungus - the causative agent of the stone smut in barley after 30 minutes of exposure. Under the same experimental conditions, the phytoncides of the varieties Valencia and Johnson cannot kill all the spores of the named barley parasite. Studies were carried out on the ability of volatile phytoncides of onions of 11 northern and 5 southern varieties to kill ciliates and phyto flora - a fungus that infects potatoes. It turned out that the studied southern varieties emit less phytoncides than northern ones [34].

Organic acids - mainly malic and citric acids, contained in large quantities in onion juice, create a rather low pH value. For most bacteria and protozoa, neutral and slightly alkaline media are optimal. Experimental studies prove the unfavorable effect of vegetable juices on bacteria, while the survival time of the latter is significantly reduced. There is information about the ability of certain organic acids, including citric acid, to inhibit the development of certain types of microorganisms (spore-forming, facultatively anaerobic, causing food spoilage), but only under conditions of an acidic environment [11].

To a certain extent, flavonoids also exhibit bacteriostatic, phagocidal, virucidal, and antiviral properties. Quercetin is practically inactive at a pH of about 7.0, but in an acidic environment it clearly exhibits antimicrobial properties. At pH = 6.5, quercetin at a concentration of 0.075-0.100 mg / ml completely inhibits growth Staphylococcus aureus, S. albus, Aerobacillus polymixa, Brucella abortus, in concentration 0.15 mg / ml, it partially inhibits the growth of streptococci types D and E and gram-negative microorganisms Escherichia coli, Salmonella oranienburg, Proteus sp. and etc.

Quercetin glycosides (rutin, quercetrin), taken in experiments at rather high concentrations, did not show antimicrobial action [11]. Anthocyanins are found in the bulbs of colored onions in the form of glycosides. It has been observed that pigmented plants are more resistant to disease than non-pigmented plants of the same species. The low content of catechins in onion scales, which sharply increases in the bottom and maximum in the leaf buds [39], also partially determines its antimicrobial properties [11].

Thus, flavonoids in the form of glycosides in vitro do not showantimicrobial activity or exhibit such properties, but only in very high concentrations. Aglycones and substances not associated with sugars (catechins), as a rule, are more active, but their antimicrobial activity is manifested in concentrations that significantly exceed the concentration of conventional antibiotics [11].

2.2. Capillary strengthening action

The capillary-strengthening effect (P-vitamin activity) is due to the presence of a large amount of flavonoids, presented mainly in the form of glycosides, as well as a small amount of catechins. Onion bulbs contain the highest amount of quercetin glycosides compared to other vegetables

(bioflavonoids). With a deficiency of bioflavonoids or their absence in food in humans and guinea pigs, the permeability of the blood vessels increases, accompanied by hemorrhages and bleeding. In addition, people have general weakness, fatigue, and pain in the extremities [4]. Bioflavonoids stabilize the main substance of connective tissue by inhibiting hyaluronidase and regulate collagen formation [22], which is confirmed by data on the positive effect of P-vitamin preparations and ascorbic acid on the prevention and treatment of scurvy, rheumatism, burns, etc.

2.3. Antioxidant properties

The antioxidant properties of onions are mainly due to the presence of flavonol compounds, ascorbic acid, and b-carotene (especially in green onions) [25].

Quercetin has the highest antiradical activity compared to other natural compounds with antioxidant effects (simple phenols, coumarins, organic acids, etc.). The antioxidant properties of bioflavonoids, in particular quercetin, are largely due to the presence of hydroxide groups [25]. The antioxidant activity of quercetin is associated with its ability to inhibit the formation of trans-hydroperoxide isomers of linoleic acid. Thus, quercetin is a highly active donor of H + atoms with respect to peroxide radicals, ending the chain of radical reactions [46]. In addition to direct antiradical action, bioflavonoids also bind heavy metal ions with variable valence; as a result, the process of lipid peroxide cleavage of biomembranes is inhibited [22].

There is evidence that colored onion varieties contain more total quercetin than uncolored varieties. Due to the high content of flavonol compounds in dry scales of onions (especially red varieties), it can be considered a natural source of antioxidants for edible oils [46].

The β-carotene molecule has 11 unsaturated double bonds [25], its reaction rate constant with free radicals is 15 times higher than that of retinol. Due to the stabilization of an unpaired electron in its molecule, β-carotene can be an interceptor of free radicals (singlet oxygen and other reactive oxygen species) [22].

Ascorbic acid [25], contained in large quantities in green onions, occupies a dominant position in the extracellular antioxidant defense, and is also the most important intracellular antioxidant. Ascorbic acid is able to easily donate 2 hydrogen atoms, thereby neutralizing free oxygen radicals, as well as free radicals of tocopherol (vitamin E), thereby preventing oxidative destruction of this main antioxidant of cell membranes [22].

2.4. Antineoplastic action

In the literature there are numerous, but still insufficiently verified data on the antitumor effect of onion preparations [2]. The antitumor activity of raw materials is associated, among other things, with the presence of flavonoid compounds (mainly derivatives of quercetin and kaempferol), for which the ability to prevent carcinogenesis and proliferation of cancer cells has been revealed [43, 50].

An aqueous preparation from onion juice, when administered in the form of injections in the experiment, has a positive effect in the complex treatment of oncological diseases [14]. Keck and Hoffmann-Ostenhof [2] observed the mitosis-inhibiting effect of aqueous extracts of onion. In the course of the work, it was shown that onion oil has a mitosis-inhibitory effect, namely, one of its components - diallyl disulfide, which, probably, is still not the only active substance. It is believed that β-carotene also has an anticarcinogenic effect and is a radioprotective compound. There is evidence of an inverse correlation between the content of β-carotene in the diet and the incidence of malignant tumors [22]. At the same time, many authors, on the basis of their observations, consider the preparations of alliin and allicin,

2.5. Hypotensive action

The hypotensive effect of onion bulbs is associated with the presence of flavonoid compounds in them, in particular quercetin. There are suggestions that the diglycosides of kaempferol contained in onions may have hypoazotemic [1] and diuretic activity [1, 16]. Contained in onion extracts, prostaglandids help to lower blood pressure; therefore, it is recommended to use onions for the prevention and treatment of hypertension [7].

2.6. Detoxifying effect

Dietary fiber includes fiber, hemicellulose, lignin, and pectin. These substances, swelling in the intestine, acquire the ability to absorb and carry with them excess cholesterol, ammonia, bile pigments and many other metabolic products. As a result, there is a significant decrease in the level of urea in the blood.

2.7. General tonic action

The general tonic effect was revealed for the essential oil of onion. It can also probably be explained by the presence of B vitamins in the raw material, which have a selective effect on the nervous system [31].

2.8. Antidiabetic action

Fresh onion juice lowers the blood sugar level of a patient with diabetes mellitus. Currently, an antidiabetic substance, mannitol, has been isolated from onions, which is widely used in medical practice [14].

2.9. Antiscorbutic action

According to the results of some studies [39], the content of vitamin C in resting onions is low (1 mg / g on dry matter); in the spring, the vitamin content increases in comparison with the winter and reaches a maximum in green growing leaves. Eating 70 g of freshly harvested green onions satisfies the body's daily requirement for ascorbic acid [31].

2.10. Other types of pharmacological action

The antispasmodic activity of fresh onion raw materials may be due to the high content of natural flavonoids - quercetin and kaempferol [16]. Organic acids - citric, lactic, tartaric, salicylic and some other acids - together with dietary fiber, inhibit the development of putrefactive and fermentative processes in the intestine.

3. CONTRAINDICATIONS TO THE APPLICATION OF ONION, GARLIC AND PREPARATIONS FROM THEM

3.1. Contraindications to the use of onion preparations

Eating fresh onion, as well as using preparations based on it, should be used with caution in the presence of the following diseases:

- acute diseases of the gastrointestinal tract, liver and kidneys (acute hepatitis, acute glomerulonephritis) [31];
- cardiovascular diseases of an organic nature [19]. Fresh onion and onion juice in large quantities can irritate the gastrointestinal tract, excretory and nervous systems [3, 31]. Complications in the form of cardiovascular disorders are possible, especially in people suffering from ischemic heart disease, heart rhythm disorders, gastritis, pancreatitis, stomach and duodenal ulcers, kidney disease and increased excitability of the nervous system. It should be used with caution in patients with bronchial asthma, as well as those suffering from allergic reactions and reacting to odors [20].

3.2. Contraindications to the use of preparations of sowing garlic

The main contraindications are: epilepsy (with plethora of the patient), pregnancy, inflammatory kidney disease [16], gastric ulcer and duodenal ulcer, exacerbation of chronic gastritis. With excessive use of garlic or therapy, irritation of the mucous membrane of the gastrointestinal tract is possible.

In traditional Chinese medicine, the maximum daily intake of garlic is no more than one onion. Excessive amounts of garlic have been reported to impair vision [40].

4. PHYTOPHARMACEUTICAL MEDICINES,

MADE FROM RAW ONION AND GARLICOn the territory of the Russian Federation, the following medicinal products (MP) and raw materials of onion and garlic are approved for medical use and are included in the State Register of Medicines [9]:

1) Tincture of garlic (antimicrobial) is used for the purpose suppression of fermentation processes in the intestine with colitis [20].

2) Fresh garlic, has antimicrobial, antifungal, anthelmintic, antiprotozoal, C-vitamin, B-vitamin; sokogonny; increasing the tone and motility of the intestines; expectorant; coronary dilating; cardiotonic action [9].

3) A thick extract of garlic is part of the drug allochol. Pills "Allochol" (Allocholum) contain condensed bile, nettle extract, activated charcoal, 0.04 g of thick garlic extract in terms of dry matter. The drug has a choleretic effect [9]. It is used for chronic hepatitis, cholangitis, cholecystitis, constipation associated with intestinal atony.

Is taken orally after meals: adults 1-2 tablets 3-4 times a day. The course of treatment is 3-4 weeks. Contraindications to the use of the drug are acute hepatitis, acute and subacute liver dystrophies, obstructive jaundice [33].

4) Allilchep (Allicepum) - alcohol extract from onions (from 160 g chopped onion get 1 liter of tincture [6]).

Allylchep is taken internally 15–20 drops 3 times a day, 15 minutes before meals with milk or water for intestinal atony, colitis and a tendency to constipation. The drug has an antimicrobial effect and is proposed to reduce the phenomena of atherosclerosis. Dose 20-30 drops 3 times a day. The course of treatment is 3-4 weeks [6, 33].

5) Allilglycer - an alcoholic extract of onions mixed in half with sterile glycerin. Contains flavonoids and onion phytoncides, which have an effect on intestinal atony, colitis, constipation and dyspepsia. Used to treat atherosclerosis, hypertension, Trichomonas colpitis. In the treatment of Trichomonas diseases, the drug is used quite widely, because treatment in these cases with fresh chopped onions, although effective, is inconvenient [6, 20].

Thus, a small amount of medicinal preparations based on onions and garlic are currently used in medical practice in Russia. The range of indications for their use is rather narrow. In traditional medicine in Russia and other countries of the world, the experience of using these medicinal plants is much wider [13], which makes it possible to consider onions and garlic as promising sources of modern effective and safe medicines based on the experience of traditional medicine.

CONCLUSIONS

1. Based on our earlier analysis and generalization of the results an attempt was made to study two representatives of the genus Allium (Allium cepa L. and Allium sativum L.) in chemical and pharmacognostic aspects [25]

establishing links between the chemical composition and pharmacological action of these plants.

2. Based on the results of the present and our previous of information and analytical research [13, 24, 25], it can be assumed that the field of application of raw materials onions and garlic is currently very narrowed compared to the experience of traditional medicine, and plants are promising objects for further study in order to create modern effective and safe medicines ...

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