



PHARMACOLOGICAL STUDY OF THE COLLECTION FOR THE TREATMENT OF ATHEROSCLEROSIS

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ABSTRACT

A new anti-sclerotic collection has been developed and studied, including meadow clover, three-part marigold, field horsetail, hawthorn, and wild rose in the same ratios. It has been ascertained that the intake of anti-sclerotic collection based on raw materials of local medicinal plants has anti-sclerotic and antioxidant effects, and also leads to the optimal physiological status of the energy supply of metabolic and biochemical processes occurring in the body of experimental animals.

ФАРМАКОЛОГИЧЕСКОЕ ИССЛЕДОВАНИЕ СБОРА ПРИ ЛЕЧЕНИЕ АТЕРОСКЛЕРОЗА

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ABSTRACT

*Разработан и исследован новый
антисклеротический сбор, включающий в
одинаковых соотношениях трав клевера луговой,
череды трехраздельной, хвоща полевого, плодов
боярышника, шиповника. Установлено, что прием
антисклеротического сбора на основе сырья*



IF = 9.2

KEYWORDS

*Атеросклероз,
растительный сбор,
холестерин,
гиполипидемия,
антиоксидант.*

*местных лекарственных растений обладает
антисклеротическим и антиоксидантным
эффектами, а также приводит в оптимальный
физиологический статус энергетическое
обеспечение метаболических и биохимических
процессов, протекающих в организме
экспериментальных животных.*

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*Ateroskleroz, dorivor yig'ma,
xolesterin, gipolipidemiya,
anti-oksident.*

ABSTRACT

*Tarkibida o'tloq se bargasi, ittikanak, dala qirqbo'g'imi,
do'lana, na'matakdan iborat bir xil
nisbatdagiantisklerotik faollikka egayangi yig'ma
ishlab chiqildi va o'rganildi. Natijada, mahalliy
o'simliklardan olingan antisklerotik yig'mani qabul
qilganda, uni sklerozga va oksidantlarga qarshi
ta'siriga egaligi, shuningdek, tajriba ostidagi
jonivorlarning organizmida ro'y berayotgan
metabolizm va biokimyoviy jarayonlarini energetik
ta'minlanishini maqbul fiziologik mavqega olib kelishi
aniqlandi.*

INTRODUCTION

The State Program for the Implementation of the Action Strategy for the Further Development of the Republic of Uzbekistan includes a set of measures, including measures for the further development of the production of domestic medicines and biologically active supplements based on local medicinal plants [1, 2].

The importance of nutrition as a component of health systems in today's reality is increasing due to the objective impossibility of mitigating or eliminating the causal factors of declining health in the coming years [3, 4]. In this regard, an important task of nutritional correction is to impart protective therapeutic and prophylactic properties through the use of herbal preparations with an anti-sclerotic effect.



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In particular, one of the priority areas for the creation of these herbal blends is the development of compositions that would have a therapeutic and prophylactic effect on a common disease such as atherosclerosis. Atherosclerosis is a disease of the blood vessels that underlies coronary heart disease (myocardial infarction) and cerebrovascular disease (stroke). Each year, 17.5 million people die from cardiovascular disease. With atherosclerosis, fats and cholesterol are deposited within the lumen and on the walls of blood vessels. These deposits (plaques) make the inner surface of blood vessels uneven and narrow the lumen, impeding blood flow. As a result, the blood vessels also become less elastic. Over time, plaque rupture or detachment may occur, increasing the risk of thrombus formation. If a thrombus forms in a coronary artery, it can cause a heart attack; if it forms in the brain, it can cause a stroke [5].

Medicinal plants used in the treatment of atherosclerosis, in addition to their lipid-lowering effects, have a positive effect on the function of other organs and tissues. Many plants contain biologically active substances with high bioavailability and absorption, providing sedative, choleric, anti-inflammatory, and tonic effects, enriching the body with microelements and vitamins. The duration of this disease increases the risk of developing serious complications. The predominantly polyvalent effect of medicinal plants used in the complex treatment of atherosclerosis helps prevent complications caused by it. As the disease progresses, depending on its manifestations, the role of herbal

medicine in the treatment plan may change. Herbal medicine can assume a dominant position, be used in equal proportions with synthetic drugs, or fade into the background as a supporting component. However, in any case, long-term use of medicinal plants is required, as only then do they provide the desired therapeutic effect [6, 7].

The objective of the research was to substantiate the therapeutic and prophylactic effects of a medicinal herbal collection with anti-sclerotic activity.

LITERATURE AND METHOD

The research involved serial samples of an anti-sclerotic mixture of local medicinal plants.

Composition: 10 g of meadow clover, 10 g of field horsetail, 10 g of three-part marigold, 10 g of Fedchenko's rose hips, and 10 g of blood red hawthorn.

Scope: as a prophylactic anti-sclerotic agent that enhances the body's defenses through antioxidant and anti-sclerotic activity and improves vitality.

Dosage and administration: brew 2 g of the collection in 200 ml of water, boil for 5 minutes, and use 3-4 times daily.

Efficacy was assessed in accordance with the 2004 guidelines for evaluating the efficacy of dietary supplements (Biologically active food supplements). The study was conducted on white mongrel rats after four weeks of once-daily intragastric (via tube) administration of the anti-sclerotic formulation at the recommended daily dose. The dose for the animals was calculated based on the amount intended for consumption by an average human weighing 60 kg, based on the weight of the (Sanitary and Epidemiological



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Surveillance Department) MMD (Main Medical Directorate) with an initial body weight of 120-130 g. The animals were kept under standard conditions.

The integrated indicators for assessing the effectiveness of the impact on the animal organism included an assessment of appearance, activity, body weight, weight of internal organs, hematological and biochemical indicators.

Biochemical blood tests were performed on a semi-automatic biochemical analyzer "CYANSmart" with software (Cypress Diagnostics, Belgium) using standard methods (AST, ALT, ALP, total protein, glucose and total cholesterol - reagent kits Cypress Diagnostics, Belgium), hematocrit was determined on a hematocrit centrifuge (Cypress Diagnostics, Belgium), a comprehensive analysis of peripheral blood was determined in a Goryaev chamber.

For the experiment, animals received the anti-sclerotic mixture per 100 g of body weight. The dose was administered in its natural form; the control group received distilled water, and the comparison group received an equivalent amount of the dietary supplement "Meadow clover herb."

The body weight of the experimental animals was recorded before the experiment began and the following day after its completion. Clinical signs were recorded daily after the first dose was administered and then once daily throughout the observation period. One month after the start of the test mixture administration, the animals were euthanized using a gentle method (by induction of deep anesthesia).

The experimental tests were carried out in compliance with the rules adopted by the European Convention for the Protection of Vertebrate Animals for Experimental and other Scientific Purposes (ETS No. 123. Strasbourg, 18.03.1986).

The obtained results were subjected to statistical processing using standard programs with an assessment of the significance of indicators ($M \pm m$) and differences according to the Student's t-test and the methodological recommendations "Using the principles of evidence-based medicine in organizing and conducting hygiene studies" based on Word 2010. Differences in the compared groups were considered reliable at a significance level of 95% ($p < 0.05$).

Body weight, clinical signs of intoxication, hematological and biochemical parameters, mortality/paralysis were entered into the computer system of the SESD MMD at the AP RUz during the tests.

To ensure a reliable assessment of efficacy, an animal obesity model was used. Rodents (usually mice and rats) are most commonly used to model obesity. These rodents, like humans, are omnivorous and have similar taste receptors and food identification and digestion systems, as well as neuroanatomically similar brain regions that control food intake [8]. Diet-induced obesity models are used primarily for the rapid assessment of systemic and organ-specific disorders caused by excess body weight due to increased total cholesterol [9] for subsequent correction. According to most researchers, diet-induced models in outbred lines are closer to the



pathogenesis of human obesity than models in genetically modified animals, in which obesity can develop on normal diets [10]. To accelerate the development of obesity, the experimental groups of animals were kept 4 individuals per cage at a higher room temperature than usual, as well as with an increase in the dark period compared to the light period [11], since an increase in the ambient temperature helps to reduce energy costs for maintaining body temperature, and an increase in the dark period

promotes more active food consumption (70-80% of the diet), since rodents are nocturnal animals [12, 13]. In addition, a high-calorie diet with added fat was used, since the metabolism of adult individuals is less intense than that of young growing rats, taking into account the fact that in rats the development and progression of diet-induced obesity occurs approximately equally in both males and females [14].

Research model:

Species of animals	Number of animal groups	Number of animals in the group	Duration of the trial	Groups of animals
white mongrel rats	3	6	1 month	1 control; 2 experiment; 3 comparison

Description of animal groups: Group 1: control - animals received distilled water; Group 2: experimental - animals were given an anti-sclerotic mixture; Group 3: comparison - animals were given meadow clover herb.

RESULTS AND DISCUSSION

In terms of body weight and its increase, no statistically significant differences were found between the animals that received the tested anti-sclerotic mixture and the control animals that received distilled water and meadow clover.

When assessing the influence of the anti-sclerotic collection on maintaining

metabolism in the body, we studied the hematological (Table 1) and biochemical parameters (Table 2) of the blood of experimental animals that received the collection, in comparison with the control and comparison group, before and after the end of the experimental administration at the recommended daily dose.

Table 1. The effect of dietary supplements of the anti-sclerotic collection on hematological parameters (M±m).

Groups	observation period	Hematological parameters				
		hematocrit, %	hemoglobin concentration, g/l	thrombocrit, %	leukocytes, ·10 ⁹ /l	erythrocytes, ·10 ¹² /l
control	before the start	33.8±1.2	131.8±4.2	0.459±0.04	14.65±2.53	6.67±1.13
	at the end	34.9±1.5	142.4±2.4	0.450±0.02	14.61±1.59	6.62±2.25



anti-sclerotic collection	before the start	35.3±1.18	134.9±1.8	0.441±0.03	14.58±1.41	6.75±1.20
	at the end	36.4±1.7	136.2±4.8	0.476±0.01	14.47±2.85	6.76±1.10
meadow clover herb	before the start	34.4±1.8	133.35±3.3	0.462±0.02	14.53±1.99	6.71±3.01
	at the end	35.7±1.4	139.62±2.55	0.463±0.01	14.61±2.56	6.69±1.98

Hematological parameters in the experimental groups did not differ statistically from those in the control group.

Table 2. Effect of the anti-sclerotic dietary supplement on biochemical parameters (M±m).

Groups	observation period	Biochemical indicators					
		Cholesterol, mg/%	Glucose, mg%	ALT, U/L	AST, U/l	ALP, U/l	TP, g/l
Control, water	before the start	0.37±0.02	128.3±5.3	55.2±3.7	114.4±5.17	34.8±5.6	65.0±1.5
	at the end	0.36±0.03	125.2±4.7	54.2±2.5	116.0±5.26	36.2±7.5	66.2±1.7
anti-sclerotic collection	before the start	0.38±0.01	129.3±4.3	58.8±2.8	113.1±5.8	35.5±3.9	63.2±2.5
	at the end	0.31±0.01*	121.1±3.8*	50.9±2.9*	117.1±3.6	36.5±1.6	64.8±1.6
meadow clover herb	before the start	0.36±0.01	125.6±4.9	56.9±3.1	113.8±3.8	35.2±4.7	64.1±2.8
	at the end	0.33±0.02	122.3±4.2*	55.3±2.3	116.6±2.7	36.3±4.5	66.4±2.0

* - significant differences from control at P < 0.05

Alkaline phosphatase (ALP), amylase enzymes (ALT, AST), and total protein (TP) levels in the experimental groups remained within physiological norms, demonstrating the potential for this herbal preparation to normalize metabolic processes and maintain optimal physiological function. A downward trend in ALT activity indicates a reduction in the damaging effects of free radicals with the use of this anti-sclerotic herbal preparation, suggesting the preparation's antioxidant activity due to its bioflavonoid content. A significant reduction in total cholesterol also attests to the anti-sclerotic activity

of this herbal preparation, based on local medicinal raw materials.

Thus, the testing confirmed the positive impact of the anti-sclerotic mixture on bodily functions: across all biochemical parameters, positive differences were observed between the experimental group receiving the mixture compared to the intact control group and the group receiving meadow clover herb, in terms of a reduction in total blood cholesterol and activation of the body's antioxidant system. A decrease in these parameters was also noted, compared to baseline values before taking the anti-sclerotic mixture and at the end of the experiment. In the groups of animals receiving the



comparison products, a slight normalization of total cholesterol levels was observed. Furthermore, the animals in the experimental group were more active, without signs of obesity.

At the end of the experiment, rats from the control and comparison groups, as well as those receiving the anti-sclerotic compound, were euthanized using a gentle method. The condition of internal organs was visually assessed during necropsy, organ weights were measured, and specific values for this indicator were calculated.

Pathological examinations were conducted the day after the final administration of the anti-sclerotic mixture. Macroscopic examination of the organs revealed no significant differences between the experimental, control, and comparison groups. However, autopsy of control animals not receiving the anti-sclerotic mixture revealed fatty streaks and pale yellow

spots on the aortas. In the group of animals receiving the comparison agent – meadow clover herb - the aortas were morphologically indistinguishable from those of intact animals.

When determining the relative mass of organs, no evidence of tissue edema, circulatory impairment, or hemorrhage was obtained. No significant differences were found between the groups in gravimetric coefficients.

Thus, the studied medicinal herbal collection has some hypolipidemic effect and an anti-sclerotic effect.

CONCLUSION

The obtained experimental results allow us to conclude that the use of an anti-sclerotic collection based on raw materials of local medicinal plants has anti-sclerotic and antioxidant effects, and also leads to an optimal physiological state of energy supply for metabolic and biochemical processes occurring in the body of experimental animals.

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