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RAVOCH (RHEUM) VA JUSAY (ALLIUM ODORUM) O‘SIMLIKLARI EKSTRAKTLARINING ANTIRADIKAL FAOLLIGI TAHLILI

АНАЛИЗ АНТИРАДИКАЛЬНОЙ АКТИВНОСТИ РАСТИТЕЛЬНЫХ ЭКСТРАКТОВ РЕВЕН (RHEUM) И ДЖУСАЙ (ALLIUM ODORUM)

ANALYSIS OF ANTIRDIKALAGTIVITY OF EXTRACTS FROM RHEUM AND ALLIUM ODORUM PLANTS

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Annotatsiya

Mazkur tadqiqot ishida Namangan viloyati hududida o‘suvchi rovoch o‘simligining barglari va Farg’ona viloyatida madaniy holatda o’suvchi jusay o’simliklarining yer ustki qismlari dan uch xil miqdorda, uch xil namunalarini antioksidantlik xususiyatlari antioksidantlar tomonidan barqaror 2,2-difenil-1-pikrilgidrazil (DFPG) molekulalarini kamaytirish kinetikasini spektrofotometrik o‘lchash usulida o‘rganilgan. O‘rganilgan o‘simlik namunalarining barchasida antioksidantlik xususiyati aniqlangan. Olingan natijalar jadvallar va diagrammallar ko‘rinishda berilgan. Rovoch barglari va jusay o‘simligining yer ustki qismidan tayyorlangan tarkibi 75% ravoch va 25% jusaydan iborat aralashma yuqoriroq antioksidantlik xususiyatini namoyon qildi.

Аннотация

В данной исследовательской работе антиоксидантные свойства трех различных образцов из листьев растения рябины, произрастающей на территории Наманганской области, и надземной части растения джусай, культивируемого в Ферганской области, были определены по антиоксидантным свойствам кинетику восстановления молекул стабильного 2,2-дифенил-1-пикрилгидразила (ДФФГ) изучали спектрофотометрическим методом измерений. Антиоксидантные свойства были определены во всех изученных образцах растений. Полученные результаты представлены в виде таблиц и диаграмм. Смесь из 75% ревеня и 25% ревеня, приготовленная из листьев ревеня и надземной части растения джусай, показала более высокие антиоксидантные свойства.

Abstarct

In this research work, the antioxidant properties of three different samples from the leaves of the rowan plant growing in the territory of Namangan region and the above-ground parts of jusai plants growing in culture in Fergana province were determined by the antioxidant properties kinetics of reduction of of stable 2,2-diphenyl- 1-picrylhydrazyl (DFPG) molecules was studied by spectrophotometric measurement method. antioxidant property was determined in all studied plant samples. The obtained results are presented in the form of tables and diagrams. a mixture of 75% rhubarb and 25% rhubarb, prepared from rhubarb leaves and the above-ground part of the jusai plant, showed higher antioxidant properties.

Kalit so‘zlar: *rovoch, jusay, antioksidant, 2,2-difenil-1-pikrilgidrazil (DFPG), erkin radikallar, spektrofotometriya, barglari.*

Ключевые слова: *ревень, джусай, антиоксидант, 2,2-дифенил-1-пикрилгидразил (ДФФГ), свободные радикалы, спектрофотометрия, листья.*

Key words*: rhubarb, jusai, antioxidant, 2,2-diphenyl-1-picrylhydrazyl (DFPG), free radicals, spectrophotometry, leaves.*

INTRODUCTION

Biological oxidation in the body consists of a series of consecutive dehydrogenation reactions where hydrogen atoms from substrates (fatty acids, carbohydrates) are transferred to an acceptor. Combined with oxygen-accepted hydrogen atoms, it participates in the final cytochrome oxidase reaction in the respiration of cells. Biological oxidation occurs in an organized manner in the cell, forming a strict sequence, releasing energy gradually and producing non-toxic products (H_2O and CO_2) in the final stage. In the body, the direct addition of oxygen to the substrate in biological oxidation can lead to the formation of autoxidation reactions. They usually begin with the formation of unpaired electrons, free radicals, by-products of which are peroxides. Therefore, these processes are called free radical or peroxide oxidation.

LITERATURE ANALYSIS AND METHODOLOGY

The endogenous inhibition of free radical oxidation is carried out by the antioxidant system, which includes a chain of antioxidants that neutralize produced free radicals and enzymes (catalase, glutathione peroxidase, superoxide dismutase) that eliminate reactive oxygen species and peroxide accumulations. Certainly, the direct effect is achieved by directly neutralizing free radicals - direct antioxidants act in this way or by activating the body's antioxidant system (indirect antioxidants group).

In order to maintain the physiological conditions in the cell, oxidation processes must be under the strict control of a special cellular system called the endogenous antioxidant system, which ensures the maintenance of general homeostasis and a stable level of ROS in the body. The antioxidant system includes antioxidant enzymes, such as superoxide dismutase (SOD, its various forms), catalase, enzymes involved in glutathione metabolism, peroxidases, etc. This system also includes proteins that bind metals of variable valence, for example, iron-binding proteins - ferritin, transferrin, etc. In addition, the body also contains low molecular compounds that regulate the level of ROS in the cell. an imbalance in the body's antioxidant system leads to oxidative stress in certain organs or tissues, which contributes to the development of many pathological processes. If the body's antioxidant system is disturbed, it is necessary to replenish the balance with exogenous plant antioxidants.

Natural compounds are an inexhaustible source of drugs with various therapeutic effects. The study of the molecular mechanisms of the pathogenesis of many diseases of plants, animals and humans has shown that all of them are related to the activation or suppression of free radical processes to one degree or another. Therefore, the search and study of regulators of such processes based on natural and synthetic raw materials remains relevant.

Compared to animal organisms, all plant compounds to one degree or another have an extremely wide range of biological activity due to the diversity of their chemical structure, and are currently in the center of scientific attention. Based on the above, the search for antioxidants and the study of their inhibitory effect on the processes of free radical oxidation and uncontrolled lipid peroxidation seems to be very timely and in demand.

Based on this, the antiradical activity (ARA) of sample 3 against the stable free radical DPPH (2,2-diphenyl-1-picrylhydrazyl) was studied within the framework in this work.

For testing, 3 samples were prepared with the following compositions.

Table 1

No.	Samples	Rheum	Allium odorum
1	First sample	25g (25%)	75g (75%)
2	Second sample	50g (50%)	50g (50%)
3	Third sample	75g (75%)	25g (25%)

DPPH method. In this study, the kinetics of reducing the stable 2,2-diphenyl-1-picrylhydrazyl (DPPH) molecules by antioxidants was determined using spectrophotometric measurement to assess the antiradical activity. The extracts under study were dissolved in ethanol at a concentration of 1 mg/ μL. The method is based on the interaction of antioxidants with the stable chromogenic radical 2,2-diphenyl-1-picrylhydrazyl. The DPPH standard solution in ethanol, prepared in acidic environment with acetic acid, with a concentration of $5 \times 10^{-4} M$, was diluted

1:10 with ethanol to obtain a working solution. The obtained solution should have an optical density above 0.9 at 517 nm. Then, 5 μL of the working DPPH solution was mixed with 50 μL of the prepared plant extracts, incubated, and the kinetics of the decrease in the optical density of the solution was recorded at a wavelength of 517 nm over a period of 30 minutes. The DPPH working solution was used as a control sample. The antiradical activity was determined according to the following formula:

Here, A_x represents the optical density of the reaction mixture.

RESULTS AND DISCUSSION

In recent times, there has been an interest in studying the role of reactive oxygen species (ROS) in the pathogenesis of various diseases. On one hand, ROS are produced during natural physiological processes and are necessary for maintaining the immune system, extending cell signaling, and synthesizing hormones. On the other hand, an excess of pro-oxidants can lead to oxidative stress, which may result in the damage of cells, cell membranes, and nucleic acids. The most direct consequences of cellular damage by free radicals are cardiovascular, bronchopulmonary, and oncological diseases. The necessary level of ROS is maintained by the antioxidant system of the body. However, in some cases, this system may not function properly, leading to the development of pathological processes. In this regard, the antioxidant activity of some polysaccharides has been studied.

Due to the possibility of antioxidants having various mechanisms of action, their effectiveness is recommended to be studied using various methods. In this study, the samples' antioxidant activity was evaluated relative to the DPPH free radical. When the extracts under study were added to the DPPH alcoholic solution, the free radical molecules were converted to a non-radical form, causing the purple color of the DPPH solution to change.

The Rheum leaves and the aerial parts of allium odorum plants were studied for their antioxidant properties using the spectrophotometric method to measure the kinetics of scavenging the DPPH (2,2-diphenyl-1-picrylhydrazyl) radicals. Three different samples of each plant were studied in three different concentrations. The antioxidant properties of all studied plant samples were determined. Figure 1

Figure 1.

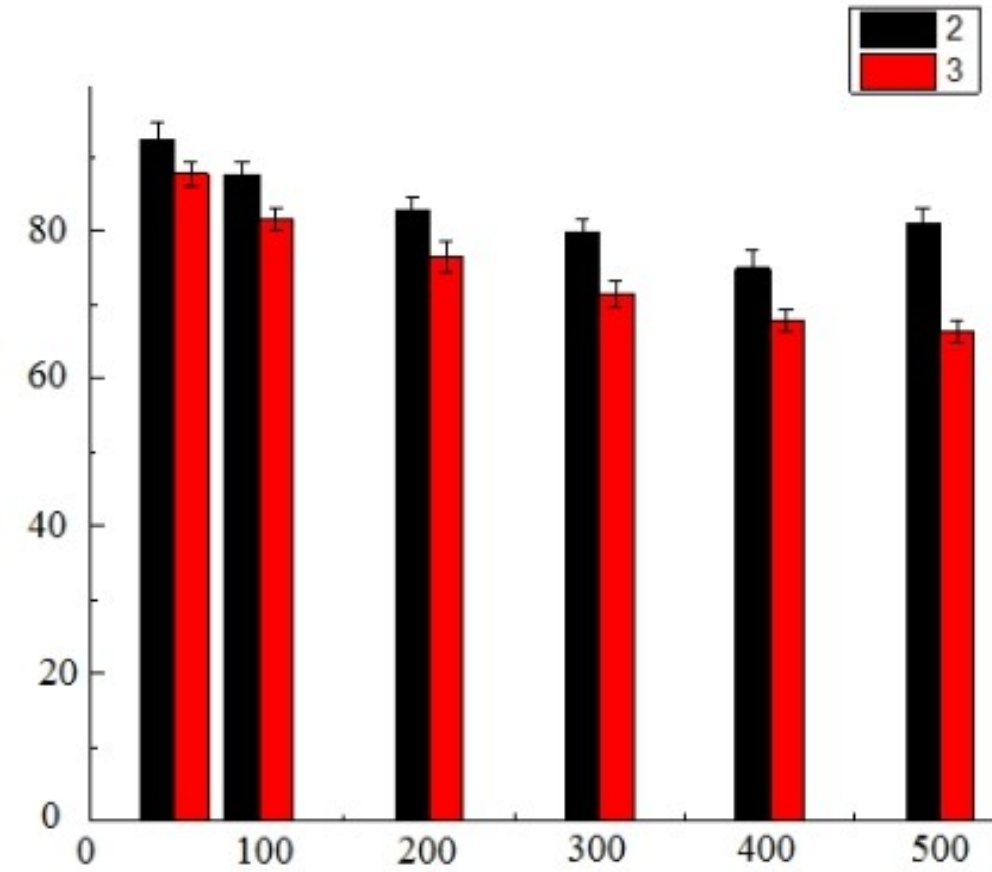

Table 2

Substance (alcoholic solution)	Inhibition, % (As of the 10th minute)					
	50 µL	100 µL	200 µL	300 µL	400 µL	500 µL
1	-	-	-	-	-	-
2	8.7±2.2	12.4±1.6	17.3±1.9	20.1±1.7	25.2±2.5	29.0±1.9
3	12.3±1.6	18.4±1.5	23.6±2.0	29.6±1.8	32.2±1.4	33.7±1.6

All samples were dissolved in 10 mg/ µL water and ethanol, and used as initial solutions. Then, 50, 100, 200, 300, 400, and 500 µL of the initial solution were mixed with 3 µL of DPPH solution in the test. The degree of inhibition of DPPH free radical is presented in Table 1. It can be seen that as the amount of extract increases, the antioxidant property increases. A mixture of 75% rheum and 25% allium odorum, prepared from rheumatic leaves and the aerial part of the allium odorum plant, exhibits higher antioxidant properties.

CONCLUSION

Based on the results of all three samples, we can see that the third sample has a high antioxidant level. There is sufficient information in the literature about the antiradical activity of medicinal plant extracts, and their maximum effect was found in the extracts containing the highest amount of polyphenols and flavonoids. Thus, further work and a detailed study of the qualitative and quantitative composition of the extracts for the composition of components (polyphenols, flavonoids, tannins, alkaloids, etc.) is required to establish the mechanism of antiradical activity. among the prepared mixtures, the mixture consisting of 75% rheum and 25% allium odorum shows higher antioxidant properties.

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