

Askarov Ibrokhim Rakhmonovich

*Professor of the Department of Chemistry of Andijan State University, Doctor of
Chemical Sciences*

<https://orcid.org/0000-0003-1625-0330>

Mo'minov Mo'ydinjon Mo'minovich

*Professor of the Department of Chemistry of Andijan State University, Doctor of
Chemical Sciences*

<https://orcid.org/0009-0005-4261-1744>

Yusupov Muxammadyusup Avazbek o'g'li

*Independent researcher of the Department of Chemistry of Andijan State
University*

<https://orcid.org/0009-0003-7827-583X>

**STUDY OF ANTIRADICAL PROPERTIES OF ARTICHOKE (CYNARA
SCOLYMUS L.) AND MILK THISTLE (SYLYBUM MARIANUM L.)
VEGETABLE OILS**

Annotation. This article examines oils obtained by cold pressing of Artichoke (*Cynara scolymus* L.) and Milk Thistle (*Silybum marianum* L.) seeds grown in the Andijan region, as well as their mixtures in various ratios, for antiradical activity in vitro using a solution of 2,2-diphenyl-1-picrylhydrazyl (DPPH). The studies compared the antiradical properties of mixtures of plant oils in various ratios.

Keywords: artichoke, milk thistle, vegetable oils, antiradical, medicine, traditional medicine, flavonoids.

Asqarov Ibrohim Rahmonovich

Andijon davlat universiteti kimyo kafedrasi professori, kimyo fanlari doktori

<https://orcid.org/0000-0003-1625-0330>

Mo'minov Mo'ydinjon Mo'minovich

Andijon davlat universiteti kimyo kafedrasi professori, kimyo fanlari doktori

<https://orcid.org/0009-0005-4261-1744>

Yusupov Muxammadyusup Avazbek o'g'li

Andijon davlat universiteti kimyo kafedrasi mustaqil tadqiqotchisi

<https://orcid.org/0009-0003-7827-583X>

UDK 547.962.9:547.917:615.4

**ARTISHOK (CYNARA SCOLYMUS L.) VA SUT QUSHQO'NMAS
(SILYBUM MARIANUM L.) O'SIMLIK MOYLARINING
ANTIRADIKALLIK XUSUSIYATINI O'RGANISH**

Annotatsiya. Ushbu maqolada Andijon hududida yetishtirilgan Artishok (*Cynara scolymus* L.) va Sut Qushqo'nmas (*Silybum marianum* L.) o'simliklari urug'larini sovuq presslash asosida olingan moylarni hamda ularning turli xil nisbatdagi aralashmalarini 2,2-difenil-1-pikrilgidrazil (DPPH) eritmasining in vitro sharoitida antiradikallik faolliklari o'rganildi. Olib borilgan tadqiqotlar natijasida o'simliklar moylarining turli xil nisbatlardagi aralashmalari antiradikallik xususiyatlari taqqoslandi.

Kalit so'zlar: artishok, sut qushqo'nmas, o'simlik moylari, antiradikallik, tibbiyot, xalq tabobati, flavonoid.

Аскарров Ибрагим Рахмонович

Профессор кафедры химии Андиганского государственного университета,
доктор химических наук

<https://orcid.org/0000-0003-1625-0330>

Моминов Мойдинжон Моминович

Профессор кафедры химии Андиганского государственного университета,
доктор химических наук

<https://orcid.org/0009-0005-4261-1744>

Юсупов Мухаммадйусапа Авазбекович

Независимый научный сотрудник кафедры химии Андиганского
государственного университета

<https://orcid.org/0009-0003-7827-583X>

ИЗУЧЕНИЕ АНТИРАДИКАЛЬНЫХ СВОЙСТВ РАСТИТЕЛЬНЫХ МАСЕЛ АРТИШОКА (*CYNARA SCOLYMUS* L.) И РАСТОРОПШИ (*SYLYBUM MARIANUM* L.)

Аннотация. В данной статье исследуются масла, полученные холодным прессованием семян Артишока (*Cynara scolymus* L.) и Расторопши (*Silybum marianum* L.), выращенных в Андиганийском районе, а также их смеси в различных соотношениях на антирадикальную активность в условиях *in vitro* с использованием раствора 2,2-дифенил-1-пикрилгидразила (DPPH). В результате проведенных исследований сравнивались антирадикальные свойства смесей масел растений в различных соотношениях.

Ключевые слова: артишок, расторопша, растительные масла, антирадикал, лекарство, народная медицина, флавоноиды.

Intraduction.

Artichoke (*Cynara scolymus* L.) and Milk Thistle (*Silybum marianum* L.) are cultivated in different regions of our Republic due to their high medicinal properties. For the purpose of plant research, the leaves and oils of medicinal Artichoke and Milk Thistle grown in the Andijan region were biochemically analysed, and based on the results, the active substances were developed based on pharmacological data, and biological food supplements were developed. It aimed to get local, cheap and high-quality products to replace the expensive drugs brought to Uzbekistan.

Materials and methods.

Currently, the demand for medicinal products obtained from Milk Thistle and Artichoke plants for the treatment and prevention of liver diseases is increasing day by day [1-2]. The reason for this is mainly ecological and environmental pollution, chemical agents, disordered eating, alcoholism, and damage to the liver, which is the filter of the human body for infections [3].

In medicine, alcoholic and aqueous extracts are obtained from mature leaves of plants. In addition, seeds are of incomparable importance among the organs that have medicinal properties [4]. Oils and special powders obtained from plant seeds by cold pressing process are used against many diseases. Due to the presence of

cynarin found in artichoke seeds and leaves and *silymarin*, flavonoid and polyphenol compounds in Milk Thistle seeds, it is used against antioxidant and inflammatory diseases, liver protection, liver cell regeneration, and improvement of digestion.

Milk Thistle is recommended as an additional therapy in chronic hepatitis and cirrhosis, after radiation and chemotherapy courses. Because milk thistle, due to its antioxidant properties, cleanses the liver of harmful toxins, reduces the number of inflamed liver cells, and increases the number of healthy liver cells [5-7]. Plant compounds fight diabetes. Milk Thistle improves the emulsification of fat in the body and lowers cholesterol through its ability to increase fluid production. This property prevents vascular diseases such as cardiovascular diseases, polyarthritis, and varicose veins. In addition, it improves the production of breast milk and strengthens this process. To realize this feature of the plant, its teas can be used in folk medicine. That is, the tea products of this plant can increase the activity of the hormone prolactin, which produces breast milk [8].

Artichoke has been used for many years in the treatment of stones in the liver and gall bladder, anemia, atherosclerosis, diabetes, kidney disease, and snake venom. Phytochemical substances *cynarin* and *synapicrin* are found in their composition. The chemical composition of the artichoke is well studied, and it is of great importance in medicine. The leaves contain *caffeoylquinic acid*, *cynarin* and *leuteonin* substances. The extract made from its leaves ensures the normal production of bile fluid in the liver. Artichoke leaves contain phenolic acid. Preparations obtained from it are used in the prevention and treatment of liver, kidney and atherosclerosis diseases [9].

Artichoke is widely used in folk medicine for urinary tract, constipation, kidney and liver cleansing. For example, in Rome, Artichoke was considered a food of the rich. It was fed to the soldiers and helped to gather forces. The fact that it contains products such as insulin, keratin, and vitamin C indicates that the plant is promising. The results of scientific research on the artichoke show that it is necessary to pay attention not only to the study of its biomorphological indicators but also to its microflora [10-11].

Results and discussion.

Artichoke (*Cynara scolymus L.*) and Milk Thistle (*Silybum marianum L.*) oils obtained based on cold pressing and their mixtures in different proportions in vitro under 2,2-diphenyl-1-picrylhydrazyl (DPPH) solution antiradical activities were studied. As a result of the conducted studies, the antiradical properties of mixtures of artichoke and milk thistle plant oils in the ratio of 1:1, 1:3 and 3:1 were compared. The decolourization of the purple 2,2-diphenyl-1-picrylhydrazyl (DPPH) solution made it possible to determine the presence of some pure antioxidant compounds with hydrogen atom or electron-donating properties. Stable DPPH• is a reagent used in spectrophotometric analysis [12]. In this experiment, the method implemented by Blois [13] was used with minor modifications to evaluate the property of inhibiting DPPH• free radicals. A 0.812 mM DPPH• solution in ethyl acetate was prepared in a 100 ml volumetric flask, wrapped in aluminium foil and stored in a dark place at room temperature for 30 minutes. 3 ml

of DPPH solution and 150 µl of ethyl acetate (blank) were added to a 4 ml quartz cuvette, placed in a spectrophotometer, and the absorbance at 517 nm every 30 seconds for 10 minutes (D_1) manufactured by YOKE (China) was measured on a K7000 spectrophotometer. The required volume of samples for analysis was filtered on a 0,45 µm syringe filter. To evaluate the antiradical properties of the sample 50, 100, and 150 µl of the extract were mixed with 3 ml of DPPH solution, and the absorption of light at 517 nm (D_2) was measured in the above order. Ethyl acetate was added to the remainder to bring the total volume of the cuvette to 3,15 mL. The antiradical property of the samples was calculated by the following formula:

$$ARA \% = \frac{D_1 - D_2}{D_1} \cdot 100 \%$$

The obtained results are given in the following table (ARA-Antiradical activity):

Table 1.

Measured light of artichoke vegetable oil into DPPH solution
absorption and antiradical activities.

Time, sec	Artichoke (50 mkl) ARA%	Artichoke (100 mkl) ARA%	Artichoke (150 mkl) ARA%	Milk thistle (50 mkl) ARA%	Milk thistle (100 mkl) ARA%	Milk thistle (150 mkl) ARA%
60	5,42	12,00	27,22	14,99	34,03	36,56
180	5,77	12,80	28,14	15,34	35,52	38,06
300	6,23	13,49	29,07	15,69	37,02	39,45
600	7,15	14,99	30,80	16,26	40,02	42,10

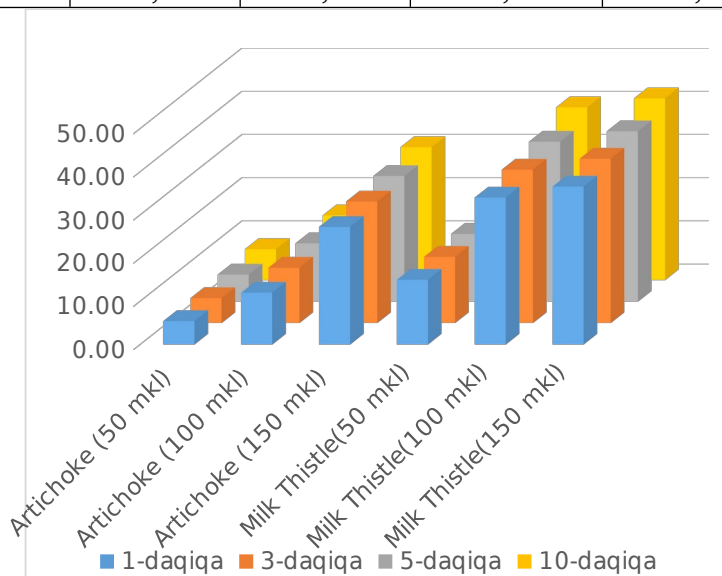


Figure 1. Antiradical activities of artichoke and milk thistle vegetable oils (%)

Table 2.

Measured absorbance and antiradical activities of samples added 1:1 to DPPH solution.

Time, sec	D_1	D_2 (50 mkl)	ARA %	D_2 (100 mkl)	ARA%	D_2 (150 mkl)	ARA%
60	0,867	0,745	14,07	0,629	27,45	0,537	38,06
180	0,867	0,739	14,76	0,619	28,60	0,523	39,68
300	0,867	0,733	15,46	0,61	29,64	0,511	41,06
600	0,867	0,722	16,72	0,591	31,83	0,485	44,06

Table 3.
Measured absorbance and antiradical activities of samples added in 1:3 to DPPH solution.

Time, sec	D ₁	D ₂ (50 mkl)	ARA %	D ₂ (100 mkl)	ARA %	D ₂ (150 mkl)	ARA %
60	0,867	0,727	16,15	0,621	28,37	0,509	41,29
180	0,867	0,719	17,07	0,609	29,76	0,497	42,68
300	0,867	0,712	17,88	0,598	31,03	0,486	43,94
600	0,867	0,697	19,61	0,577	33,45	0,462	46,71

Table 4.
Measured absorbance and antiradical activities of samples added in 3:1 to DPPH solution.

Time, sec	D ₁	D ₂ (50 mkl)	ARA%	D ₂ (100 mkl)	ARA%	D ₂ (150 mkl)	ARA%
60	0,867	0,809	6,690	0,815	6,00	0,62	28,49
180	0,867	0,804	7,266	0,783	9,69	0,607	29,99
300	0,867	0,799	7,843	0,76	12,34	0,594	31,49
600	0,867	0,79	8,881	0,723	16,61	0,569	34,37

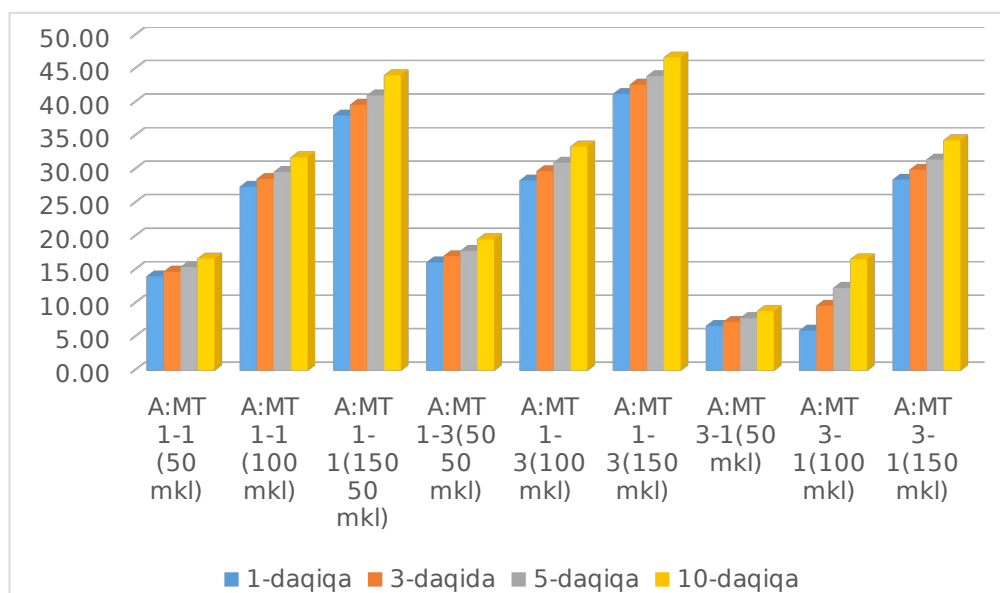


Figure 2. Antiradical activities of the samples (%).

Table 5.
Antiradical activities of primary plants and their 1:3 oil mixture.

Time, sec	Artichoke (150 mkl) ARA%	Milk thistle (150 mkl) ARA%	A-MT 1:3 (150 mkl) ARA%
60	27,22	36,56	41,29
180	28,14	38,06	42,68
300	29,07	39,45	43,94
600	30,80	42,10	46,71

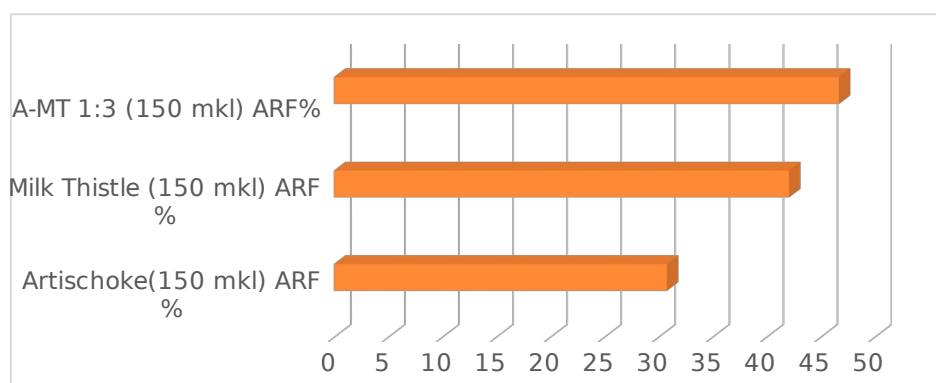


Figure 3. Antiradical activities (%) of primary plants and their 1:3 oil mixture.

Conclusion.

There are many foreign scientific sources on the chemical composition of artichoke (*Cynara scolymus* L.) and milk thistle (*Silybum marianum* L.) plants and nutritional products obtained from plants and their specific components and their use in folk medicine. According to the results of the study, the antiradical activity of the oils obtained by cold pressing of the seeds of thorny artichoke and milk thistle grown in the Andijan region and their mixtures in different proportions were studied for the first time in vitro. As a result of the conducted research, 150 μ l of artichoke vegetable oil showed 30,8% in 10 minutes, milk thistle vegetable oil showed 42,10%, while the antiradical properties of vegetable oil taken in a ratio of 1:3 it was found to be the highest compared to the rest of the samples 46,71% at the 10th minute.

The preliminary results showed that biologically active substances such as synarin, synapicrin, silymarin, and fat-soluble vitamins contained in artichoke and milk thistle plant oils can be seen to be effective against diseases such as hepatoprotection and restoration of hemostatic liver cells. From the above results, it can be concluded that the sample prepared from the 1:3 ratio of artichoke and milk thistle vegetable oils can be recommended as a new brand food supplement.

References:

1. Abdulloyev O.SH., Asqarov I.R., Mo'minov M., Yusupov M.A. "Определение некоторых показателей качества растения артишок (*Cynara scolymus* L.) и количества содержащихся водорастворимых витаминов методом ВЭЖХ"// Journal of Chemistry of Goods and Traditional Medicine//Volume 3, Issue 1, 2024
2. Лунева И.Л. "Фармакогностическое изучение артишока колючего (*Cynara scolymus* L.) интродуцированного на Кавказских Минеральных Водах"// дис. канд. фарм. наук.- Пятигорск, 2009.-119 с.
3. Saminov A.A., Ismoiljonova D.E., Rahmataliyeva M.I. "Dorivor sut qushqo'nmas o'simligining foydali xususiyatlari va undan oqilona foyalanish"//ISSN: 2181-3337 international scientific journal//UIF-2022: 8.2. №4 2022
4. Hammouda R.M. "Flavonoids of *Cynara scolymus* L. cultivated in Egypt" // Plant Foods Hum Nutr, 1993.Vol.4. -p.120.
5. Askarov K., Musayev I., Turdaliev A., Eshpulatov Sh. "Geochemical barriers in irrigated soils and the impact of them on plants"// European Journal of Molecular & Clinical Medicine, 7, - pp. 3082-3089.
6. Адылова Т.А. "Биологические особенности и распространение перспективных лекарственных растений" //Под редакцией. – Ташкент: Фан, 1981. –158 с.

7. Буданцева А.Л. “Растительные ресурсы России: Дикорастущие цветковые растения, их компонентный состав и биологическая активность. Под редакцией”//М.: Товарищество научных изданий КМК, 2013. – 312 с
8. Хожиматов К.Х., Хожиматов О.К. Собиров У.А. “Сборник правил пользования объектами лекарственных, пищевых и технических растений”. Ташкент: //«Янги асп авлоди», 2009. – 171 с
9. Yusupov M.A., Asqarov I.R., Mo‘yidinov M.M., G‘opirov K.G. “Artishok o‘simligi tarkibidagi kimyoviy birikmalarning biologik faolligini baholash” //Journal of Chemistry of Goods and Traditional Medicine. Volume 2, Issue 2, 2023
10. Миррахимова Т.А., Набиева Н.М. “Исследование эмбриотоксичности и тератогенности сухого экстракта артишока колючего”//Фармацевтический журнал.- Ташкент, 2015.- №1.-С.108-110
11. Neung Jae Jun et al. ”Radical Scavenging Activity and Content of Cynarin (1,3-caffeoylquinic acid) in Artichoke (*Cynara scolymus* L.)” // J. Appl. Biol. Chem., 2007.– vol. 50, №4.-pp. 244-248.
12. Gulcin, I.; Beydemir, S.; Sat, I.G. Kufrevioglu, O.I. “Evaluation of the antioxidant activity of cornelian cherry (*Cornus mas* L.) Acta Aliment”//Hung. 2005, 34, 193–202.
13. Blois, M.S. “Antioxidant determinations by the use of a stable free radical”// Nature 1958, 181, 1199–1200.