

ANDIJAN STATE MEDICAL INSTITUTE

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**PRODUCTION AND CLASSIFICATION OF PRODUCTS FOR
FOLK MEDICINE BASED ON GULKHYRI AND SEDANA
PLANTS**

(monograph)

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Production and classification of products for folk medicine based on gulkhyri and sedana plants /Monography/ Text.

The monograph presents information on the distribution of marigold and celandine plants in nature, their chemical composition, use in folk medicine and healing properties, and the use of food additives “ASKHUM” and “ASQARAKHUM” prepared from the compositional mixtures of oils obtained from marigold and celandine seeds against internal and external inflammation of the body. *20% of the world's population, or about 1.6 billion people, have various types of inflammation. The incidence of infectious diseases due to inflammation is increasing.*

Also, the food additives "ASXUM" and "ASQARAXUM" Data on the *in vivo* anti-inflammatory activity of these food additives are presented.

Reviewers:

The monograph was approved by the expert council of the Andijan state medical institute on _____, 2026, with statement No. ____ and recommended for publication.

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ANNOTATSIYA

Ushbu monografiyada gulxayri va sedana o'simliklarining tabiatda tarqalishi, o'simliklarning kimyoviy tarkibi, xalq tabobatida qo'llanilishi, gulxayri va sedana moylarining tarkibidagi og'ir metallar, zaharli elementlar, sedana urug'i tarkibidagi minokislotalar, yallig'lanishga qarshi hususiyatga ega bo'lgan terpenoidlar, gulxayri va sedana urug'laridan olingan moylarning kompazision aralashmalaridan tayyorlangan "ASXUM" va "ASQARAXUM" oziq-ovqat qo'shilmalarining antioksidantlik, antiradikallik hususiyatlari, yallig'lanishga qarshi faolligini *in vivo* sharoitda tekshiruvdan o'tkazilganligi va bu oziq-ovqat qo'shilmalariga "Tashqi iqtisodiy faoliyat tovarlar nomenklaturasi" bo'yicha yangi tovar kod ishlab chiqilganligi ko'rib chiqilgan.

АННОТАЦИЯ

В монографии рассмотрены распространение растений алтея и чернушки в природе, химический состав растений, применение в народной медицине, тяжелые металлы в маслах алтея и чернушки, токсичные элементы, аминокислоты в семенах седаны, противовоспалительные свойства "АСХУМ" и "АСКАРАКСУМ" БАДы, приготовленные из композиционной смеси терпеноидов, семян алтея и чернушки, антиоксидантные, антирадикальные свойства, противовоспалительная активность были испытаны *in vivo* и в этом пищевом продукте –разработан новый товарный код «Номенклатуре товаров внешнеэкономической деятельности» для пищевых добавок.

ANNOTATION

The monograph explores the natural distribution of licorice and thyme plants, their chemical composition, traditional medicinal uses, heavy metals in the composition of licorice and thyme extracts, toxic elements, amino acids in thyme extract, terpenoids possessing anti-inflammatory properties, and "ASXUM" and "ASQARAXUM" food additives prepared from compositions of licorice and thyme extracts, their antioxidant and antiradical properties, and their effectiveness against inflammation tested under *in vivo* conditions, leading to the development of new product codes under the "Nomenclature of goods of external economic activity".

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ABBREVIATIONS

1. ADA- adenosine deaminase
2. ARF- antiradical activity
3. ABTC- Asia Pacific Economic Corporation
4. DFPG- 2,2-diphenyl-1-picrylhydrazyl
5. EQF- anti-exudation activity
6. GDAG- histone deacetylase
7. GSH-ST- glutathione-S-transferase
8. IQ- infrared
9. IB-second merger
10. IL-interleukin
- 11.LPO- lipid peroxidase
- 12.MDA- malonilealdoza
13. Mph- microphage
14. MPO- myeloperoxidase
15. NK- nucleic acid
16. OECD- Organization for Economic Cooperation and Development
17. PGE- prostaglandin
- 18.QD- diabetes
19. QG- reduced glutathione
- 18.SanPin- sanitary and epidemiological rules and regulations
20. TIF – foreign economic activity
21. TN- nomenclature of goods
22. TQ- Tumoxinon
23. UB- ultraviolet
24. O‘zR- Republic of Uzbekistan
25. CGD- configured diene
26. CAT- catalase
27. CPx – glutathione peroxidase
- 28.CUPRAC- Cupric Redining Antioxidant Capacity
- 29.GDAG- histone deacetylase

INTRODUCTION

Relevance and necessity of the topic. One of the urgent problems in the world is the increase in the number of natural food products that have the properties of preventing and treating inflammation based on local raw materials. In this regard, the development of natural, harmless, environmentally friendly food additives based on local medicinal plants widely used in folk medicine, which replace synthetic drugs, contain biologically active compounds, macro and microelements that have the property of strengthening the inflammatory system, and their use in folk medicine is one of the urgent problems. In order to prevent and treat inflammatory diseases in humans, scientific research is being conducted around the world to develop natural food additives containing chemical compounds that have the ability to treat these diseases, and to determine their chemical composition. In this regard, special attention is paid to identifying local medicinal plants containing natural chemical compounds that improve metabolism, increase immunity, and prevent inflammation, isolating compounds useful for the human body from their composition by improving existing methods, proving the chemical composition and structure of the obtained compounds using modern methods, and developing natural food additives based on them.

In our republic, natural food supplements based on medicinal plants that have the ability to prevent and treat various diseases of the population are being developed, and certain results are being achieved in classifying them based on their chemical composition. The development strategy of New Uzbekistan ¹ has identified important tasks to be implemented under the “Implementation of the Food Industry Development Program”. Based on these tasks, obtaining harmless, natural food additives based on medicinal plants such as *Althaea* and *Nigella*, containing compounds with anti-inflammatory properties, improving metabolism, as well as studying their chemical composition, structure, and properties, as well as

¹Decree of the President of the Republic of Uzbekistan No. PF-60 dated January 28, 2022 "On the Development Strategy of New Uzbekistan for 2022-2026"

developing and implementing commodity codes for TIF and TN, is of great scientific and practical importance.

Decree of the President of the Republic of Uzbekistan No. PF-60 dated January 28, 2022 “On the Development Plan of New Uzbekistan for 2022-2026” This dissertation research will to a certain extent serve the implementation of the tasks set out in the Decree of the President of the Republic of Uzbekistan No. 2884 on measures to improve the management structure of Uzkiyosanoat JSC dated April 12, 2017, Resolution No. 3983 on measures for the accelerated development of the chemical industry in the Republic of Uzbekistan dated December 25, 2018, as well as Resolutions No. 4947 and No. 4668 on additional measures for the development of folk medicine in the Republic of Uzbekistan dated April 10, 2020, and other regulatory legal acts related to this activity.

Compliance of the research with the priority areas of the development of science and technology of the Republic. This research was carried out in accordance with the priority area of the development of science and technology of the Republic VII. “Chemical technologies and nanotechnologies”.

The level of research on the problem. The plants of the genus *Althaea* and *Nigella* have long been widely used in folk medicine due to their medicinal properties . Extensive research has been conducted in Russia, Indonesia, Arabia and the USA on the chemical composition of the plants and the extraction of biologically active substances from them .

Russian scientists such as NK Rud, AMSampiev, NADavitanyan, A.Harzallah, M.Kanter discovered the pharmaceutical use of cedar oil. Indonesian scientists YA Sary, K.Chaieb discovered the healing of wounds with cedar oil. Arabian scientists such as A.Ahmad, A.Husayn, M.Mujib conducted scientific work on the therapeutic areas of cedar. American scientists such as R.Woodward, D.Whiting found that cedar oil stimulates bone marrow formation They conducted studies on its stimulation and use against cancerous tumors.

In Uzbekistan, A. Choriyev developed agricultural techniques for growing marigolds. AR Batoshov studied the medicinal properties of whole-leaved sedum. Doctor of Chemical Sciences, Professor IRAskarov, in his books “The Encyclopedia of Medicine”, “Mysterious Medicine”, “Phytotherapy”, “Evidence-Based Folk Medicine Methods”, provided information about the healing properties of sedum and sedum and their use in the prevention and treatment of a number of diseases. Currently, the scientific literature mentions the production of food additives from sedum and sedum, but they have not been used in medical practice, including in the treatment of various inflammatory diseases of the body. Also, commodity codes for TIF, TN have not been developed for food additives from sedum and sedum plants based on their chemical composition.

This dissertation work is aimed at solving the problems of using food additives prepared based on oils extracted from the seeds of medicinal plants, such as althaea and nigella, against inflammation of organs such as joints, duodenum, and kidneys in the human body, and developing and implementing new product codes based on the biologically active substances contained in them.

The relationship of the dissertation topic to the scientific research work of the educational institution where the dissertation was completed:

Dissertation research Carried out within the framework of the scientific research plan of Andijan State University in the areas of "Acquisition and classification of goods used in the national economy and folk medicine".

The purpose of the research is to extract oil from the seeds of the medicinal plants althaea and nigella, obtain new food additives based on the obtained oils, determine their chemical composition and physicochemical properties, and develop new commodity code numbers for TIF and TN based on their chemical composition.

The objectives of the study: to determine the optimal parameters for extracting oils from althaea and nigella seeds in cold pressing equipment;

marigold and nigella oils determination of the amount of microelements using modern physicochemical methods; determination of the amount of amino acids and terpenoids in the content of celery seeds identification; gypsy and cedar oils and their various proportions determination of the antioxidant activity of the mixture;

"ASXUM" rich in minerals based on althaea and nigella oils and Creation of "ASQARAXUM" food supplements;

"ASXUM" and "ASQARAXUM" biologically active food additives determination of antiradical activity;

"ASKHUM" and "ASQARAKHUM" food determination of the pharmacotoxicological index of food additives;

"ASXUM" and "ASQARAXUM" food additives study of anti-inflammatory activity in a carrageenan tumor model; classification of the obtained new food additives according to their chemical composition into TIF, TN development of new code numbers;

The objects of the research were althaea and nigella oils, as well as the food additives "ASXUM" and "ASQARAXUM" developed on their basis.

The subject of the study is althaea and nigella oils, to obtain new food additives containing biologically active compounds, to determine their anti-inflammatory properties, and to classify them into appropriate classes based on their chemical composition.

Research methods. The dissertation work includes chemical analysis, optical emission spectrometry, spectrophotometric analysis, biological anti-inflammatory activities, antioxidant, antiradical, pharmacotoxicological analysis methods were used.

The scientific novelty of the research is as follows: using the inductively coupled plasma emission spectroscopy method, the amount of 26 macro- and microelements in bulrush oil and 28 in nigella oil was determined, and based on them, the order of increasing amounts of elements in the molar composition was established; the amount of amino acids and terpenoids in sedana seeds was

determined using the USSX method, and the presence of amino acids such as arginine and glutamine, as well as thymoquinone, α - and β -pinene, which have a positive anti-inflammatory effect, was proven; when the antioxidant activity of a food supplement based on althaea and nigella oils was determined using the phosphomolybdenum method, the result was "ASXUM". It has been proven that "ASQARAXUM" is a higher antioxidant than ascorbic acid by 40%, and "ASQARAXUM" is 61.3%; when the kinetics of the reduction of stable radical (DFPG) molecules were measured spectrophotometrically to determine the antiradical activity of food additives, it was found that ASXUM was 12.2% higher than glycoside, and ASQARAXUM was 10% higher;

When the pharmacotoxicological index of the food additives "ASXUM" and "ASQARAXUM" was determined using the Lima method, it was proven that these food additives belong to class VI - non-toxic compounds; the obtained new food additives were classified according to their chemical composition, New international commodity code numbers were developed for them according to TIF TN; **The practical results of the research** are as follows:

Effective anti-inflammatory based on rosehip and fennel seed oils "ASKHUM" and "ASQARAKHUM" food additives were created; for food additives based on althaea and nigella oils a new international commodity code number has been developed;

Reliability of research results. The results of the analysis of the healing properties of food additives, elemental analysis, antioxidant, antiradical, pharmacotoxicological indicators and anti-inflammatory activity were determined using modern equipment: "DD85-G" cold press equipment, analytical balance (FA220 4N), mineralization device (MILESTONE Ethos Easy, Italy), acid cleaning device (Distillacid BSB-939IR), inductively coupled plasma optical emission spectrometer (Avio 200 ISP-OES), FTK-amino acid identification (Agilent 1200) chromatography,

This is explained by the fact that the measurements were made using the Discovery HS C18 column, that the results obtained in the experiments correspond to those obtained using modern physicochemical methods, that the results obtained have been published in scientific publications and have been approved by authorized bodies.

Scientific and practical significance of the research results. The scientific significance of the research results is explained by the fact that the chemical composition and medicinal properties of the created food additives were determined using chemical analysis and spectrophotometric methods, and their antioxidant, antiradical, pharmacotoxicological, and anti-inflammatory properties were analyzed.

The practical significance of the research results is that the new food additives "ASXUM" and "ASQARAXUM", prepared on the basis of oils extracted from althaea and nigella seeds, have been launched for production at "SIFAT-AGRO-SERVIS" LLC, operating in the Andijan district, and serve to treat and prevent various inflammatory diseases.

Implementation of research results. Based on the scientific results obtained on the creation and classification of certain food additives containing biologically active substances with anti-inflammatory properties:

A certificate of conformity (No. UZ. SMT. 01. 0094. 96108495, "Sanitary-epidemiological conclusion" No. 31-8/602 of the Ministry of Health of the Republic of Uzbekistan) was obtained from the National Certification System of the Republic of Uzbekistan for the development of new natural anti-inflammatory food additives "ASKHUM" and "ASQARAXUM" based on althaea and nigella seed oils. As a result, it allowed for the identification of these food additives at the required level.

According to the nomenclature of goods for foreign economic activity, code number 210690980 7 was developed and introduced into State Customs Practice for "natural food additives based on plants, containing nigellone, thymoquinone,

dithymoquinone, unsaturated fatty acids and vitamin E” (Reference of the State Customs Committee of the Republic of Uzbekistan No. 17/05-23-037 of 2023). As a result, it became possible to control the customs duties levied on such food additives when exporting and importing them.

CHAPTER I. INFLAMMATION PROCESS. BIOLOGICAL ACTIVITY THE IMPORTANCE OF ADDITIVES AND THEIR CLASSIFICATION BY CHEMICAL COMPOSITION (LITERATURE ANALYSIS)

1.1-§. Distribution, chemical composition and medicinal properties of the plants of the genus *Althaea* and *Nigella* in nature

There are mainly medicinal althaeas (Altey lekarstvenniy- *Althaea officinalis*), Armenian althaea (Altey armyanskiy-*Althaea armanica*), and white althaeas (Altey golotisvetnyy- *Althaea nudiflora*) [1; 234b].

The flower is a perennial plant belonging to the family of the Asteraceae. The stem is erect, simple or sparsely branched, with soft stellate hairs, 70-150 cm high. The leaves are ovate, the lower part is usually triangular-cordate, the margin is irregularly toothed, sometimes slightly 3-5-lobed, densely soft hairy, gray-green, banded, the upper leaves are short-banded. The flowers are white-pink, 20-30 mm in diameter, with double calyx, many stamens (stamens), growing together with the seed, forming a single tube. The flowers are located in clusters in the axils of the leaves, with a very short peduncle, densely soft hairy. The lower sepals are composed of 8-10 fused, elongated-ovate, densely soft hairy pointed petals, the sepals are relatively shorter. Sepals ovate, elongated and pointed towards the top, densely pubescent, fused at the bottom. Petals pale or bright pink, sometimes white, 1.5-2 times longer than the calyx, triangular-obverse cordate. Seeds smooth or very slightly curled on the back, stellate pubescent, with a blunt structure on the edge. Fruits are flat, divided into 15-25 seeds. The back of the seeds is densely

covered with stellate pubescence. Flowering from July to September and fruiting begins [1;235b].

Rosemary grows in Europe, Western Asia, North Africa, and the Middle East. It is widespread in the steppe and forest-steppe zones of the European part of Russia, in the south of Western Siberia, in Kazakhstan, in some regions of Central Asia and the Caucasus. The gypsy moth prefers habitats with sufficient moisture: river banks, ditches, lakes and ponds, mainly in saline meadows. Usually forms small groups, sometimes sparse thickets. In Ukraine, it is found mainly in the basins of the Dnieper, Seversky Donets and Southern Bug [2;124-b].

In Uzbekistan, the gypsy moth is mainly distributed in Tashkent, Samarkand, and Fergana regions. It grows in mountainous areas and near water [3;232-b].

Today, many scientists in our Republic are conducting scientific research on the cultivation of medicinal plants, determining the amount of micro- and macroelements in their content, and studying their pharmacology [2;148 -b].

Among the medicinal plants, we can also mention the nigella plant, which is widely distributed in Uzbekistan.

Nigella is an annual plant belonging to the Ranunculaceae family, reaching a height of 20-75 cm. The stem is long, multi-faceted or cylindrical, branched in the middle and upper parts, slightly covered with hairs, the branches end with a single flower at the tip. The lower leaves have a scaly margin, quickly wither, slightly pubescent, 2-3 times pinnately cut, the lobes are broadly oblong, blunt or slightly sharp-pointed. The upper leaves are unstalked, 1.5-3 cm long, dry at the same time as the plant, and look similar to the lower leaves. The sepals are 10-15 mm long and 3-8 mm wide, oblong, more oblong or oblong-ovate, with a small claw. The petals are 2 times shorter than the sepals, hairy, and also have a claw. The outer lip is deeply divided into two, the lobes are turned down. The inner lip is much shorter than the outer, has a linear structure. The fruit is a 5-7-lobed fruit. Up to 1.5 cm long, swollen. The seeds are three-edged, uneven, light brown, colored. It flowers and ripens in May-June [4;440-b].

Nigella–(*Nigella sativa* L) can be literally translated as “black seed” in Arabic texts. Because scientists have long argued about what this “black seed” is. Many have argued that it is a black seed called “shunbiz”. In fact, it is dark green, but many are accustomed to saying that it is black. It is also called “black cumin”, “Indian cumin”. In our country, it is called “nigella”. Nigella plays a great role in medicine. Nigella improves the immune system in the human body and has anti-inflammatory and healing properties for a number of diseases [5;51-b].

Geographical distribution - Nigella is currently cultivated in South-East Bulgaria, North America, Central and Southern Europe, East and South Asia, the Western Mediterranean, the Middle East (Pakistan, Afghanistan, Saudi Arabia, Iran), North Africa, Tunisia, and India. Nigella is also widely distributed in Lithuania, southern and western Ukraine, Moldova, Crimea, and the Caucasus [2 ; 207-b]. Nigella is found wild in arable lands in the south of the European part of Russia and in the Caucasus, and is also cultivated in cultivated areas. It is a widespread plant in the Tashkent and Samarkand regions of Uzbekistan [1; 774-b].

The chemical composition of the *Althaea* plant - the roots contain about 35% mucilage, 37% starch, 10.2% sucrose, aspartic acid, betaines (4%), oils (12%) and other substances. The leaves and flowers also contain essential oils (about 0.02%). The healing effect of *Althaea* is due to the mucilage and pectin substances it contains. The mucilage mainly consists of polysaccharides, disaccharides, pentoses, galactose, pentose and hexosans that form dextrose. [13 ; 113-115-b].

The root of the bulrush plant contains more salts of K, Ca, Mg, Fe, Mn, the stem consists of biologically active substances with medicinal properties, of which; starch-37%, pectin-35%, sugar-8%, carotene-5%, lecithin, phytosterol, fats 1-1.5%, in addition, biologically active substances are found in the leaves and stems, of which; essential oils, rubber, ascorbic acid and carotene have been identified. The leaves of the bulrush plant contain substances with medicinal properties, of which; essential oils are important factors that carry out the interconnection of all

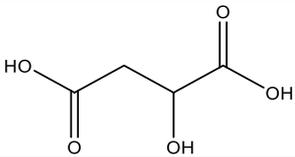
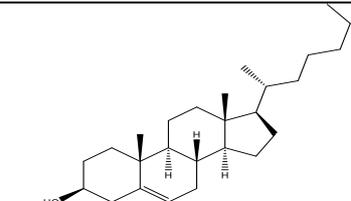
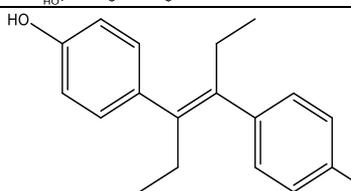
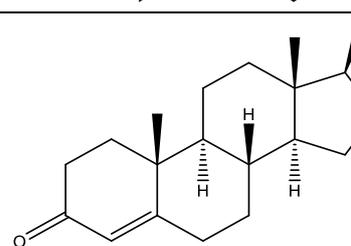
physiological and biochemical processes in the plant body. Ascorbic acid participates in the oxidation process of the body [6; 284-285-b].

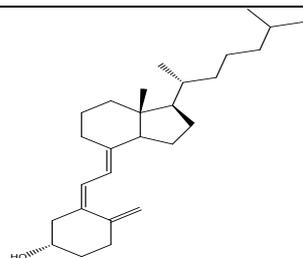
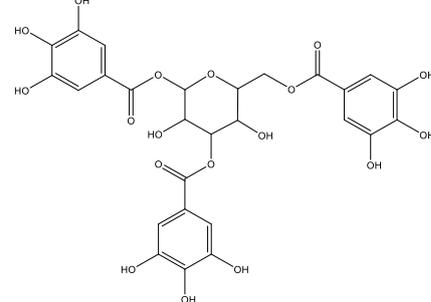
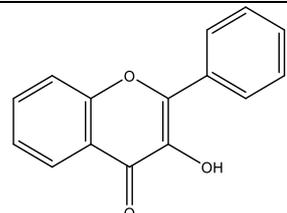
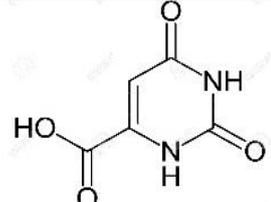
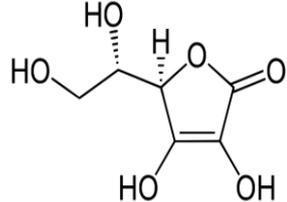
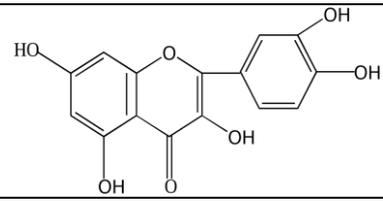
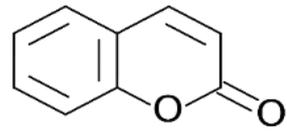
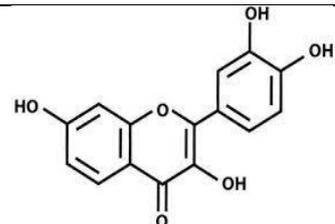
The seeds of the Althaea plant contain biologically active substances with healing properties, of which; linoleic acid - 52.8%, oleic acid - 30.8%, alpha linolenic acid - 2.5%, and fats - 13.9%. Althaea seeds are mainly composed of fats and fatty acids, which are mainly external anti-inflammatory agents. Unsaturated fatty acids enhance this property.

In addition, the althaea plant contains malic acid, essential oil, rubbery substance, steroids, tannins, betaine, fats, vitamins B₃, C, as well as organic substances such as flavonoid glycosides, coumarins, and phenolics [7 ; 13-b].

Table 1.1

Biologically active substances found in the composition of the Althaea plant

No.	Biologically active substance	Types of biologically active substances	Biologically active substance formula
1	Acids	Malic acid	
2	Steroids	Cholesterol	
		Strogen	
		Testosterone	

		Cholecalciferol	
3	Tannins	Tannin	
4	Flavonols	Flavonoid	
5	Vitamins	Vitamin-B	
		Vitamin-C	
6	Glycosides	Flavonoid glycosides	
		Coumarin	
		Quercetin	

As can be seen from Table 1.1 below, the althaea plant contains a number of biologically active substances [7 ; 13-15-b].

The chemical composition of the nigella plant - the seed part contains protein - 26.7%, fat - 28.5%, carbohydrates - 24.9%, fibrous fiber - 8.4%, total ash - 4.8%, drying oils 0.5-1.6%. In addition, it contains 41.5% cellulose, water - 8.1-11.6% [8; 188- b].

The seeds also contain a number of different vitamins (e.g. A, B₁, B₂, B₃ and C) and the following metal salts are rich in minerals (e.g. Ca, K, Se, Cu, P, Zn, Fe). Carotene and vanillic acid are found in the seeds, roots and shoots. The fatty components are linoleic acid-50-60%, oleic acid-20%, digomolinoleic acid-10%, elcodadienoic acid-3% and the main unsaturated fatty acids. Palmitic acid and stearic acid belong to the two main saturated fatty acids, in which α -sitosterol-44.54% and stigmasterol-6.57-20.92% are found [8;183-b].

The composition of nigella seeds was studied by European scientists S. Gharby, H. Harhar, D. Guillaume, and information was provided on the presence of biologically active organic substances in the seed, such as myristic acid, palmitoleic acid, arachidonic acid, cholesterol, campesterol, β -sitosterol, 5-avenasterol, 7-stigmasterol and 7-avenasterol [9;172-177 b].

Nigella essential oil is a yellow liquid with a bitter odor. Its active ingredient is melanchol. The oil contains saturated and unsaturated fatty acids, including Omega-9 and Omega-6, amino acids, in particular arginine, phospholipids, phytosterols (campesterol, betasitosterol, stigmasterol, tannins, flavonoids, carotenoids, mono- and polysaccharides, enzymes, alkaloids, saponins and triterpenes). Up to 0.43% ascorbic acid and a large amount of carotene have been detected in the leaves of the plant [9;172-b].

The phytochemical composition of the celery plant is very diverse, and it contains steroids, lipase enzyme, essential oil, fatty oil, triterpene saponins, coumarins, phenolcarboxylic acids, amino acids, carbohydrates, proteins, minerals, melanthin glycoside, tannins, and vitamins [10;48-b].

Researchers at the Tunisian Center for Biotechnology have developed a qualitative composition, that is, they have determined the composition of phenolic compounds of sedum, including gallic, p-dihydroxybenzoic, chlorogenic, p-coumaric, ferulic, vanillic, trans-2-hydroxycinnamic and trans-cinnamic acids, as well as epicatechin, catechin hydrate, quercetin, apigenin, amentoflavones [10;48-55-b].

The mineral composition of nigella oils was determined by atomic absorption spectroscopy and its composition consists of potassium, magnesium, calcium, sodium, phosphorus salts and minerals such as sodium, iron, copper, zinc and manganese [11;673681-b].

The amino acids asparagine, glutamic acid, glycine, leucine, isoleucine, serine, threonine, tryptophan, and tyrosine have been identified in celery seeds [12;149-b].

According to scientific data, the main component of nigella oil is nigellone. Nigellone, according to some reports, is a mixture of dithymoquinone and thymoquinone. These substances were found in nigella essential oil by gas chromatography method: p-cymene, thymoquinone, ethyl linoleate, α -pinene, ethyl hexadecanoate, ethyl oleate, 3-pinene, limonene, carvacrol, camphene, sabinene, myrcene, α -terpinene, 3-phellandrene, hterpinene, tolerable nolene, linalool, borneol, terpinen-4-ol, 1,8-cineole, camphor, carvone, bornylacetate, longifolin, α -longipinen, 3-thujone, p-cymen-8-ol, transsabinene hydrate, cis-sabinene hydrate, (e)-anethole, artemisia ketone, 2-undecanone, ethylhexanoate, ethylheptanoate, ethyloctanoate, ethyltetradecanoate, ethyloctadecanoate, methyl linoleate, 2-heptenal, ethylnonanoate, thymohydroquinone, dipropyl disulfide, dibutyl disulfide, butyl propyl disulfide substances were detected [13;629-631-b, 14;167-175-b, 15;323-328-b].

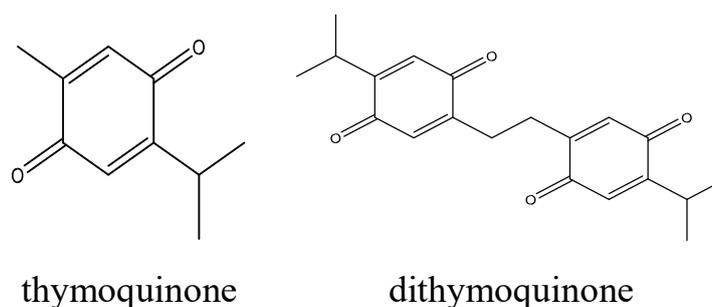


Figure 1.1. Anti-inflammatory substances in the oil of the nigella plant

Figure 1.1 shows the biologically active substances that have anti-inflammatory properties both internally and externally, which are components of the nigellone compound found in nigella oil [16;195-199-b].

A study of the chemical composition of safflower oil shows that it is rich in fatty acids, the main representatives of which are listed in Table 1.2 [17;352-b].

Table 1.2

Fatty acids found in safflower oil

Trivial name	Systematic name	Acid formula
Saturated fatty acids		
Myric acid	Tetradecanoic acid	$C_{13}H_{27}COOH$
Pentadecyl acid	Pentadecanoic acid	$C_{14}H_{29}COOH$
Palmitic acid	Hexadecanoic acid	$C_{15}H_{31}COOH$
Margarine acid	Heptadecanoic acid	$C_{16}H_{33}COOH$
Stearic acid	Octadecanoic acid	$C_{17}H_{35}COOH$
Arahinic acid	Eicosanoic acid	$C_{19}H_{39}COOH$
Behenic acid	Docosan acid	$C_{21}H_{43}COOH$
Lignoceric acid	Tetracosanoic acid	$C_{23}H_{47}COOH$
Monounsaturated fatty acids		
Myristoleic acid	Cis-9-tetradecanoic acid	$C_{13}H_{25}COOH$
Palmitoleic acid	Cis-9-hexadecanoic acid	$C_{15}H_{29}COOH$
Oleic acid	Cis-9-octadecanoic acid	$C_{17}H_{33}COOH$
Polyunsaturated fatty acids		
Linolenic acid	Cis-,cis-9,12-octadecanoic acid	$C_{17}H_{31}COOH$
Linoleic acid	Cis-,cis-,cis-6,9,12-octadecanoic acid	$C_{17}H_{28}COOH$
Arachidonic acid	Sis-, Sis-, Sis-5,8,11,14-eicosotetradecanoic acid	$C_{19}H_{31}COOH$

Table 1.2 lists the main fatty acids found in sesame oil, their trivial, systematic names, and empirical formulas.

Using the chromato-mass spectrometry method, it was determined that the quantitative composition of the seeds of the nigella is 32.53% fatty acids. In addition, the presence of fatty acids and dehydroretinol acetate was determined by US scientists [18;223-226-b].

The healing properties of the bulrush plant - Ibn Sina used a decoction made from the roots, seeds and leaves of the medicinal bulrush as an expectorant, used it as a softening medicine for coughs, prostate tumors, prostatitis, hemoptysis, pleurisy, bronchial and lung inflammation, and as a diuretic for difficulty in urination and bladder stones. If the hair is washed in a decoction of bulrush roots, it softens and helps it grow. It also removes dandruff. If the flowers are applied to the head, it prevents meningitis. Its tincture is useful for eye injuries. Its seeds are among the medicines that treat coughs. If the decoction of the roots is drunk, it cures heartburn in the urinary tract and swelling of the stomach, liver, kidneys and bladder. If the leaves are boiled in water and given to a pregnant woman to drink, she will give birth easily. It reduces swelling in the body and softens them. If applied with vinegar, it cures vitiligo (pes). It also cures bee stings. But it is harmful to the spleen. In vitiligo (pes), if the juice of the rose is applied to the skin and left in the sun, it cures this disease. If a teaspoon of the decoction is drunk three times a day, it cures colic [1;235-b].

Basitkhan Shoshi, in his book "Drugs and Their Names," describes althaea as follows: its Greek name is hitmiy, which means "many-useful." He mentioned that the famous herb is called by the Arabs - hubboza, the Persians - shabparak, the Turks - obim kumoch, the Uzbeks - althaea and nigella plant.

The healing properties of the althaea are that it has the properties of dissolving, cooking, reducing and softening the inflamed area. The healing properties of the althaea flower are lower than those of its seeds, leaves and stems.

When tied to the head, the leaves of the nigella are useful in stopping brain swelling, ear swelling, and other pains and healing external wounds, and they disperse swellings and glands in the body. They remove fresh wounds, boils, and swellings in the chest. They are useful against joint pain caused by crushing and heat. When tied with olive oil, they draw out the poison from the bites of poisonous insects. They are useful when placed on a burned limb. In Central Asian folk medicine, a decoction made from the roots, leaves, and flowers is used as a softening medicine for hemoptysis, tuberculosis, bronchial asthma, coughs, and chest pains, as well as for gargling. Boiling the roots and drinking them is recommended for postpartum hemorrhages. An ointment made from the roots, leaves, and flowers is used to treat boils and external wounds. In Tajikistan, this plant is also used as medicine [2-238-b].

Along with the medicinal nigella, which is grown in Uzbekistan, Kyrgyzstan and Tajikistan, it is necessary to mention the Armenian bulrush. This plant differs from the medicinal bulrush only in its leaves and fruits. The roots of the Armenian bulrush also contain the same substances as the medicinal bulrush, for this reason this plant is used in medicine along with the medicinal althaea [19; 320-b].

Modern science has established the expectorant, softening and anti-inflammatory effects of bulrush preparations, and this effect is due to the presence of mucilage in their composition. These substances have an enveloping property, protecting the nerve cells of the mucous membrane of the upper respiratory tract and gastrointestinal tract from various effects, contributing to the slower absorption of various drugs and a somewhat longer local effect, and tissue healing. For this reason, althaea root powder in the form of tinctures, liquid and thick extracts and juice is widely used as an anti-inflammatory drug, mainly in catarrhal conditions of the respiratory tract and gastrointestinal tract (gastritis, peptic ulcer disease, enteritis, colitis, etc.) [1;236-b].

In vitro and *in vivo* effects of roots, seeds and oils of Gulkhayri It has many pharmacological effects, such as antitussive, anti-inflammatory, antioxidative, antibacterial, and antifungal activities.

German scientist Schmidt discovered that the root extract of the marigold flower has expectorant properties for the mucous membrane of the upper respiratory tract [20;71-b].

American scientists I. Fink *and* his students conducted an independent survey of patients who received oral aqueous extracts of bulrush roots in a clinical trial. The results of the study showed that aqueous extracts had a good effect in the symptomatic treatment of oral or pharyngeal dysentery [21;299-305-b].

Relevant studies have shown that the mucilage polysaccharide content of marigolds is 6.2%-11.6% [22;1-9-b].

The antitussive activity of polysaccharides from the root of the gypsy moth was tested as an antitussive agent [23;93-99-b].

In mechanically induced cough, both polysaccharides and rhamnogalacturonan significantly reduced the intensity, frequency, and frequency of cough. The mucilaginous substance contained in the roots of the marigold forms a protective layer on the respiratory mucosa, preventing it from being irritated by foreign antigens.

Anti-inflammatory effect- US scientists Bonaterra *et al.* studied the *anti-inflammatory effects of marigold root extract on macrophages (Mph) in vitro* using the THP1 (human acute monocytic leukemia) cell line . The results of enzyme-linked immunosorbent assay showed that the extracts had a strong inhibitory effect on the LPS-induced induction of tumor necrosis factor-alpha (TNF- α) and interleukin-6 (IL-6). They also found that the extracts protected human Mph from H₂O₂ -induced cytotoxicity and cellular reactive oxygen species production, in addition to improving the migratory ability of the cells.

Antioxidant effect- Many studies on the antioxidant activity of althaea have been conducted *in vitro* by Benbassat and Zaghlool . [24;182b]. They evaluated the

antioxidant activity of root extracts prepared with different extraction solvents using ABTS, DFP, hypochlorite scavenging and iron-related lipid peroxidation assays. They found that the aqueous extract had weak antioxidant activity, while the ethanol extract showed good apparent antioxidant activity. In addition, althaea The antioxidant properties of ethanolic extracts of flowers of the genus A. were evaluated in various *in vitro* tests. The extracts showed 85.5%, 91.2% and 96.4% inhibition of linoleic acid emulsion peroxidation, respectively. In addition, the extracts were shown to have effective reducing power, free radical scavenging, superoxide anion radical scavenging and metal chelation at the same concentrations (50, 100 and 250 mg/ml) [25;1859-b].

Indonesian scientist M. Sadigara, using iron-reducing assays, found that the antioxidant capacity of althaeas varies from strong to weak depending on the plant color (red-pink, pink, white) [26;113-117-b].

African scientist J. Sales studied the antibacterial effect of alcoholic extracts from the stems and leaves of the althaea plant. He proved that alcoholic extracts of althaea leaves were effective against gram-positive bacteria, but not against gram-negative bacteria at the tested concentrations [27;105-b].

African scientist Zaghlool and his students studied the protective effect of fenugreek on gastric ulcers in rats against external injuries. They found that althaea (100 mg/kg/day) for 14 days could significantly reduce the number of ulcers and the ulcer index. At the same time, all blood and tissue parameters were significantly improved to varying degrees [28;421-b].

Russian scientist M. Rezaei conducted research on the effect of the althaea plant on the treatment of external wounds [27;112-b].

M.Rezaei Althaea found that ethanolic extracts of leaves can accelerate wound healing processes and increase the percentage of wound closure in an excision wound model in rats. A study on the mucilage contained in bulrush showed that the mucilage contained in bulrush significantly improved wound healing and showed that it could be cured in a short time [28;428-b].

The healing properties of senna - In the medical hadiths of our Prophet Muhammad (PBUH), senna is said to have a cure for all diseases except death. According to "Tibbi Nabawi", bread with senna removes the toads, stops dizziness and diarrhea. It relieves pain in one half of the head. It is said to be very useful for diseases such as facial wrinkles, difficulty sleeping and snoring, memory loss, dizziness, blurred vision, and darkening of the eyes [1;776-b].

Ibn Sina used sedana to treat certain eye diseases. He made a juice of nigella and honey with hot water and used it to treat bladder and kidney stones. The great physician also used nigella as an anthelmintic, an anthelmintic, and a sedative.

The Nigella plant has expectorant, cleansing and dissolving properties. It helps with toothache and headache in cold temperament. If eaten dried, it also cures colds. Its oil cures paralysis, facial wrinkles and asthma. It increases milk in nursing women. If brewed or eaten, it helps thicken the spleen. It expels large and small worms, as well as flatworms, from the abdomen. If smoked, it cures hemorrhoids. Its oil cures pain in the knees and all cold forms of malaria. However, it is harmful to the liver [1;775-b].

The medicinal properties of Nigella oil, i.e., its consumption and application, have been reported in scientific literature for treating paralysis, facial drooping, limb numbness, joint pain from cold, fatigue, back pain, and genital activation [1;777-b].

Antioxidant capacity of celery. A number of *in vitro* and *in vivo* antioxidant studies have been conducted with nigella extracts, seed oil, and TQ. The findings suggest that it has potential radical scavenging and inhibitory effects on oxidative stress [29;706-719-b, 30;143-151-b]. TQ has been shown to be effective in parameters such as adenosine deaminase (ADA), catalase (CAT), myeloperoxidase (MPO), lipid peroxidase (LPO), reduced glutamine (QG), glutathione-S-transferase (GSH-ST), glutathione peroxidase (GPx). It also reduced the levels of malonylaldehyde (MDA), conjugated diene (CGD), and the pro-inflammatory mediators interleukin-1 beta (IL-1b), interleukin-6 (IL-6), tumor necrosis factor-

alpha (TNF- α), and interferon. Interleukin-10 (IL-10) is replaced by interleukin-gamma (IFN-g) and prostaglandin (PGE₂) [31;183-b, 32;938-946-b, 33;148-154-b].

Anti-inflammatory effects of the nigella plant. Results from different animal models are promising. The oil of the TQ has shown anti-inflammatory potential [34;254-b, 35;218-b, 36;373-b]. This activity is related to the reduction of NO production, interleukin-1 (IL-1), cyclooxygenase-1 (COX-1), cyclooxygenase-2 (COX-2), histone deacetylase (HDAC) and other pro-inflammatory mediators. The topical application of TQ induces the expression of hemeoxygenase-1, NAD(P)H-quinone oxidoreductase-1, GSH-ST and glutamate cysteine ligase in mice; while the oil of the nigella inhibits COX, 5-LPO in the arachidonate metabolism pathways in rats, TQ has also been shown to reduce nuclear translocation and DNA binding of nuclear factor-kappa-B (NF- κ B) in mice by blocking the phosphorylation and subsequent degradation of I κ B α . [37;1059-b, 38;556-b].

TQ also attenuated the phosphorylation of Akt (protein kinase B), c-Jun-N-terminal kinase (c-JUNK), and P38 mitogen-activated protein kinase (MAPK-P38). In B16F10 mice, the downregulation of NLRP3 (NACHT, LRR, and pyrin domain-containing protein-3) expression led to the inactivation of caspase-1, followed by inhibition of IL-1 β and IL-18. Furthermore, the inhibitory effects of TQ on NF- κ B and reactive oxygen species (ROS) led to partial inactivation of the NLRP3 inflammasome [39;92-98-b].

§ 1.2. Antioxidants and their role in the human body. Synthetic antioxidants used in the food industry and their negative effects features

Russian scientists led by A.I.Prida conducted scientific research on the analysis of “Natural antioxidants of polyphenolic nature”. According to the information provided by these scientists, doctors, chemists and biochemists pay serious attention to the problems of oxygen metabolism in the human body in their work. Because oxidative stress in the human body occurs when the balance

between the biochemical mechanisms of oxygen utilization is disturbed. Oxidative stress is eliminated with the help of biologically active substances (BFM), in particular antioxidants [40; 76-78b].

Antioxidants stop rapidly increasing oxidation processes, forming inactive radicals and removing them from the body [41; 7-14-b, 42; 13-19-b].

Free radicals usually accumulate in cell membranes and begin to destroy them, causing the cells of the human body to gradually break down and die. This results in accelerated aging of the body, damaged tissues, weakened immunity, and other health problems, including more than 60 different diseases, such as atherosclerosis, cancer, cataracts, Parkinson's disease, Alzheimer's disease, and heart disease.

The human body has a defense system of antioxidants, which operates through primary antioxidant enzymes and secondary antioxidant vitamin systems [43; 32-36-b, 44; 28-30-b].

When the human body is exposed to extreme factors such as radiation and poisons, many harmful molecules are produced, and in this case the body needs more antioxidants [45; 63-75-b, 46; 287-298-b].

In many cases, chronic diseases, such as stress, radiation, and aging, can lead to the formation of free radicals, which are products of the complete reduction of oxygen in the body [47; 3-13-b, 48; 678-691-b].

Excessive production of free radicals leads to disruption of the body's cell membrane functions, deterioration of our health, and premature aging [49; 73-75-b, 50; 257-b].

Antioxidants are compounds that protect cells, or rather cell membranes, from harmful effects or reactions that lead to excessive oxidation in the body [51; 230-231-b, 52; 163-166-b].

Because free radical molecules are missing one or more electrons, they aggressively attack healthy molecules, causing chain reactions. Free radicals

usually accumulate in cell membranes and begin to destroy them, resulting in the gradual destruction of our body's cells [53; 127-132-b].

Antioxidants act as a kind of donor for free radicals, sacrificing their own electrons to stop the formation of free radicals and prevent them from becoming free radicals. As a result, the oxidation of cells in the body is slowed down or even completely stopped [54; 77-78-b, 55; 119-b].

Antioxidants work best only in a group, that is, when they support each other. For example: Vitamin E is the main destroyer of lipid oxidation reactions, and is consumed and absorbed to eliminate these reactions. If vitamin C is present with it, it restores the function of vitamin E and activates it. Vitamin C also protects selenium from oxidation . Glutathione converts lipid peroxidation products into less harmful substances and protects vitamin E [56; 46-49-b, 57;312-322-b].

Non-enzymatic antioxidants, which are not produced by the body and must be obtained from food or pharmaceutical sources, break the chain of free radical formation and help prevent the depletion of enzymatic antioxidants [58; 235-236b, 59;-154-b].

Enzymes are considered the primary antioxidant defense, eliminating reactive oxygen species. They convert oxygen species into hydrogen peroxide and less aggressive radicals, which are then converted into water and useful oxygen [60; 646-b, 50; 61-142-b].

Vitamins and vitamin-like substances act as secondary antioxidant defenses, scavenging free radicals and preventing the development of a chain reaction that leads to the formation of new free radicals that release excess energy. These vitamins or vitamin-like substances include water-soluble vitamin C, vitamins (bioflavonoids - rutin, quercetin, citrine, hesperidin, ascorutin), fat-soluble vitamins - vitamin A, beta-carotene, E, K, sulfur-containing amino acids (glutathione, cysteine, methionine), cytochrome C, chelates, micronutrients such as alcohol, selenium and zinc in microdoses [62; 632-b, 8; 217-b, 63; 4295- 4298-b].

Antioxidants are widely used in food industries, mainly in the oil and fat, confectionery, dairy processing, meat processing, and fish processing [64; 67-74-b, 112; 65-1640-b].

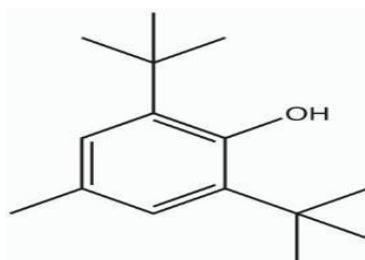
Technological and hygienically, antioxidants are required to be present in food products in a concentration of no more than 0.02%. Small amounts of antioxidants are added to food products to protect them from oxidation [66; 88-91b, 67; 126-131-b].

More than 10 types of antioxidants are used, ranging from 300 to 350 UE according to the EII category (Eurasian Economic Union) [68; 3133-b, 69; 31-33-b].

Antioxidants are substances that protect food products from oxidation under the influence of atmospheric oxygen. In this process, antioxidants are consumed during the oxidation process, that is, they are broken down under the influence of atmospheric oxygen. Therefore, the more antioxidants a product contains, the longer its shelf life. However, the addition of antioxidants in large quantities can have a negative effect on the composition of food products [70; 369-387-b, 71; 573-585-b].

Although these types of antioxidants increase the shelf life of food products, they can also exhibit harmful properties. The properties of some synthetic antioxidants are listed below [72; 235-243-b].

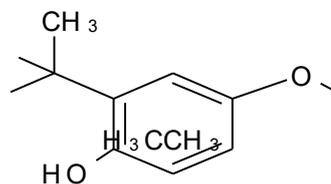
Butylhydroxytoluene. This substance is used as an antioxidant in the production of chewing gum. Butylated hydroxytoluene has a negative effect on the nervous system in the human body and can also cause the development of malignant tumors [73; 192-200-b, 74; 173-179-b].



(1.2)

Butylhydroxytoluene

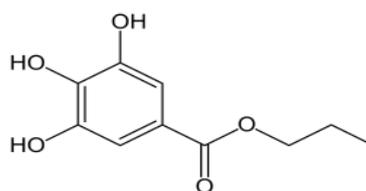
Butyloxyanisole is used as an antioxidant in the preservation of animal fats, powdered milk, and some confectionery products. This compound is actively involved in increasing blood cholesterol levels [75; 281-286-b, 76; 30-35-b].



(1.3) Butyloxyanisole

Propyl gallate is a synthetic antioxidant obtained by the reaction of n-propanol with 3,4,5-trihydroxybenzoic acid. This antioxidant is widely used not only in the food industry, but also in the pharmaceutical and cosmetic industries.

(1.4)



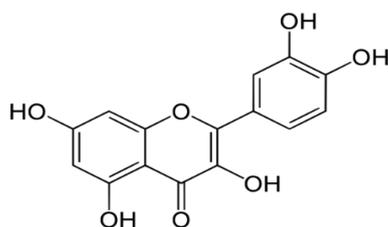
Propyl gallate

Propyl gallate causes asthma, skin allergies, and gastrointestinal diseases in the body [77; 127-133-b, 78; 53-55-b, 79; 30-32-b].

Quercetin – C₁₅H₁₀O₇. It is an example of a vitamin of the R-group.

It is part of a number of biologically active additives (BFA) and drugs, and is also used in alternative (non-traditional) medicine.

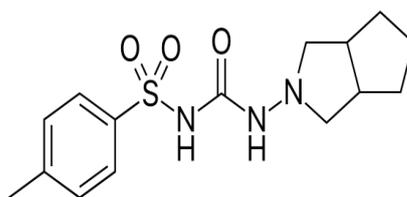
(1.5)



Quercetin – C₁₅H₁₀O₇

Gliclazide- C₁₅H₂₁N₃O₃ S is an oral hypoglycemic agent derived from the second generation sulfonylureas, which is used for weight loss in people who do not exercise.

(1.6)



Gliclazide- C₁₅H₂₁N₃O₃S

Glycoside is not recommended for patients with vomiting, abdominal pain, rash, liver and kidney problems, as well as pregnant women [80; 236-b, 81; 372-374-b, 82; 308-b].

§ 1.3. Inflammatory processes in the human body, their causes and treatment of inflammation with modern synthetic drugs and folk remedies treatment with medicinal methods

The concept of inflammation (lat. inflammatio) is a complex, local and general protective and adaptive process that occurs in response to the action of a damaging (alteratio) or pathogenic stimulus and is manifested in reactions aimed at the destruction of products, agents. It leads to maximum recovery in the damaged (exudatio, etc.) and damaged area (proliferation). Inflammation is characteristic of humans and animals, including protozoa and unicellular organisms. The mechanism of inflammation is common to all organisms, regardless of the location, type of pathogen and individual characteristics of the organism [83;98-b].

In earlier times, the Roman philosopher and physician Aulus Cornelius Celsus (25 BC - 50 BC) described the external signs of inflammation as being observed in such external signs as: lat. rubor - redness (local redness of the skin or mucous membranes); edema - swelling of the body (swelling); caloric - heat (increased body temperature); pain - occurrence; functio laesa - immobility:

At the end of the 19th century, IIMechnikov considered inflammation to be an adaptive reaction of the organism that developed in the process of evolution, one of the most important manifestations of which is the phagocytosis of pathogenic agents by microphages and macrophages, thereby ensuring the

recovery of the organism. However, Mechnikov could not find the reparative function of inflammation. Emphasizing the protective nature of inflammation, he also believed that the healing power of nature, which is the inflammatory reaction, is not yet an adaptation that has reached perfection. [84; 98-b].

External pathogenic (damaging) factors that cause inflammation are divided into the following according to their nature:

- 1) Physical - trauma (mechanical damage to tissue integrity), frostbite, thermal burns.
- 2) Chemical - alkalis, acids (gastric hydrochloric acid), essential oils, irritants and toxic substances (alcohol), and some medications
- 3) Causative agents of biological infectious diseases: animal parasites, bacteria, viruses, their metabolic products (exo- and endotoxins) [84; 112-b].

Inflammatory terms are often Latin names, consisting of a root term element denoting the name of an organ and the suffix *-itis* (-itis). For example: *gaster* (Latin stomach) + *-itis* = *gastritis* (gastritis - inflammation of the gastric mucosa); *nephros* (Latin kidney) + *-itis* = *nephritis* (nephritis) [85;1070-b].

The well-established old names of inflammatory diseases are excluded: *pneumonia* (from the Greek *pneumonia*, lung), *tonsillitis* - inflammation of the tonsils, *panaritium* - inflammation of the fingers, nails, etc.

Since inflammation is a natural response of healthy tissues to injury, it is not entirely appropriate to call it a "pathological" process. The term "pathological" is used only for processes that deviate from the normal course of the defense reaction and do not lead to the desired end result [86;286-b].

Inflammation is the body's response to injurious factors. The inflammatory process is local and general, and consists of the stages of alteration, exudation, and proliferation.

Many pathogens have been shown to cause specific inflammations that are specific to certain types of infections (tuberculosis, leprosy, syphilis). Biologically damaging factors also include immune complexes consisting of antigens,

antibodies, and complement, which cause immune inflammation (allergy, autoimmune thyroiditis, rheumatoid arthritis, systemic vasculitis). It is not considered that any allergic reaction can cause tissue damage. Under certain conditions, when the patient's body is sensitized (production of immunoglobulin E) and attaches it to the inner surface of the blood vessels of future target organs, they quickly become damaged as a result of allergic reactions. [87;656-b].

The inflammatory process is divided into three main stages:

- 1) Alteration is damage to cells and tissues.
- 2) Exudation is the release of fluid and blood cells from the vessels into tissues and organs.
- 3) Proliferation (or productive phase)- cell proliferation and tissue growth, resulting in tissue integrity restoration (repair).

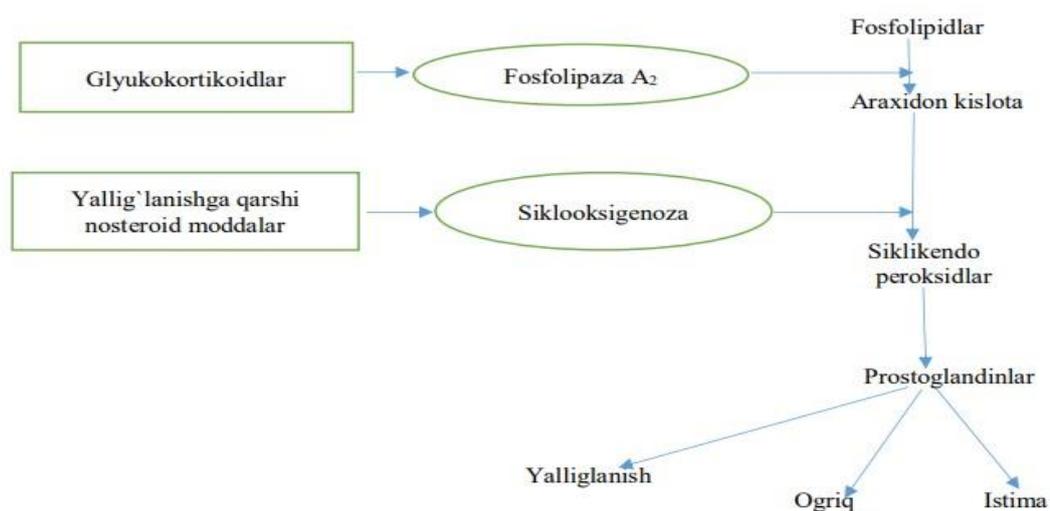


Figure 1.7. Mechanism of action of anti-inflammatory agents.

From Figure 1.7 below, we can see that in the zone of primary transformation, the intensity of metabolism decreases, since cell functions are disrupted, and in the zone of secondary transformation, it increases mainly due to carbohydrate metabolism (including glycolysis of polysaccharides). Oxygen consumption and carbon dioxide release increase, since oxidation does not always proceed to the final formation of carbon dioxide (disruption of the Krebs cycle). This leads to the accumulation of poorly oxidized metabolic products with an

acidic reaction in the inflammatory zone: lactic, pyruvic, L-ketoglutaric acids are formed, the normal level of tissue acidity, pH=7.32-7.45, can increase to pH=5.39-6.5 (with acute purulent inflammation), acidosis occurs [88;640-b].

At the site of injury, the vessels dilate, as a result of which the blood supply increases, the blood flow slows down, and as a result, redness, an increase in temperature, and then an increase in the permeability of the capillary wall. Leukocytes, macrophages and the liquid part of the blood (plasma) accumulate at the site of injury - edema occurs, which, in turn, compresses the nerve endings, causing pain and all together dysfunction. Inflammation - is regulated by inflammatory mediators, histamine, serotonin, cytokines - bradykinin, kallikrein (see. Kinin-kallikrein system), IL-1 and TNF, the blood coagulation system - fibrin, Hageman factor, the complement system, blood cells - leukocytes, lymphocytes, are directly involved. The processes of free radical formation in damaged tissues increase. The stages of inflammation are associated with biochemical changes in the body, the release of inflammatory mediators - prostaglandins, bradykinins, serotonin, histamines.

Among the mediators of inflammation, prostaglandins are considered to be the most powerful painkillers. The enzymes phospholipase A and cyclooxygenase are involved in the formation of prostaglandins. During inflammation, the activity of these enzymes increases, and a large amount of prostaglandins are formed, which injure tissues, causing stages of alteration and exudation. Among the mediators of inflammation, bradykinin dilates blood vessels, increases their permeability, the number of leukocytes in the inflammatory focus, and the temperature. During inflammation, polysaccharides increase, which are hydrophilic and attract fluid and proteins to their surface, The tissues swell, the substance between the cells begins to break down into hyaluronic acid, which leads to the proliferation phase of inflammation. Due to inflammation, the patient feels pain, the temperature rises, and vital tissues and organs are damaged.

Anti-inflammatory agents are divided into two groups based on their chemical structure: steroids and nonsteroidal agents. Steroids The adrenal glands produce hormones called glucocorticoids, including hydrocortisone, prednisolone, dexamethasone, triamcinolone, flumethasone, and hydrocortisone, sinalar, oxycort, and flucinar. Glucocorticoids suppress all stages of the inflammatory process - alteration, exudation, proliferation [89;286-b].

Types of inflammation.

Acute inflammation is characterized by: intensive course and termination of inflammation, usually within one or two weeks (depending on the affected organ or tissue, the degree and extent of their changes, and the reactivity of the organism); moderate tissue changes and destruction, exudative and proliferative changes that are characteristic of inflammation.

Chronic inflammation can be primary or secondary in origin. If the process continues for a long time after the acute inflammatory period, it is called "secondary chronic". If the inflammatory process is initially constant - sluggish and lasts for a long time, it is called "primary chronic". Given the presence of a large number of mononuclear phagocytes and lymphocytes in the focus of chronic inflammation, chronic inflammation (including its specific forms in a number of infectious diseases) is called mononuclear infiltrative. Chronic inflammation is characterized by a number of signs: the formation of granulomas (for example, tuberculosis, brucellosis or syphilitic inflammation); infiltration of the focus of inflammation by various types of leukocytes, but mainly monocytes and lymphocytes; the formation of a fibrous capsule (for example, in the case of a foreign body or deposition of calcium salts); the development of necrosis in the center of the focus of chronic inflammation [90;33-b].

The causes of chronic inflammation are diverse and can be combined into several groups, including various forms of phagocytic insufficiency; prolonged stress and other conditions accompanied by an increase in the level of catecholamines and glucocorticoids in the blood. These groups of hormones reduce

the processes of proliferation, maturation and activity of phagocytes, enhance their destruction; Factors leading to chronic inflammation are shown in Table 1.3.

Table 1.3

The main groups of factors that cause chronic inflammation

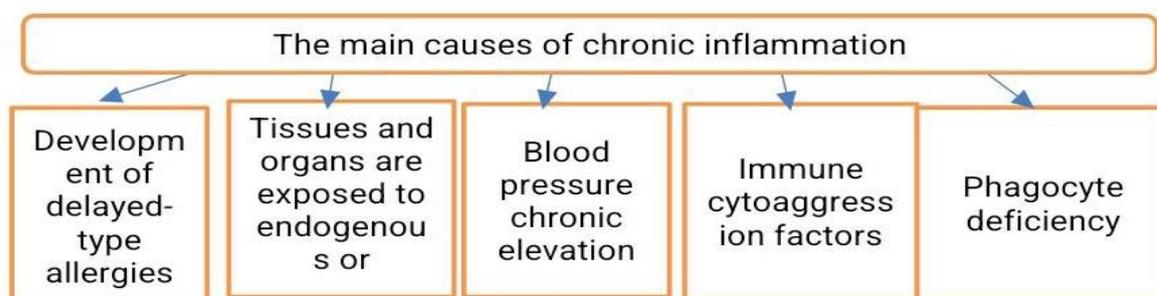


Table 1.3 lists the main factors that cause inflammation, and allergies, chronic high blood pressure, and changes in the immune system are the main causes of chronic inflammation.

Anti-inflammatory drugs - drugs used to reduce inflammation, are intended for topical, oral, and injectable use, and are produced in almost all dosage forms [90;-60 b].

The use of anti-inflammatory drugs depends on the organ in which the inflammatory process is observed and its pathogenesis.

Many drugs belonging to different groups of pharmacologically active compounds have anti-inflammatory effects, acting against inflammation regardless of its causes, nature, and classification.

In inflammation caused by infection, antibiotics and chemotherapeutic agents are used, which inhibit the vital activity of microorganisms and affect the inflammatory process in the microflora environment. Certain chemotherapeutic agents (for example, sulfonamides, tetracyclines, etc.) also eliminate inflammatory processes, but their effectiveness is less.

Despite the great practical importance of adrenal hormones and their synthetic analogues, glucocorticoids, their use can cause some side effects. Therefore, they should not be taken without medical supervision.

Anti-inflammatory steroids include resorptive (hydrocortisone, prednisolone, dexamethasone) and acting (fluocinolone acetonide, flumethasone pivalate, betamethasone) glucocorticoids, whose effects are combined with immunosuppressive effects; nonsteroidal agents include some carboxylic acid derivatives (pyrazolone, oxicams) [91;511-b].

A number of painkillers are also used as anti-inflammatory drugs. They are weaker than glucocorticoids in terms of anti-inflammatory effect, and they also cause relatively few side effects. Therefore, painkillers are widely used for inflammation of the joints, muscles, and internal organs. They have analgesic and antipyretic effects. Many medicinal plants (for example, yarrow, yarrow) have a good anti-inflammatory effect in some skin and mucous membrane diseases. When the respiratory tract is inflamed (especially in children), a drug in the form of a mucus is prescribed. It does not have a direct anti-inflammatory effect, but only envelops the mucous membrane and protects it from various effects.

Emollients also have a weaker anti-inflammatory effect, and are mainly used for inflammation of the skin and mucous membranes. Emollients, together with the protein substances of the tissue, form a protective layer, protecting the mucous membranes and damaged surfaces from various influences and preventing the inflammatory process from worsening [91;586-b].

The immunosuppressive effect of anti-inflammatory steroids is of particular importance in aseptic inflammation (especially in allergic or autoallergic tissue damage). Immunosuppressants, mainly by suppressing immune cell factors, inhibit the proliferative phase of inflammation due to their cytostatic effect. eliminates .

Anti-inflammatory drugs are used to treat inflammatory diseases of various etiologies. They are most often used as antirheumatic drugs. Anti-inflammatory steroid drugs are used to treat myocarditis, acute and chronic (nephritis, hepatitis) inflammatory diseases of internal organs. Glucocorticoids are used for local application in dermatology (for example, eczema, dermatitis, neurodermatitis), in ophthalmology (keratitis, conjunctivitis, iritis, blepharitis), otorhinolaryngology

(vasomotor and allergic rhinitis, inflammation of the external auditory canal)]. Currently, the following synthetic drugs are used in modern medicine for inflammatory diseases:

Fanigan-N100 tablets: active ingredient paracetamol 500 mg

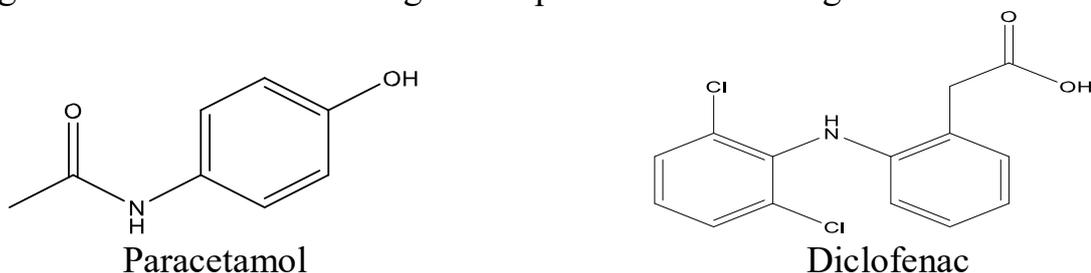


Figure 1.8. Main chemicals in synthetic drugs used in inflammation

Figure 1.8 shows the chemical formula of paracetamol and diclofenac, which are the main ingredients in synthetic anti-inflammatory drugs. Corn starch, povidone (PVP K-30), croscarmellose sodium, microcrystalline cellulose PH-102, magnesium stearate, and yellow dye are used as excipients in this synthetic drug.

When consuming Fanigan-N100 tablets, side effects such as disorders of the blood and lymphatic system, the immune system, the skin and subcutaneous connective tissue, the psychological, nervous system, the organ of vision, the organ of hearing and the balance system, the cardiovascular system, the respiratory system, the chest and chest cavity, the gastrointestinal system, the liver and biliary tract may be observed in the human body.

Dimax tablets - active ingredients: paracetamol 500 mg, diclofenac 50 mg,

Excipients: corn starch, microcrystalline cellulose, crospovidone, povidone PVPK-30, purified water, colloidal silicon dioxide, magnesium stearate.

Side effects: Gastrointestinal disorders include nephrotic syndrome, epigastric pain, nausea, vomiting, diarrhea, hepatitis, rash, shortness of breath, bronchospasm, and persistent bleeding.

Küpen tablets - active ingredients: paracetamol 500 mg, diclofenac 50 mg,

Excipients: starch, gelatin, talc, magnesium stearate, sodium starch glycolate, dye.

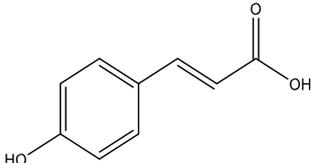
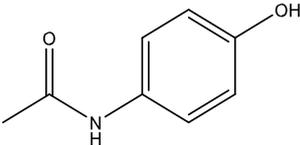
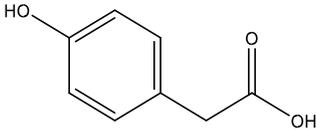
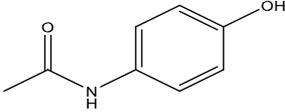
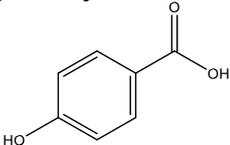
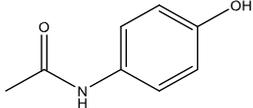
Side effect: Anorexia, constipation, nausea, abdominal pain, diarrhea; - gastrointestinal ulcers with possible complications of bleeding (as a rule, they occur only with long-term use); - depression, drowsiness, headache; - hematuria, nephrotic syndrome, acute renal failure, proteinuria; - thrombocytopenia, anemia; allergic reactions.

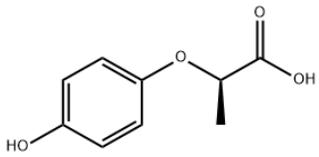
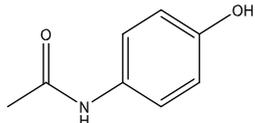
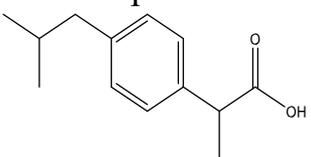
Above, we have become acquainted with synthetic drugs used against various external and internal inflammations of the body. When we studied the chemical composition of these products, we observed in the literature analysis that substances similar to the chemical structure of the main active ingredients are also present in the composition of the plants of the marigold and celandine.

can accumulate in the kidneys, liver, and urinary tract, causing various inflammatory diseases. We are introduced to medicinal plants such as marigold and celandine and does not have any side effects on the body.

Table -1.4

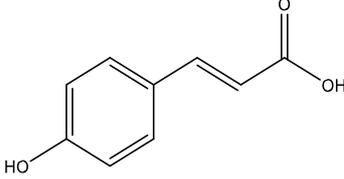
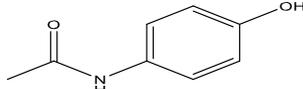
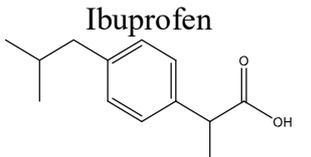
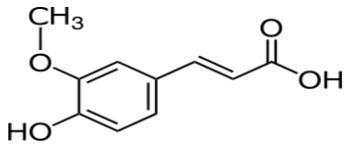
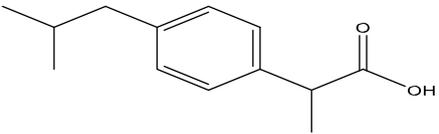
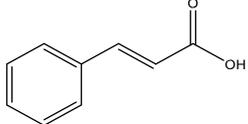
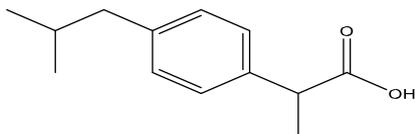
Chemical composition of anti-inflammatory components present in the oil of the rosehip plant

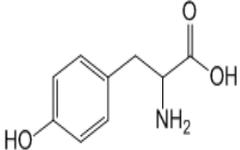
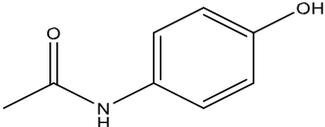
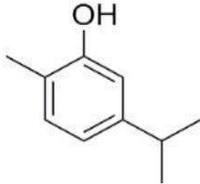
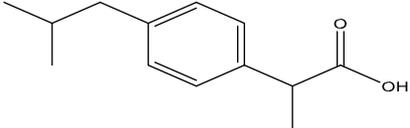
No.	Althaea is in the composition	Contains synthetic drugs used for inflammation
1	<p>P-coumaric acid</p> 	<p>Paracetamol</p> 
3	<p>P-hydroxyphenyl acetic acid</p> 	<p>Paracetamol</p> 
4	<p>P-hydroxybenzoic acid</p> 	<p>Paracetamol</p> 

5	<p style="text-align: center;">P-hydroxyphenoxy acid</p> 	<p style="text-align: center;">Parasetamol</p>  <p style="text-align: center;">Ibuprofen</p> 
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As can be seen in Table 1.4 above, the gypsy moth plant contains several biologically active substances that are similar in chemical structure to substances such as paracetamol and diclofenac, which are the main components of a number of synthetic drugs used for inflammation.

Table 1.5
Chemicals similar to synthetic drugs used for inflammatory diseases in the plant
Sedana

No.	Sedan structure	Contains synthetic drugs used for inflammation
1	<p style="text-align: center;">p-kumar</p> 	<p style="text-align: center;">Paracetamol</p>  <p style="text-align: center;">Ibuprofen</p> 
2	<p style="text-align: center;">Ferulic</p> 	<p style="text-align: center;">Ibuprofen</p> 
3	<p style="text-align: center;">Trans-cinnamic acids</p> 	<p style="text-align: center;">Ibuprofen</p> 

4	<p style="text-align: center;">Tyrosine</p> 	<p style="text-align: center;">Paracetamol</p> 
5	<p style="text-align: center;">Carvacrol</p> 	<p style="text-align: center;">Ibuprofen</p> 

As can be seen in Table 1.5 above, the composition of the sedana plant, like the gulkhayri plant, contains biologically active substances similar to the chemical structure of substances such as paracetamol and diclofenac, which are the main components of a number of synthetic drugs used against inflammation in a number of organisms. These data indicate that the sedana plant contains a number of biologically active substances that have anti-inflammatory properties.

§ 1.4. Anti-inflammatory food additives and their classification by chemical composition

Although synthetic anti-inflammatory drugs are used to treat various inflammatory diseases, these drugs can have negative effects on certain systems in the human body, such as the gastrointestinal, mesenteric, and duodenal tracts.

Given the side effects of synthetic drugs on the human body, patients suffering from various inflammatory diseases are recommended to use medicines or food supplements made from medicinal herbs. Such medicinal food supplements are used in medicine in the treatment of various inflammatory diseases and are highly effective.

Let us give a few examples of them.

Curcumin is a colorful spice that is considered a food additive due to its spicy taste and health benefits. The active compound in it, curcumin, has beneficial

properties such as anti-inflammatory and antioxidant properties, as well as joint and heart health benefits.

Black cumin oil is a medicinal herb that reduces inflammation in rheumatoid arthritis and osteoarthritis by inhibiting inflammatory chemicals called IL-1, IL-6, and nuclear factor- κ B. The recommended daily dose of black cumin oil is 200 mg .

Ginger is an anti-inflammatory herb that may help reduce osteoarthritis pain. Ginger contains a natural chemical called kaempferol, which has similar effects to ibuprofen and naproxen in reducing pain and inflammation. Recommended dosage: 25 mg per day.

Krill oil - A 2007 study published in the American Journal of Nutrition found that consuming krill oil reduced levels of C-reactive protein (CRP), or inflammation, by 20%. Recommended dosage: 500-2000 mg per day.

Probiotics - increase intestinal permeability, have a negative effect on intestinal bacteria. Recommended dose: 60mg.

In accordance with the letter of the Presidium of the Higher Attestation Commission under the Cabinet of Ministers of the Republic of Uzbekistan dated July 9, 1997 No. 01-84/0917, by the resolution of the Committee of Science and Technology of the Republic of Uzbekistan dated July 15, 1997 No. 14, a new specialty awarding scientific degrees and titles in the field of chemical and technical sciences was included in the "Nomenclature of Specialties of Scientific Workers" with the code "Classification and Certification of Goods Based on Chemical Composition" - 02.00.22. This discipline was proposed for the first time in the world in 1997 by Uzbek chemists, Doctor of Chemical Sciences, Professor IRAskarov and Doctor of Technical Sciences, Professor TTRriskiyev [92; 451-b].

In this specialty, it is planned to conduct economic research, along with chemical and technological research, such as studying the composition, extraction, origin, structure, organoleptic and physicochemical indicators of substances in connection with the classification and certification of goods according to the TIF TN.

The specialty 02.00.22-“Classification and certification of goods based on their chemical composition” studies the problems of assigning code numbers and issuing certificates in the international TIF TN based on the chemical composition, chemical and physical and other properties of goods. The development of international code numbers for many BFM obtained from medicinal plants and conducting scientific research on their certification remains one of the least studied areas.

Considering that today, research work on the classification and certification of goods based on their chemical composition is extensive and of scientific and practical importance worldwide, and that these studies are related to the chemistry of goods in content, by the resolution of the Presidium of the Uzbek State Chemical Industry Commission No. 242/4 dated September 28, 2017, the name of the specialty “Classification and Certification of Goods Based on Their Chemical Composition” was changed to “Chemistry of Goods” and approved with the specialty code 02.00.09 [93; 43-b, 94; 35-b].

Commodity chemistry, as its name suggests, studies goods in two interrelated areas: classification and certification. Each commodity, as an object of trade, is presented to the customs authorities along with a customs declaration.

One of the main tasks assigned to the customs authorities of the Republic of Uzbekistan is the implementation of the TIF TN on the classification and coding of goods in foreign economic activity, which is a component of customs work. Determining the price of goods and correctly calculating and collecting customs payments depends on the correct classification of goods according to the TIF TN. In the process of organizing customs control of goods and means of transport and carrying out customs clearance, it is necessary to correctly conduct state customs policy. The correct classification of goods is of great importance for accurate maintenance of foreign trade customs statistics [95; 27-33-b, 96; 14-19-b, 97; 123-b].

The main research elements of the foreign economic activity commodity nomenclature are goods and nomenclature terms. These terms are explained as follows.

Any movable property that is the subject of purchase, sale or exchange, including currency and currency assets, electricity, thermal energy and other types of energy, the results of work performed and services rendered, as well as vehicles, and intellectual property objects, are considered goods.

The set of lists of commodity names used in any field of science and technology is called nomenclature (from the Latin word "nomenclatura"). A systematized list of commodity names used in human life is called a commodity nomenclature, which is used by customs officers and declarants in their official activities.

Goods are diverse in type, origin, use, and composition. In order to name all goods based on a certain system, and to include them in a single system, that is, a nomenclature of goods, for use, there has been a need to develop a procedure for classifying goods based on the subjection of goods to a single rule in foreign economic activity.

Classification is understood as the division of various goods into groups (positions, subpositions, subsubpositions) according to their functions, composition, value and characteristics inherent in the goods. Goods can also be classified according to their chemical composition, degree of processing and other properties. According to this system, all goods are assigned a separate TIF TN international code number by section, group and subgroup.

The Foreign Economic Activity Commodity Nomenclature defines the code numbers of goods used for human needs, having any physical movement, based on the basic rules for classifying goods.

When classifying goods according to the commodity nomenclature, the following tasks are performed:

- favorable conditions are created for the free movement of goods in international trade;
- goods are assigned a code number specific to the TIF TN;
- Customs duties are collected correctly and in full from goods through the TIF TN code number,
- (the country's economic security is ensured);
- With the TIF TN code number, customs and state statistics are maintained, and the movement of goods in the process of foreign trade is analyzed and studied.

In 1853, at the International Congress of Statisticians, proposals were made to develop a nomenclature of goods for foreign economic activity that would include all goods [98; 349-b, 99; 167-b, 100; 106-b].

The issue of adopting a commodity nomenclature was also considered at the International Congress held in Paris in 1890. The rapid growth of technology at the turn of the 20th century put the issue of resolving this problem on the agenda. 60 years after the First International Congress, on December 31, 1913 , at the Brussels Convention, the BTN was adopted by 29 participating states. The first BTN consisted of 5 sections and 186 commodity positions. Since this BTN did not protect the interests of all states and did not include all goods, it was not adopted by many states, and work continued on the development of a new TN [101; 80-b, 102; 31-33b,].

In 1938, a new commodity nomenclature, the Reduced List of Commodities for International Trade Statistics, was published. In this nomenclature, the classification of goods was based on the type of goods and the material from which they were made. The function of goods was taken into account only in some cases. This nomenclature consisted of 17 sections, 50 groups and 456 commodity positions.

According to the Convention, the structure of the Harmonized System should be adopted without changes, and the classification and codes of goods consisting of 6 digits should not be changed. Each member state of the Convention

should develop and apply its own TN on the basis of the UT. It is also recognized that when determining the code numbers of goods, after 6 digits, they can add as many digits as they want, taking into account the statistical and customs purposes of their countries. Accordingly, the Russian Federation has 10, the USA has 11, Canada has 10, India and the European Union countries have 8, the CIS has 9 and Uzbekistan has developed its own TN up to 10 digits.

The commodity nomenclature of the Republic of Uzbekistan is also based on the Harmonized System, which is used in practice all over the world. In the Republic of Uzbekistan, the Harmonized System was officially introduced in 1993 only for foreign countries, and from January 1, 1994, for all countries, and the Harmonized System of Classification of Goods (HSC) began to be used in practice.

Typically, in the UT-based TIF TN, goods are divided into groups, positions, subpositions, and subsubpositions. The code numbers allocated to goods are 6 digits in the UT for groups, positions, and subpositions, and 10 digits in the TIF TN for groups, positions, subpositions, and subsubpositions.

Their structural structure is that the first two digits in the commodity codes represent the commodity group, digits 1-4 represent the commodity position, digits 1-6 represent the commodity subposition, and digits 1-10 represent the commodity subsubposition.

In the Combined Nomenclature of the Member States of the European Union (CNO), commodity codes are 8 digits long, in the commodity nomenclature of the CIS countries, 9 digits long, and in the commodity nomenclature of the Member States of the Eurasian Economic Community and the Republic of Uzbekistan, 10 digits long.

The 1996 version of the Harmonized System consists of 21 sections, 97 groups (3 groups - 77, 98 and 99 in reserve), 1241 commodity headings and 5113 subheadings.

Unlike the 1996 version of the Harmonized System, the 2002 version significantly improved the nomenclature of goods by adding 3 new headings and 112 subheadings. In the January 2007 version, 24 headings and 206 subheadings were eliminated. In other words, the economic interests of each country are protected by these changes to the Harmonized System.

The 2017 version of the Customs Tariff of the Republic of Uzbekistan includes additions and changes to 233 commodity positions, a total of 36 commodity positions were added, and 79 commodity positions were excluded from the UT due to the complete lack of demand for these goods in the foreign market.

It was determined that the main criteria for assigning international code numbers to food products from plants and a number of other goods are their chemical composition and physical properties. In the issue of certification of goods, it was also noted that, taking into account the fact that when issuing certificates for any goods, their chemical composition and physical and biological properties can be used as the main criteria, it became clear that there is a high demand at the international level for conducting separate scientific research on assigning international code numbers to goods and certifying them.

Under the leadership of the founder of this new science in Uzbekistan, the inventor of Uzbekistan, Doctor of Chemical Sciences, Professor Ibroximjon Rakhmonovich Askarov, in 2002, NXXokhatboyev conducted research on the classification and certification of cottonseed oil based on its chemical composition, and defended his candidate's thesis in technical sciences. In this dissertation, cottonseed oils were divided into classes based on their chemical composition and new code numbers were recommended. In 2010, QMKarimkulov defended his doctoral dissertation on the classification of cotton fiber based on its chemical composition. The doctoral candidate recommended several code numbers for cotton fibers. Similarly, in 2015, doctoral candidate LTPulatova conducted scientific research on the classification of pharmaceutical drugs and recommended new code numbers to the TIF TN. MG'.Khamrakulov, who works at the Tashkent

Institute of Chemical Technologies, defended his dissertations for the degree of Doctor of Philosophy (PhD) in Technical Sciences in the specialty of commodity chemistry 02.00.09, and STIslomova, who works at Fergana State University, defended his dissertations for the degree of Doctor of Philosophy (PhD) in Chemical Sciences 02.00.09, and scientists such as MA Akhmadaliyev, who works at the Fergana State University, defended his dissertations for the degree of Doctor of Philosophy (PhD) in Chemical Sciences 02.00.09, and PK Turdalieva, M.Yo.Imomova, and RB Karaboyeva, who work at the Department of Biological Chemistry of the Tashkent Pediatric Medical Institute, defended their dissertations for the degree of Doctor of Philosophy (PhD) in Chemical Sciences 02.00.09. BNSattarova, who works at the Fergana Polytechnic Institute, defended her dissertations for the degree of Doctor of Philosophy (PhD) in Chemical Sciences, specialty 02.00.09-Commodity Chemistry. Sh.U.Yuldoshev, who works at the Institute of "Chemistry of Plant Substances" of the Academy of Sciences of the Republic of Uzbekistan, defended her dissertations for the degree of Doctor of Philosophy (PhD) in Chemical Sciences, specialty 02.00.09-Commodity Chemistry. Kh.Isakov, who works at the Department of Chemistry of Andijan State University, defended her dissertations for the degree of Doctor of Philosophy (PhD) in Chemical Sciences, specialty 02.00.09-Commodity Chemistry. Scientists such as MM Xojimatov, O.Sh.Abdullayev, MM Mo'minjonov also defended their dissertations for the degree of Doctor of Chemical Sciences (PDs) in the specialty of 02.00.09-Commodity Chemistry. Scientists such as N.Q.Tulakov, M.Mamaraxmonov, D.T.Xasanova, Q.Q.Otakhonov, A.S.Khojiqulov and F.S.Abdug'afforov and others defended their dissertations for the degree of Doctor of Philosophy (PhD) in Chemical Sciences in the specialty of 02.00.09-Commodity Chemistry. It is clear from this that conducting scientific research in the field of new science has a positive impact on the economy of our country.

In the duly executed BYuB, among other items, there are items indicating the name of the goods and the international code numbers of the goods according

to the TIF TN. At the same time, a document confirming the conformity of the goods to the requirements of safety and quality indicators, that is, a quality certificate, must also be provided. The criteria for determining the conformity of goods to the 10-digit international code number of the TIF TN are not perfect for many goods, and scientific research is being conducted in many countries in this direction. Determining the international code numbers of goods makes it possible to substantiate the issues of their chemical composition, technological processes of their production, quality control of exported or imported goods, issuing them with quality and other certificates in accordance with the results of scientific research [103; 254-255-b, 104; 98-b, 105; 70-b]

§ 1.5. The importance of the science of "folk medicine" in public health

It is known that for thousands of years, humans have been preserving their own and others' health by rationally using medicinal remedies made from natural plant and animal products [2; 3-b].

All branches of science, including medicine, first appeared in the countries of the East. This historical information is now proven by material evidence found through archaeological excavations and historical works written by historians. Doctors in ancient Egypt divided medicine into various specialties, for example, there were specialists in eye, dental, internal diseases, and also specialists in mental diseases and surgeons. In dental diseases, doctors treated it with natural remedies, removed those that could not be cured, and at the same time, even in those times, they performed tooth fillings.

The 25-volume manual "Book on All Branches of Medicine" by the great medical scientist, Abu Bakr Muhammad ibn Zakariyya ar-Razi, the scientific and medical heritage and unique works of our great ancestor, Hazrat Abu Ali ibn Sina, who was called "Shaykh-urraisi" among medical scholars, are used by medical workers all over the world [106;3-b].

Abu Ali ibn Sina not only continued ancient traditions, but also. He created new methods of treatment and laid the foundation for medical science. The information recorded in the book "The Laws of Medicine", which has become a standard practice in the work of medical professionals, has not lost its importance in the slightest.

When talking about folk medicine, Abu Hassan al-Bayhaqi, Ibn al-Kifti, Ibn It is appropriate to acknowledge the work of scholars such as Abi Usaybia and Abu Bakr Ibn al-Khaliqan, Abu Bakr Ar-Razi, Abu Ali ibn Sina, Sharafuddin Iloki, Najibuddin Samarkandi, Ismail Jurjani and their works [107;13-b].

In the recognition of Ibn Sina as a great physician and judge, of course, the collection "Al-Qanun fittibb" ("The Canons of Medicine") and "Ash-Shifa", consisting of 22 books, played an important role. In these unique works, Ibn Sina, along with his incomparably high scientific observations, was able to reasonably describe the knowledge accumulated over many years of observation and experiments. In the work "The Canons of Medicine", the scientist writes about the etiology of diseases: health, disease and their causes can sometimes be open (clear), sometimes closed (unclear) [108; 5-b].

In 1928, during the former Soviet era, the activities of doctors were banned by a special decision of the Council of People's Commissars [97;3-b].

Although folk medicine is not officially recognized in Uzbekistan, its effective methods and medicines have been widely used in practice. After the Republic of Uzbekistan gained independence, our first president The establishment of the "Academy of Folk Medicine" in Uzbekistan, at the initiative of Islam Karimov, served as a great impetus for the development of this science in our country.

In 129 of the 194 WHO member countries, traditional medicine has official status. That is, it is regulated by law. Among them, the legislation of countries such as China, Japan, South Korea, Germany, and India has rich experience and is well-developed.

On October 12, 2018, the Resolution of the President of the Republic of Uzbekistan No. PQ-3968 “On measures to regulate the sphere of folk medicine in the Republic of Uzbekistan” was adopted. With this resolution, all doctors who have received a license from a special commission under the Ministry of Health of the Republic of Uzbekistan have the right to treat patients.

The official registration of the Academy of Medicine of Uzbekistan “Practitioners of Medical Scientific Activities” as a non-governmental non-profit organization with the Ministry of Justice of the Republic of Uzbekistan on November 15, 2017 was the first step towards integrating traditional healers with modern doctors in treating patients. The Academy of Medicine of Uzbekistan has carried out a number of works to bring together the country's leading healers, doctors, candidates of medical sciences and leading doctors practicing traditional medicine [109; 275-b].

Honored Inventor of Uzbekistan, Doctor of Philosophy, Professor IRAskarov and Doctor of Philosophy, Professor NS Mamasoliev developed a passport for the discipline of "Folk Medicine" in 2019 and proposed it to the Higher Attestation Commission under the Cabinet of Ministers of the Republic of Uzbekistan. Based on this proposal, the discipline of "Folk Medicine" was approved for the first time in the world, and the specialty code 14.00.41 was assigned.

In order to provide doctors with wide freedoms and privileges, as well as to improve their scientific level, on May 16, 2019, in accordance with the Resolution No. 0344 of the State Inspectorate for Quality Control under the Cabinet of Ministers, a training course in folk medicine was opened in the Zhalakuduk district of Andijan region. At this Medical Academy center, trainees undergo a three-month training course. While they improve their theoretical knowledge with lectures by doctors of medical sciences, professors and experienced doctors, they acquire valuable practical skills in a specialized sanatorium for treatment with folk medicine methods called “Oltin vodiyl tabati” located in the South Olamushuk

town of Zhalakuduk district. Then, trainees who complete the training course are awarded special certificates [109;4-b].

The Resolution of the President of the Republic of Uzbekistan No. PQ-4668 dated April 10, 2020 “On additional measures for the development of folk medicine in the Republic of Uzbekistan” identified a number of tasks as priorities.

Currently, there is a need to combine the thousands of years of experience of folk medicine with the scientifically proven knowledge of modern medicine. Because the true purpose and objectives of both are the same, namely the prevention and treatment of the health of society. Conclusions on Chapter I

The current scientific research on the state of inflammation in the world and Uzbekistan, the role of synthetic drugs and biologically active additives in its elimination, was studied and the following conclusions were reached:

1. The natural distribution, chemical composition, and medicinal properties of the plants of the genus Gulkhairi and Sedana were studied, and it became clear that new anti-inflammatory food additives should be developed based on them.
2. Research conducted by scientists on antioxidants and their importance in human life was analyzed, and the adverse effects of synthetic antioxidants used in the food industry on the body were studied.
3. It was found that the use of various modern synthetic drugs in the inflammatory process, the side effects of synthetic drugs, and the use of a natural anti-inflammatory healing food supplement based on the oils of the marigold and celandine plants did not reduce the inflammatory process.
4. The mechanisms of action of anti-inflammatory food additives on the human body, biologically active food additives created by scientists, and their classification according to chemical composition were identified.
5. Given the prevalence and spread of various inflammatory diseases among the population, the development of new anti-inflammatory food additives based on medicinal plants remains relevant for traditional medicine.

CHAPTER II. RESULTS OF EXPERIMENTS CARRIED OUT AT RESEARCH OBJECTS AND THEIR DISCUSSION

§ 2.1. Oil extraction from marigold and celandine seeds by cold pressing optimal conditions for obtaining

We have developed an optimal method for extracting oil from the seeds of the bulrush plant growing in the Andijan region of the Republic of Uzbekistan. For this, the “DD85-G” cold press equipment manufactured by the German company “AEN Engineering GmbH & Co.KG” was used. The results of the research are presented in the table below:

Table 2.1.

Efficiency of oil extraction from 100 g of marigold seeds at different seeding rates and temperatures

Nasadka slot size, mm	Screw rotation speed, rpm	Temperature, °C	oil separation yield, ml
6	12	66	8
8	12	54	7
10	12	40	6
12	12	36	5
14	12	32	4.34

2.From Table 1, we can see that two factors were tested in the extraction of oil from bulrush seeds: the size of the nozzle and the temperature regime. The oil content of bulrush seeds obtained by this method is 6%, and the maximum temperature is below 45 °C, which ensures the preservation of all the unique biochemical composition of the oil and important biologically active substances. Therefore, we chose this method as the optimal conditions when the nozzle opening is 10 mm, the screw rotation speed is 12 rpm, and the amount of oil extracted from 100 g of bulrush seeds is 6 ml.

Under the same conditions, oils were extracted from sedum seeds using a “DD85-G” cold press. The oil yields are shown in Table 2.2.

The efficiency of oil extraction from 100 g of sesame seeds at different seeding hole sizes and temperatures

Nasadka slot size, mm	Screw rotation speed, rpm	Temperature, °C	Oil separation yield, ml
6	12	62	30
8	12	51	28
10	12	40	25
12	12	36	20.7
14	12	32	16.7

So, from Table 2.2, we can see that when the nozzle gap is 10 mm, the screw rotation speed is 12 rpm, and the temperature is 40 °C , the amount of oil extracted from 100 g of sedum seeds is 25 ml, we have chosen this method as effective.

§ 2.2. Macro- and micronutrients in the oil extracted from fenugreek seeds elemental analysis results

The macro- and microelements in the composition of rosehip oil were analyzed using an inductively coupled plasma optical emission spectrometer (Avio 200 ISP–OES). The device has a high level of accuracy, allowing the measurement of elements in the solution with an accuracy

Table 2.3:

Amount of macro- and microelements in 100 g of oil from bulrush seeds grown in Andijan region

Element	P	Ca	K	Na	S	Mg	Sr.	O	Fe
Amount (mg/%)	135.9	112.8	82.9	47.9	42.6	39.0	5.2	6.7	4.4
Element	Li	Ye	Cr	Zn	Mn	Pb	Sn	Cu	Te
Miqdori (mg/%)	0.615	0.568	0.544	0.532	0.05	0.204	0.106	0.079	0.066
Element	Mo	Ni	Sb	B	Cd	Ag	Hg	Co	
Miqdori (mg/%)	0.008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

As can be seen from Table 2.3 above, the content of 26 (twenty-six) macro- and microelements was determined in the oil of locally grown gulkhayri plant. It

was determined that the oil contains a large amount of P, Ca, K, Na, S and Mg elements.

Phosphorus - element in the form of a phosphoric acid residue and its organic compounds participates in the metabolism of carbohydrates, proteins and fats. It is part of phosphoproteins, coenzymes, phospholipids, phosphorylated forms of sugars. Phosphorus compounds are a permanent component of living organisms. In humans and animals, phosphorus is found in the composition of brain and nervous tissues, in blood and milk. Phosphorus plays an important role in the functioning of the central and peripheral nervous systems. The most active metabolism of phosphorus occurs in muscle tissue, phosphorus compounds adenosine triphosphate (ATF) and creatine phosphate accumulate energy released during glycolysis and oxidative phosphorylation, and then it is used for mechanical work (muscle work), chemical work (biosynthesis of various compounds) and electrochemical work (transport of substances through biomembranes). [110; 21-b].

The daily requirement for calcium is on average 800 mg/kg, but in young children and the elderly this figure increases to 1000-1200 mg. People with low blood calcium levels often experience irritability, fatigue, and loss of interest in anything. A decrease in calcium in the body leads to impaired ossification and brittle bones [110;40-b].

Potassium compounds improve the functioning of the heart muscle. They regulate the functioning of muscle tissue in the body. Disturbances in potassium metabolism primarily cause dysfunction of the heart tissue. This leads to heart palpitations, fatigue, dizziness, irregular heartbeat, and edema. The daily requirement for potassium is 2 g [110;45-b].

Sodium is an essential element for life and is involved in mineral metabolism in the human body. It is present in erythrocytes, red blood cells, serum and gastric juice, and plays an important role in water and salt metabolism and in maintaining acid-base balance. Sodium ensures that blood pressure is normal and

the blood buffering capacity is at a certain level. It is involved in the regulation of liver function, nervous system, and digestive enzymes [110;47-b].

The element sulfur is one of the main components of the human body. This non-metal is found in nature in every plant and animal cell. It makes up 0.25% of the human body. This element is called the "Beauty Mineral". Because it gives hair softness and shine. The clear and youthful appearance of the face is also due to this element. Sulfur is involved in metabolism, protein synthesis, and the formation of hair and nails. It is also found in insulin, which controls the synthesis of carbohydrates. Sulfur helps the liver produce bile. Methylsulfanylmethane is involved in the development of muscle tissue [110;51-b].

The physiological role of magnesium is that it is a cofactor of several important enzymes in carbohydrate-phosphorus and energy metabolism, as well as other enzymatic processes. Magnesium participates as a cofactor in more than 300 enzymatic reactions. In addition, magnesium plays an important role in protein biosynthesis, in the transfer of genetic information involving DNA and RNA, in the formation of cyclic AMP, which serves as a mediator in the transmission of hormonal signals to the cell, and is involved in glucose metabolism. [110;23-b].

When comparing our rosehip oil with the SanQvaM “Hygienic Norms of Food Safety” of the Ministry of Health of the Republic of Uzbekistan No. 0366-19, the quantitative standards for toxic Hg, As and heavy elements Pb, Cu, Cd, Zn were found to be low [111; SanPin].

§ 2.3. Results of macro- and microelement analysis of oil extracted from safflower seeds

Macro- and microelements in the composition of sedana oil were analyzed using an inductively coupled plasma optical emission spectrometer (Avio 200 ISP–OES). The device has a high level of accuracy, allowing the measurement of elements in the solution to an accuracy of 10^{-9} g. The table below presents the results of macro- and microelements in the sedana oil:

Table 2.4:

Amount of macro- and microelements in 100 g of sesame seed oil grown in Andijan region

Element	S	Ca	K	Na	Fe	Sr	P	O	Yes	Mg
Amount (mg/%)	37.1	10.7	9.2	3.98	3.26	3.1	1.92	1.07	1.07	0.932
Element	Zn	What?	Cr	Yes	Cu	V	Pb	Sn	The	Sn
Amount (mg/%)	0.118	0.17	0.3	0.053	0.031	0.0	0.016	0.087	0.08	0.087
Element	Mn	Sb	Ag	Hg	Co	Cd	Mo	B		
Miqdori (mg/%)	0.072	0	0	0	0	0	0	0		

As can be seen from Table 2.4 above, when analyzing locally grown sedana oil, it was found that 10 out of 28 (twenty-eight) macro- and microelements, namely S, Ca, K, Na, Sr, P, Al, Se, Mg, were found to be present in amounts ranging from 0.932 mg to 37.1 mg per 100 g of oil. It was experimentally proven that the toxic elements Hg, Cd, Ag were absent, and the heavy metal Pb was within the permissible limits.

The macro- and microelements contained in marigold and celandine oils were compared with the SanQvaM “Hygienic norms of food safety” of the Ministry of Health of the Republic of Uzbekistan No. 0366-19, the results are presented in Table 2.5.

Table 2.5

Heavy metal and toxic element levels in rosehip and sedana oil

Heavy metals, toxic elements	Heavy metal, toxic element content, mg/kg			Compliance of indicators with the requirements of the regulatory document
	According to the regulatory document	Gulkhairy	Sedan	
Cadmium	0.05	0.00	0.00	Fits
Lead	0.3	0.204	0.016	Fits
Arsenic	0.1	0.00	0.00	Fits
Mercury	0.05	0.00	0.00	Fits
Nickel	0.7	0.00	0.17	Fits

From Table 2.5, we can see that our oils contain harmful and toxic elements such as Hg, Cd, As, Pb, Ni.

When comparing the “Hygienic Norms of Food Safety” with SanQvaM №. 0366-19, it was proven that some oils do not contain the specified standards at all [102; SanPin].

§ 2.4. Results of determination of amino acids and terpenoids in celery seeds

Plants have the ability to synthesize all the nitrogenous compounds they need. In the process of amino acid synthesis, ammonia nitrogen is converted into organic compounds. Amino acids formed in plants are continuously replaced. They are mainly used for protein synthesis, but can also be decarboxylated, used for the synthesis of nitrogenous bases and other compounds, can release the amino group, be completely oxidized and serve as a source of energy for the body. Amino acids are also used in medicine, animal husbandry, microbiology and the food industry [1;1142-b;112; 320b].

Aspartic acid is one of the endogenous amino acids. It was first isolated from asparagus juice in 1827. It is produced independently in the body or comes with food, as well as nutritional supplements. It is incorporated into proteins or exists in free form. It is accumulated in brain cells.

Glutamic acid was first isolated in pure form in 1866 by German chemists. It was obtained by Karl Heinrich Ritthausen, who described its properties and named it “gluten”, derived from the Latin word. Glutamine is very common in nature, for humans it is not an essential amino acid, that is, it can be synthesized in sufficient quantities. [113;2068-2072-b].

Its concentration in the blood is 500-900 $\mu\text{mol/l}$, which is higher than the concentration of other amino acids [114;19-b] the Andijan region was carried out according to the method of Steven A, Cohen Daviel [115;1-16-b]

Considering that amino acids are part of proteins and other biologically active compounds and actively participate in various biological processes in the

body, it is advisable to study their composition [116;243-b]. Isolation of free amino acids. To precipitate proteins and peptides from the aqueous extract, 1 ml of 20% TCCA (trichloroacetic acid) was added to 1 ml of the test sample. After 10 minutes, the precipitate was separated by centrifugation at 8000 rpm for 15 minutes. 0.1 ml of the solution was taken from the precipitate and lyophilized.

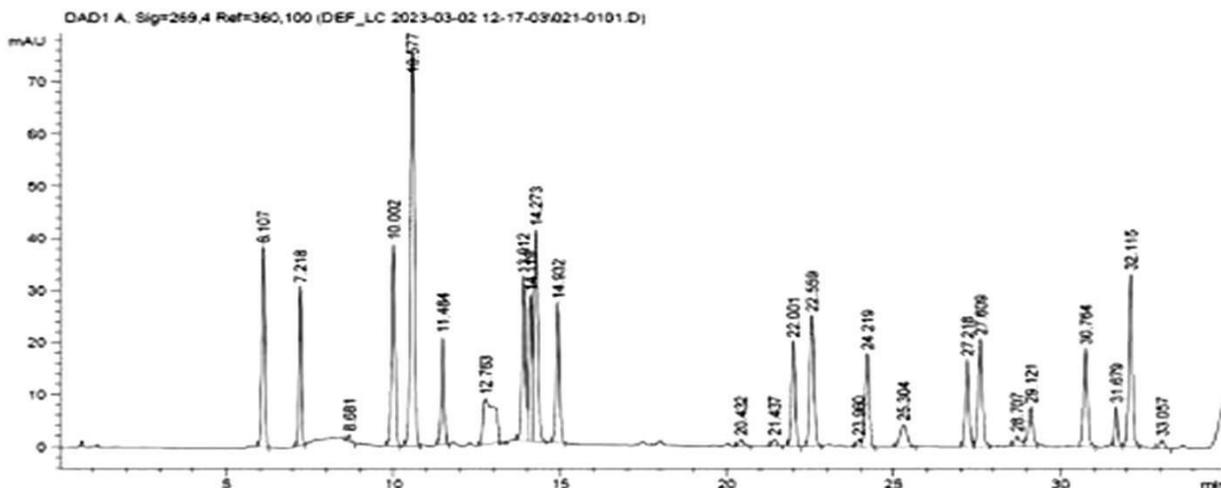


Fig. 2.1. Chromatogram of phenylthiocarbamyl (PTK) derivatives of amino acids obtained using USSX

Figure 2.1 shows a chromatogram of standard amino acids and shows the retention times of 25 amino acids.

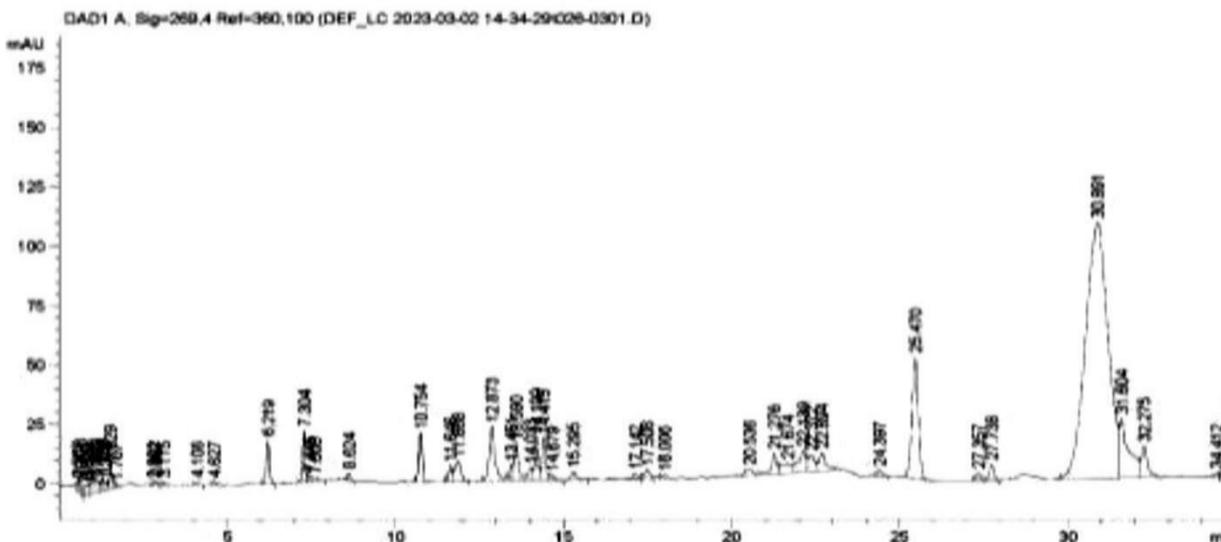


Figure 2.2. Chromatogram of amino acids in the composition of celery seeds obtained using USSX

Figure 2.2 shows a chromatogram of amino acids in sesame seeds obtained at the USSX, which revealed a total of 20 different amino acids in the seed.

Identification of FTK-amino acids was carried out on an Agilent 1200 chromatography, Discovery HS C18 column. Solutions – A: 0.14 M CH₃COONa ; B: CH₃CN. Flow rate 1.2 ml/min, absorbance at a wavelength of 269 nm. The results obtained are presented in Table 2.6.

Table 2.6

Amino acid content of celery seeds

Amino acid name	Amount, µg/g	Amino acid name	Amount, µg/g
Aspartic acid	0.18	Proline	0.05
Glutamic acid	0.24	Tyrosine	0.32
Serene	0.02	Valine	0.17
Glycine	0.08	Methionine	0.05
Asparagine	0.08	Isoleucine	0.06
Glutamine	0.11	Leysin	0.10
The most	0.31	Gistidin	0.00
Trion	0.06	Tryptophan	0.24
Arginine	0.22	Phenylalanine	0.13
Alan's	0.15	Liz's	0.01
Jam		2.59	

Table 2.6 shows that the sample contains 20 amino acids, of which cysteine (0.31 mg/g), tyrosine (0.32 mg/g), as well as tryptophan (0.24 mg/g), glutamine (0.24 mg/g) and arginine (0.22 mg/g) are the most abundant in quantitative terms. As can be seen from the amino acid composition, the sample contains all amino acids that are not synthesized in the human body, that is, those that cannot be replaced (exchanged), including valine, threonine, methionine, isoleucine, lysine, phenylalanine, and arginine.

It is known from the literature that alanine regulates blood sugar levels, protects the prostate gland, arginine strengthens immunity, and valine serves as a source of energy in muscle cells. Of the essential amino acids, glycine is involved in controlling metabolism in the body, isoleucine is the basis for the synthesis of proteins and antibodies in the body, leucine is used in liver diseases, anemia, and lowers blood sugar levels, lysine is important for the growth of body tissues, methionine is involved in the synthesis of vitamin B, proline protects against atherosclerosis, etc. [117;246-b].

The European scientist Nickavar and his students determined the content of the main terpenoids thymoquinone (TQ), dithymoquinone (DTQ), trans-anethole, p-cymene, and limonene in the composition of the sedum [118;249-b].

The bioactivity of terpenoids contained in the oil of cedar distributed in Tunisia was studied by US scientists Bourguou.S, Pichette. A and Marzouk. B. [118;255-b].

We analyzed the terpenoids found in the seeds of celandine grown in the Andijan region and which have medicinal properties. The results are presented in Figure 2.3.

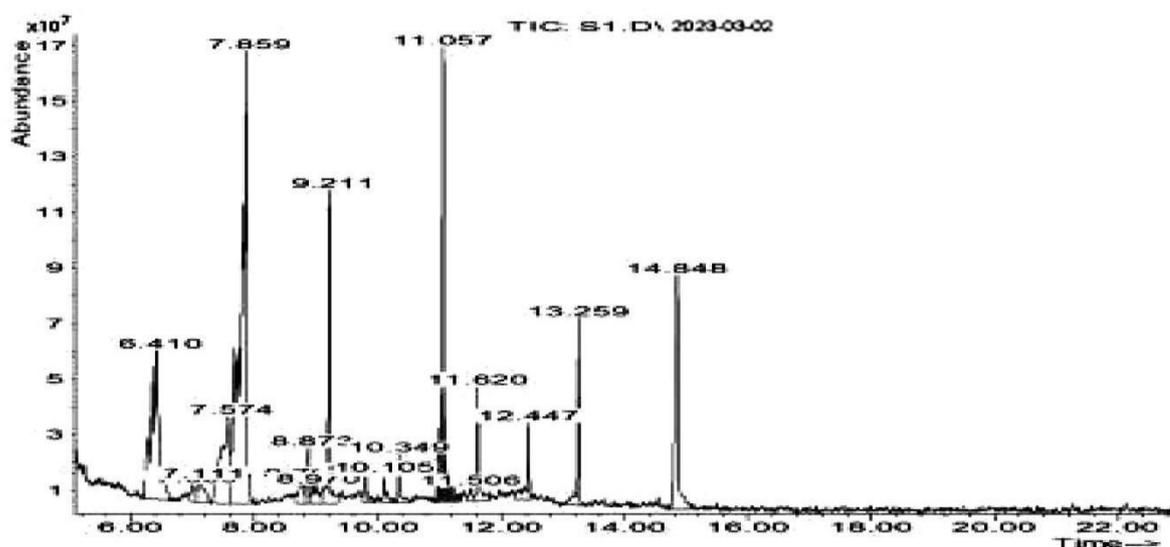


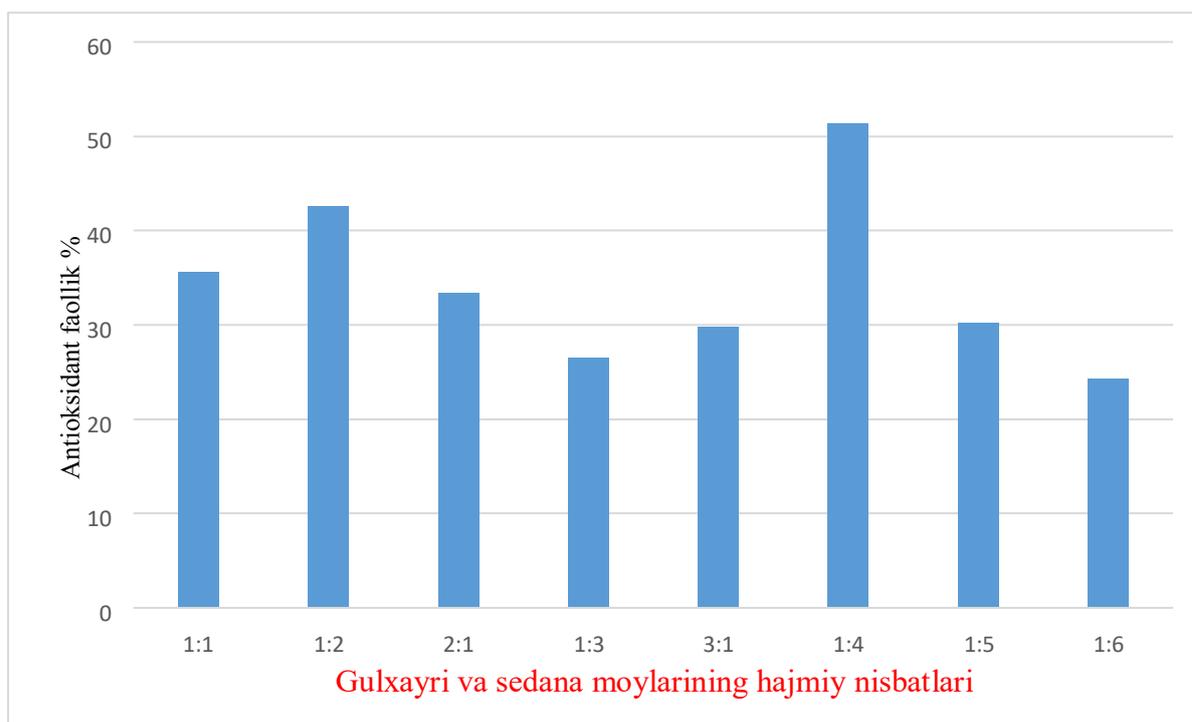
Figure 2.3 . Chromatogram of terpenoids in ethanolic extraction of fenugreek seeds

The data in Figure 2.3 show the retention times of terpenoids in the seeds of sedum. Thymoquinone, which accounts for 13.1% of the terpenoids in sedum, is

known to have anti-inflammatory and antiprostata cancer activity. Sedum seeds, which contain 13.8% α -pinene and 1.7% β -pinene in their terpenoids, have a positive effect on inflammations such as angina, laryngitis, and sinusitis [110;57-59-b].

§ 2.5. Development of new food additives based on antioxidant activity and cost of mixtures of rosehip and cedar oils in different volumetric ratios

The antioxidant activity of the oils of the rosehip and sedana plants, mixed in different volumetric ratios, was determined using the phosphomolybdenum method developed by P. Prieto using a spectrophotometer [120;337-b]. Figure 2.4 below shows a graph of the antioxidant activity of the oils of the rosehip and sedana plants using the reduction of phosphomolybdenum Mo (VI) to Mo (V).



2. Figure 4. Antioxidant properties of 7.5% solutions of bulrush and cedar oils in different proportions using the phosphomolybdenum method

During the study, the AA% values of 7.5% solutions of the samples were determined, the results obtained are shown in Table 2.7.

Table 2.7

Antioxidant activity of a mixture of rose and sedum oils

A mixture of rose and cedarwood oils	3:1	2:1	1:1	1:2	1:3	1:4	1:5	1:6
AA%	29.8± 1.2	33.4± 1.2	38.4± 1.8	42.6± 2.2	26.5± 1.1	51.3± 2.4	30.2± 1.4	24.3± 1.2

From Table 2.7, we can see that the antioxidant properties of the mixtures of rosehip and cedar oils in volume ratios, when analyzed using the phosphomolybdenum method, are manifested in high AA% at volume ratios of 1:2 (42.6%) and 1:4 (51.3%).

The cost of the product is 200,000 (two hundred thousand) soums for 1 kg of gulkhayri seeds, the oil yield from the seeds is 6%, that is, 60 ml of oil is extracted from 1 kg of seeds, and 30,000 (thirty thousand) soums for 1 kg of sedana seeds, the oil yield from 1 kg of seeds is 25%, that is, 250 ml of oil is produced from 1 kg of seeds. The food additives offered by us are packaged in 30 ml bottles. Accordingly, the approximate cost of oil mixtures obtained in different proportions is shown in Table 2.8.

Table 2.8

Cost indicators of 30 ml of mixtures of gulkhayri and sedana oils in different volume ratios (sums)

A mixture of rose and cedarwood oils	3:1	2:1	1:1	1:2	1:3	1:4	1:5	1:6
Product cost (sum)	75900	67900	51800	35700	27700	22880	19700	17500

In this table, we can see that the cost of the product decreases as the volume of sedana oil increases in the composition of mixtures of gulkhayri and sedana oils in various proportions. The cost of the oils is lower in mixtures in the volume ratios of 1:3, 1:4, 1:5, 1:6, while the antioxidant activity AA% is higher in 1:2 and 1:4. We paid attention to oil mixtures that contain more biologically active substances, have high antioxidant activity, and can have an effect against various oxidative processes in the body. Since the cost of the mixture of oils in the volume

ratio of 1:2, 1:3, 1:4,1:5 and 1:6 is similar, and in addition, the antioxidant activity AA% is higher in the ratio of 1:2, 1:4, we chose these compositional mixtures of gulkhayri and sedana oils.

Accordingly, we named the 1:2 compositional mixture of gulkhayri and sedana oils, which showed high antioxidant activity, ASXUM, and the 1:4 mixture of oils, ASQARAXUM.

§ 2.6. ASXUM and ASQARAXUM food additives

Results of antioxidant activity determination

There is growing interest in the use and measurement of antioxidants in the food, pharmaceutical, and cosmetic industries, as they are used to treat many degenerative diseases, aging, prostaglandin-mediated inflammation, cancer, and chronic diseases that are associated with oxidative stress in the body [121241-b; 122;-598-620-b].

Total antioxidant activity (phosphomolybdenum assay). The antioxidant activity of the samples was determined using the phosphomolybdenum method developed by Prieto et al. [120;341-b]. The phosphomolybdenum method is used to assess the total antioxidant capacity of plants, extracts, various grains and seeds, oils extracted from them, and vitamin E [123;-46-55-b].

The formation of green phosphate salts and Mo(V) complexes was determined spectrophotometrically by the improved phosphomolybdenum method by Fiske and Subbarow. The kinetics of the formation of the phosphomolybdenum complex were studied with α -tocopherol as the reducing agent at different temperatures [124;-375-379-b, 125;-249-255-b, 126;-176-187-b].

European scientists Sunita . S , Schuff . C, Lampasona . M. studied the composition of essential oil from the seeds of the sedum plant and its antioxidant and antimicrobial activities under *in vitro conditions* [127;-123-132-b].

Pakistani scientists R. Sakib, S. Aktar, S. Kaur studied the antioxidant properties of thymoquinone and dithymoquinone in safflower oil [128;575-b].

US scientists Sadighara. P, Gharibi. S, Jafari. A, Jahed. G studied the antioxidant activity of the flowers of the gulkhairi plant [129;-413-419-b].

European scientists Bonaterra. A, Hunold. P, Fink. G studied the anti-inflammatory and antioxidant effects of bulrush root extract on macrophages *in vitro* [130;-1304-1309-b].

During our study, the antioxidant activity of a mixture of gulkhayri and sedana oils localized in the climatic conditions of the Andijan region was studied using the phosphomolybdenum method. The basis of this method is the conversion of Mo (VI) ions to Mo (V) by antioxidants, resulting in a change in the optical density of the solution.

Here, the substance that reduces the Mo(VI) ion to Mo(V) is the unsaturated carboxylic acids in our oil, because 86.2% of the rosehip oil is made up of oleic, linoleic and linolenic acids. In our sedana oil, 80% of the unsaturated fatty acids are found. [131; 209-211-b]. The results obtained are shown in Table 2.9.

Table 2.9

Comparison of antioxidant activity of different doses of ASXUM and ASQARAXUM food additives to AA% standard ascorbic acid

No.	Product name	Antioxidant activity of the oil mixture when 1 ml of phosphomolybdenum solution is added in the following volume activity AA%				
		10 µl	25 µl	50 µl	75 µl	100 µl
1	ASQARAXUM	6.2±1.4	14.5±2.2	38.4±2.3	58.1±2.1	86.1±3.4
2	ASXUM	5.7±1.2	11.7±2.1	28.3±2.8	42.4±2.4	64.8±3.4
3	Ascorbic acid	5.4±1.2	5.9±1.4	18.6±2.1	19.4±2.4	24.8±2.8

Table 2.9 shows that the antioxidant activities (AA%) of solutions of various concentrations of ASXUM and ASQARAXUM food additives are higher than those of ascorbic acid used as a standard. This can be seen more clearly in Figure 2.5 below. Based on the research results, the AA% of the samples relative to ascorbic acid is given in the form of a diagram:

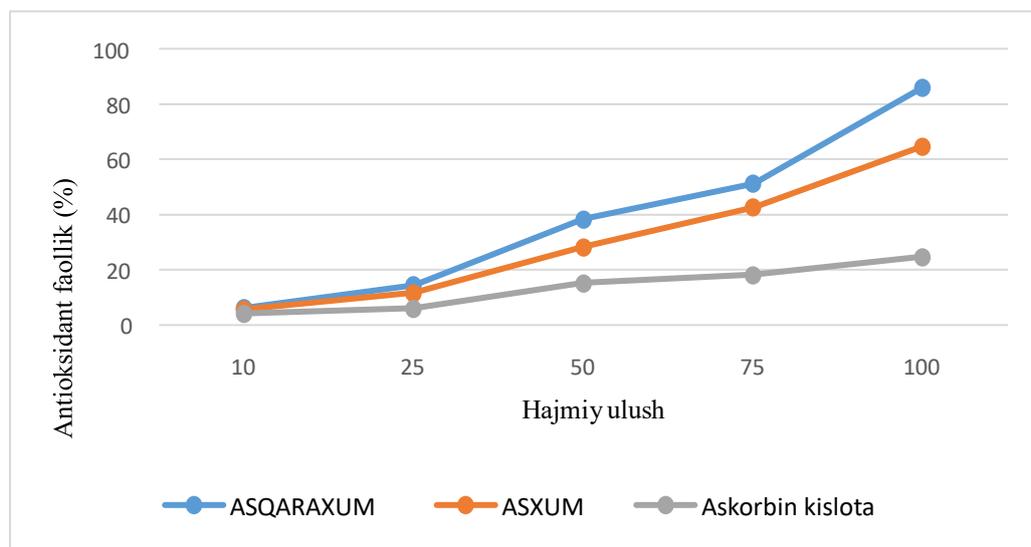


Figure 2.5. AA% of ASQARAXUM and ASXUM food additives

When we observe the results in Figure 2.5, it was experimentally proven that the ASXUM food additive had the highest (64.8%) and the ASQARAXUM food additive had the highest (86.1%) antioxidant activity in a 100 μ l concentration sample.

2.7. Antiradical activity of the food additive “ASXUM”

study results

Most of the antiradicals isolated from plants are phenolic compounds. They are involved in the prevention of various diseases associated with oxidative stress, such as cancer and cardiovascular diseases [132;944-b].

Antiradicals can have different mechanisms of action, and it is recommended to study their activity using different methods. In this study, ARF extracts were evaluated in relation to the free radical DFPG. Since the tested food additive ASXUM is a mixture of oils, it was dissolved in DMSO (dimethyl sulfoxide) and 30% ethanol solutions, since these substances convert the antiradical active substances in the oil into a soluble state in an aqueous solution. As a result, our product dissolves in an aqueous solution and becomes a true solution. Then, the aqueous solution of DFPG

When added, free radicals are converted to non-radical forms. As a result, the optical density of the DFPG solution changed over time. The antiradical activity is based on the kinetics of this change.

A concentration of 50 $\mu\text{l/ml}$ was chosen to compare the ARF of the ASXUM food additive. We diluted the ASXUM food additive 1:100 with the corresponding solvent DMSO (dimethylsulfoxide) and the resulting solution (DMSO) in 30% ethanol. The concentration of DFPG is 0.1 M. The measurements were performed at 20°C.

When ASXUM food additive is added to DFPG solution, an experimental decrease in the optical density of DFPG solution is observed, indicating that they have high ARF. The ARF for ASXUM food additive was evaluated after 100 times dilution, indicating that ASXUM food additive has antiradical ability.

Figure 2.6 below shows the experimentally determined ARF of the food additive ASXUM:

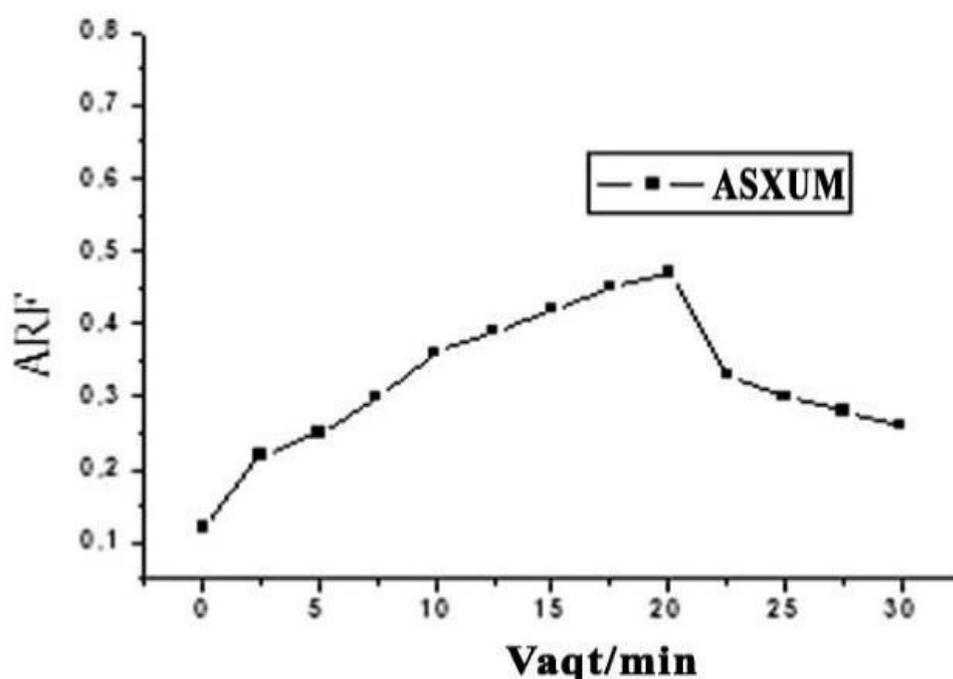


Figure 2.6. Antiradical activity of the food additive ASXUM over time

From the diagram above, it is clear that ASXUM exhibits the highest antiradical activity (ARF) of the food additive with 47.8% in 20 minutes.

The time dependence of the antiradical activity of the ASXUM food additive is presented in Table 2.10.

Table 2.10

ARF indicators (%) of the ASXUM food additive

Time/min	0	5	10	15	20	25	30
ARF%	12.4±1.2	29.5±1.4	38.2±1.6	43.6±1.8	47.8±2.4	28.3±1.6	26.1±1.2

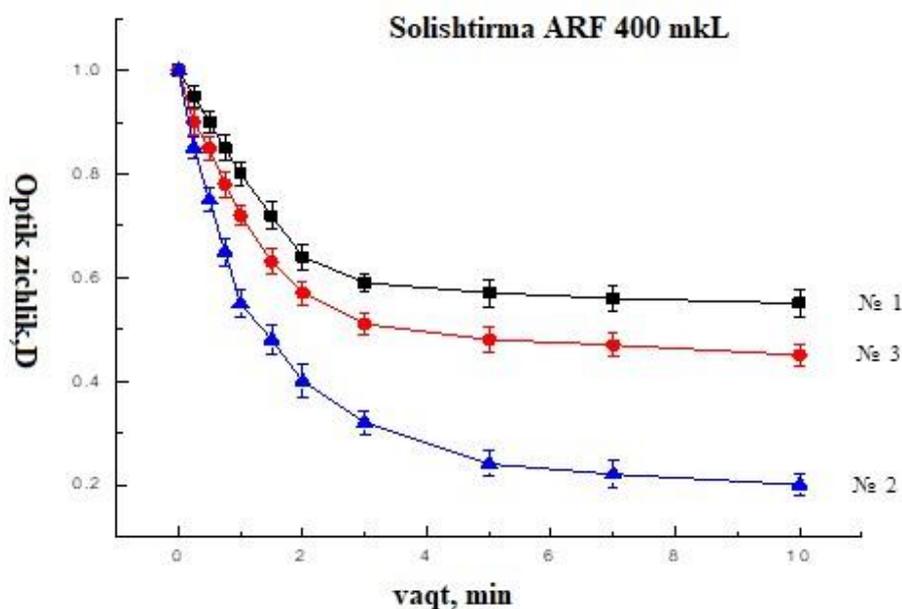
In Table 2.10, the food additive ASXUM shows the highest ARF (47.8%) at 20 minutes. Then, it was observed that the ARF gradually decreased and decreased to 26.1% at 30 minutes. Therefore, it was found that the optimal time for the sample to show ARF is 20 minutes.

§ 2.8. Analysis of the antiradical activity of the food additive “ASQARAXUM”

In recent years, biologically active compounds have been studied with great interest as free radical scavengers as therapeutic agents against various diseases [133; 2058-2070-b].

Many compounds in plants have the property of scavenging free radicals (chain-breaking antioxidants), which are highly reactive as hydrogen or electron donors, and many compounds with antioxidant activity have the property of neutralizing free radicals, reducing their formation [134;-703-725-b].

The antiradical activity of the food additive ASQARAXUM dissolved in DMSO and ethanol was determined by a standard method, based on the kinetics of the optical density of the alcoholic solution of 1,1-diphenyl-2-picrylhydrazyl (DFPG). The free radical concentration was 0.1 M. The sample solution dissolved in DMSO (dimethylsulfoxide) and ethanol was added to 3 ml of DFPG solution in a cuvette at a volume of 100, 200, 300, 400 µg/l. The change in the optical density of the alcoholic solution of DFPG was measured using a UV-5100 spectrophotometer in a 3 ml cuvette with a thickness of 1 cm [135;565-567-b].



№-1 Glycoside, № 2- Quercetin, №-3 ASQARAXUM

Figure 2.7. Results of measuring the relative optical density of DFPG ethanol solution in the presence of samples (400 μ l).

Analyzing the results obtained in Figure 2.7, it can be concluded that when the tested ASQARAXUM food additive solution was added to the DFPG solution, a decrease in the optical density of the DFPG solution was observed, which indicates their antiradical activity. It was observed that the ASQARAXUM food additive exhibits antiradical activity.

Table 2.11

The time required to reduce the concentration of DFPG by 50% (t_{50}) under the influence of samples.

Samples	IC ₅₀ , μ l	t_{50} sec
Glycoside	245 \pm 12	215 \pm 14
Quercetin	395 \pm 16	580 \pm 22
Askarahum	285 \pm 17	307 \pm 18

We can observe that the antiradical properties of the ASQARAXUM food supplement in Figure 2.7 are higher than those of the standard substances gliclazide and lower than those of quercetin.

§ 2.9. *In vivo* pharmaco-toxicological analysis of the food additives “ASXUM” and “ASQARAXUM” used in inflammation

The acute toxicity of the food additives ASXUM and ASQARAXUM used in inflammation was determined. When ASXUM food additive was administered to mice at doses of 5000 and 10000 mg/kg, no acute toxic effects were observed. Only after 5-10 minutes of administration at a dose of 10000 mg/kg, animals showed increased respiration, huddled together, and squinting and narrowing of the eyes, which lasted for 25-

It took 30 minutes and the mice began to return to normal, continuing to eat and drink water. During the entire experiment, no animal deaths were recorded at the above doses (5/0).

When ASQARAXUM food additive was administered to mice at doses of 5000 and 10000 mg/kg, no acute toxic effects were observed in animals. 10 minutes after ASQARAXUM was administered at a dose of 10000 mg/kg, animals showed increased respiration, squinting, and narrowing of the eyes, which lasted for 30-35 minutes, and the mice returned to normal and continued to drink food and water. When the experimental mice were observed for 14 days, no animal deaths were recorded at the above doses (5/0).

When senna oil was administered to mice at doses of 5000 and 10000 mg/kg, no acute toxic effects were observed in the animals. 10 minutes after administration at a dose of 10000 mg/kg, animals experienced increased respiration, convulsions, and squinting, which lasted for 20-30 minutes, and the mice returned to normal, their food and water requirements were similar to those of the control group. The experiments were observed for 14 days, and no animal deaths were recorded at the above doses (5/0).

When 5000 and 10000 mg/kg of marigold oil was administered to mice, no adverse effects were observed in acute poisoning in animals. 10-15 minutes after the administration of this sample at a dose of 10000 mg/kg, a slight increase in

breathing, clumping of mice, and narrowing of the eyes were observed, which lasted for 20-25 minutes, after which they began to return to normal, and their food and water intake became normal.

Table 2.12

ASXUM and ASQARAXUM food additives and sedana and gulkhayr
oil acute toxicity indicators, n=5

Experience	Animal type, gender	Dose mg/kg, ml	Number of dead animals	Animal mass, g (1 day)	Animal mass, g (7 days)	Animal mass, g (14 days)	LD50 confidence interval
ASXUM	Male mouse	5000	5/0	21	22	25	>10000 mg/kg
		10000	5/0	21	23	25	
ASQARAXUM		5000	5/0	20	22	24	
		10000	5/0	22	24	26	
Sedan oil		5000	5/0	21	24	25	
		10000	5/0	20	21	23	
Rosehip oil		5000	5/0	21	24	26	
		10000	5/0	21	23	25	
Control		0.5 ml	5/0	22	24	26	-

As can be seen from Table 2.12 above, there was no decrease in body weight of animals in the experimental groups compared to the control group. Based on the results obtained, it can be concluded that the median lethal dose (LD₅₀) of ASXUM and ASQARAXUM food additives, sedana and gulkhayri samples when administered once to mice was higher than >10000 mg/kg.

Thus, when the acute toxicity of ASXUM and ASQARAXUM food additives, sedana and gulkhayri oils was studied in mice, it was found that these substances belong to class VI - non-toxic compounds, and when administered once into the stomach, the median lethal dose (LD₅₀) was more than 10,000 mg/kg.

Results of testing the anti-inflammatory activity of ASXUM and ASQARAXUM food additives *in vivo using the carrageenan tumor model*

The volume and weight of the hind limb edema were measured 3.5 hours after the injection of carrageenan-induced acute exudative inflammation phlogogen into the mice taken for the sample. The results obtained were compared with the control

and comparative Kuppen pharmacopoeia preparation groups of mice and are presented in Table 2.13 below.

2.13 table

In vivo effects of ASXUM and ASQARAXUM food additives and oils from the seeds of Cedana and Gulkhayri plants on carrageenan-induced angiogenesis in mice effect on inflammation

Groups	Dose, mg/kg, ml	After 3.5 hours			
		Tumor volume, %	EQF, %	Tumor weight, mg, %	EQF, %
Control	0.2 ml	82.0 ± 8.4	-	36.5 ± 1.6	-
Kiepen	55 mg/kg	44.0 ± 4.0	56.0	30.7 ± 1.5	15.9
Sedan oil	0.2 ml	52.6 ± 6.5	47.4	31.1 ± 3.0	14.8
Rosehip oil	0.2 ml	48.8 ± 5.3	51.2	28.5 ± 3.5	21.9
ASXUM food supplement	0.2 ml	36.4 ± 3.0	63.6	26.8.5 ± 2.0	26.6
ASQARAXUM food addition	0.2 ml	25.0 ± 4.3	75.0	18.0 ± 2.5	50.7

When we look at Table 2.13, when the anti-inflammatory activity was studied in the carrageenan tumor model, all the groups studied achieved higher results in terms of tumor volume and tumor weight reduction, anti-exudation activities compared to the control group. In this case, when ASXUM and ASQARAXUM food additives were administered to mice in doses of 0.2 ml, the highest anti-inflammatory activities were 63.6% and 75%, respectively. These food additives also showed higher results compared to the comparative anti-inflammatory drug Kupene, the anti-inflammatory activity of Kupene in this study was 56%. When Sedana and Gulkhairi seed oils were administered to mice in a volume of 0.2 ml, the anti-inflammatory activity was 47.4% and 51.2%, respectively.

These same indicators were also observed in our second experiment, which showed the superior results of ASXUM and ASQARAXUM nutritional supplements in reducing tumor severity and anti-inflammatory activity.

Conclusions on Chapter II

The following conclusions were drawn by analyzing the results of experiments conducted to determine the activity of the research object, the amount of biologically active substances and micro- and macroelements in the oils of bulgarian and cedarwood:

1. Optimal conditions have been developed for extracting oil from fenugreek and safflower seeds.
2. Oils extracted from marigold and celandine seeds were analyzed using an inductively coupled plasma emission spectrometer (Avio 200 ISP–OES), and no toxic elements or heavy metals were detected in the analysis.
3. The seeds of the fenugreek plant contain 20 amino acids, the largest of which are cysteine (0.31 mg/g), tyrosine (0.32 mg/g), as well as tryptophan (0.24 mg/g), glutamine (0.24 mg/g) and arginine (0.22 mg/g). In addition, it was found that the human body does not synthesize (exchange) amino acids valine, threonine, methionine, isoleucine, lysine, phenylalanine, arginine. The terpenoids contained in the seeds of the fenugreek plant are 13.1% - thymoquinone - it is known that it has anti-inflammatory and anti-prostate cancer activity. Containing 13.8% α -pinene and 1.7% β -pinene, fenugreek plant contains biologically active substances that have a positive effect on inflammations such as angina, laryngitis, sinusitis.
4. The composition of new biologically active food additives ASXUM and ASQARAXUM was developed based on the cost and antioxidant activity of different volumetric ratios of rosehip and cedar oils.
5. The antioxidant activity of the food additives ASXUM and ASQARAXUM was evaluated using the phosphomolybdenum method.

6. ASXUM and ASQARAXUM food additives The antiradical activity was studied by a sharp decrease in the optical density of the DFPG solution, the experiment ultimately indicated that they had high ARF.
7. ASXUM, ASQARAXUM food additives, Studies of the acute toxicity of samples of sedana and gulkhairi, when administered once to mice, showed that the compounds belong to class VI according to the OECD classification.
8. As a result of clinical trials, it was observed that the anti-inflammatory properties of the food additives "ASXUM" and "ASQARAXUM" are higher than those of the synthetic drug kyupen.

CHAPTER III. BIOLOGICAL ACTIVITY OF EXTRACTS OF GULKHAYRI AND SEDANA PLANTS AND OILS EXTRACTED FROM THEIR SEEDS OF ANTI-INFLAMMATORY EFFECT *IN VIVO* CONDITIONS. (EXPERIMENTAL PART)

3.1. Development of optimal conditions for cold-pressing oil extraction from marigold and celandine seeds

To obtain oils from marigold and celandine seeds in a sanitary manner, the German company "AEN Engineering GmbH & Co.KG"

The cold press machine "DD85-G" manufactured by "Dr. DD85-G" was used. This machine used 8 different slotted devices (nesadka). The sizes of these slots are 6, 8, 10, 12 and

The dimensions are 14 mm. The compression screw rotation speed of the "DD85-G" cold press equipment has three different rotation speeds: 12, 24, 36 rpm.

The screw rotation speed is controlled by an inverter. We measured the oil yield from 100 g of fenugreek and safflower seeds with a total of 5 different nozzle sizes and a screw rotation speed of 12 rpm. The results obtained are 2.1- and are presented in Tables 2.2.

The optimal conditions for the separation of oil from bulgur seeds are a nozzle size of 10 mm, a screw rotation speed of 12 rpm, and a temperature of 40 °C was found, and the volume of oil separated from the seed was 6 ml.

The optimal conditions for the separation of oil from safflower seeds are a nozzle size of 10 mm, a screw rotation speed of 12 rpm, and a temperature of 40 °C. °C, in which the volume of oil separated from the seed was 25 ml.

adopted the parameters of the oil nozzle size of 10 mm, the screw rotation speed of 12 rpm, and the temperature of 40 °C as optimal conditions.

§ 3.2. Macro- and microelements in rosehip and cedar oils determination

For mineralization of completely dried marigold and celandine seed oils, i.e., to obtain a clear solution, 200 mg was weighed on an analytical balance (FA220 4N). A mineralization device (MILESTONE Ethos Easy, Italy) was used to convert the sample to a mineral state. For this, a sample (200 mg), 6 ml of nitric acid (HNO_3) purified by distillation, i.e., acid distilled in an infrared light-based acid purification device (Distillacid BSB-939-IR), and 2 ml of hydrogen peroxide (H_2O_2) as an oxidant were placed in a test tube of the device. The entire mixture was mineralized at 180°C for 20 min.

After the mineralization process was complete, the mixture in the test tube was transferred to a separate conical volumetric flask and diluted to 40 ml.

The solution in the flask is placed in special test tubes in the sampling section and placed for analysis. The prepared sample is analyzed using the Avio 200 ISP–OES was analyzed on an inductively coupled plasma optical emission spectrometer. The results obtained are presented in Tables 2.3 and 2.4.

§ 3.3. The content of amino acids and terpenoids in celery seeds determination

The synthesis of phenylthiocarbamyl (PTK) derivatives of amino acids was carried out by the method of YuSSX, and free amino acid PTK derivatives was carried out by the method of Steven A, Cohen Daviel.

Their identification was carried out on an Agilent Technologies 1200 chromatograph. Terpanoids were analyzed by gas chromatography-mass spectrometry using an Aligent 7890 V gas chromatograph coupled to an Aligent 5977 A mass spectrometric detector (MS) (Aligent, USA).

Chromatography-mass spectrometry conditions: HP-5 MS capillary column with dimensions of 30 m x 0.25mm x 0.25 mm. Carrier gas – helium, flow rate 4 ml/min, sample was introduced into the evaporator at a temperature of 220°C using an autoinjector in a volume of 5 μl . The column temperature was increased from 48°C to 230°C over 20 min and the temperature was held at this point for an

additional 3 min. The chromatographic profile was monitored using flame ionization and MS detectors connected in series. The profile generated by the MS detector – concentrated ion current chromatography was analyzed using the Mass Hunter (Agilent, USA) program and the mass spectrum consisting of m/z values of quasi-molecular and fragment ions was determined by comparison with the Wiley and NIST 17 databases.

§ 3.4. Different volumetric ratios of mixtures of rosehip and cedar oils were evaluated as novel food products based on their antioxidant activity and cost. development of additives

To develop a new food supplement from oils extracted from fenugreek and celandine seeds, we prepared six different compositional mixtures of oils, namely 3/1, 2/1, 1/1, 1/2, 1/3, 1/4 1/5 and 1/6. To test the biological activity, we used a spectrophotometer using the phosphomolybdenum method developed by P. Prieto.

Aliquots of 0.075 ml of the obtained samples were mixed with 1 ml of reagent solution (0.6 M sulfuric acid, 28 mM sodium phosphate, and 4 mM ammonium molybdate) in a vial. The vial was incubated at 95°C for 90 min with the vial closed.

After incubation, the samples were cooled to room temperature and the optical density was determined against the reagent at a wavelength of 765 nm.

As a result of the analysis, the antioxidant activity of six different 7.5% marigold and celandine oils was 1/1-35.6%, 1/2- 42.6%, 2/1- 33.4%, 1/3- 26.5%, 3/1-29.8%, 1/4-51.3%, 1/5-30.2% and 1/6-24.3%. The highest antioxidant activity was observed in the 1/2 and 1/4 ratios of marigold and celandine oils.

The costs of bulrush and senna oils were calculated as follows. 1 kg of bulrush seeds costs 200,000 (two hundred thousand soums), 1 kg of senna seeds costs 30,000 (thirty thousand soums), the average oil yield from bulrush seeds is 6%, and the average oil yield from senna seeds is 25%. The calculation results are

shown in Table 2.8, assuming that the created food additives are packaged in 30 ml glass bottles.

§ 3.5. Antioxidant properties of ASXUM and ASQARAXUM food additives detection of dental activity

For the experiment, oils were extracted from the seeds of gulkhayri and cedana, which were grown locally in the Andijan region.

Aliquots of 0.01, 0.025, 0.05, 0.075 and 0.1 ml of the food additives ASXUM and ASQARAXUM were mixed with 1 ml of the reagent solution (0.6 M sulfuric acid, 28 mM sodium phosphate and 4 mM ammonium molybdate) in a vial. The vial was incubated at 95°C for 90 min with the vial closed. After incubation, the samples were cooled to room temperature and the optical density was determined at a wavelength of 765 nm relative to the reagent. The percentage of inhibition was determined using the following formula:

$$AA \% = \frac{D_1 - D_2 \times 100}{D_1} \times 100\%$$

To determine the antioxidant activities of ASXUM and ASQARAXUM food additives, a Cary 60 UV-Vis Agilet Technologies spectrophotometer, graduated measuring (beaker, micropipette) vessels, 50-100 cm³ chemical beakers, ordinary filter paper, a glass funnel, and a 250 cm³ flask were used. For spectrophotometric analyses, a 25 ml cuvette with a thickness of 10 mm was used. All measuring instruments (measuring flasks, pipettes) necessary for the work were calibrated. The instrument was prepared for operation as follows: 1) The Cary 60 UV-Vis Agilet Technologies spectrophotometer was connected to a 220 V, 50 / 60 Hz. power supply and the SET tumbler was turned on; 2) When the START button is pressed, the "G" symbol corresponding to its value and wavelength value appears on the digital display window of the instrument; 3) When the Cary 60 UV-Vis Agilet Technologies spectrophotometer is stored for a long time without use or is moved from its installed location to another place, the technical condition of the

instrument is checked. 4) It is advisable to check the technical condition of the instrument during operation. This is very important for assessing the performance of the instrument. The recommended frequency of checks during active operation of the instrument is once a month.

In addition, the amplifier is zeroed by checking the wavelength transmission coefficient on the indicator window. 5) To zero the amplifier, the photometer is connected to a 220 V, 50/60 Hz. power source and the SET tumbler is turned on by opening the cuvette compartment cover. The instrument is kept connected to the power supply for 30 minutes and heated. The NUL button is pressed and the amplifier is zeroed. At the same time, the zero count value appears to the right of the flashing comma on the indicator window, and the "0" symbol appears to the left. By pressing the NUL button, the corresponding zero count value is set; 6) The wavelength values on the digital window correspond to the Cary 60 UV-Vis control light wavelength values, and the deviation from the maximum transmission point specified in the instrument passport should not exceed 3 nm. After checking the zero count, using the wavelength setting device, the wavelength values were set according to the table by 15-20 nm, which were smaller than the passport values of the Cary 60 UV-Vis light filter. The lid was closed and the "G" button was pressed. By turning the wavelength setting device clockwise, the initial value of the maximum count on the "G" scale was found. The count was made on the "lambda" wavelength scale corresponding to the maximum count on the "G" scale. The average value of the wavelengths, measured three times in a row, was taken. The calculated values should correspond to the wavelength values of the Cary 60 UV-Vis light filter indicated in the spectrophotometer passport, and the deviation should not exceed 3 nm.; 7) The Cary 60 UV-Vis control is neutral with an error of no more than 0.5% for the transmittance coefficient on the digital window should correspond to the transmission coefficients of the light filters. The test was carried out at a wavelength of 347 nm. With the lid of the cuvette compartment closed, the G and P buttons were pressed one after the other, the lid of the cuvette

compartment was opened, and the NUL button was pressed. Then the lid was closed, and when the P button was pressed, the readings 100-0.2 appeared on the window. A neutral light filter taken for control was placed in the cuvette compartment and the lid was closed. A report in percentages corresponding to the transmission coefficient of the light filter was displayed on the window. The values of the transmission coefficients of the Cary 60 UV-Vis light filters given in the photometer passport were compared with the results obtained during the test. In this case, the transmission coefficient value was 0.3 % [136; 117-121-b]. The results obtained are presented in Tables 2.7 and 2.9.

The results were processed using the t-student test and the Orijen, USA program [137; 565-567-b].

§ 3.6. Determination of antiradical activity of food additives ASXUM and ASQARAXUM

We investigated the antiradical activity of the food additives “ASXUM” and “ASQARAXUM”, a compositional mixture of oils extracted from the seeds of gulkhayri and sedana plants grown in the Andijan region.

US scientists Asma .M, Hanane.K, Camela.M studied the antiradical activity, toxicity, and cyclic oxidoreductase activity of cedar oil using the DFPG method [138; 128-134-b].

Moroccan scientists Tiji.S, Benayad.O, Berrabah.M determined the antioxidant activity of cedar oil grown in that country using the DFPG method [139; 227-233-b; 140;26-39-b].

During our research, we found that the food products “ASXUM” and “ASQARAXUM”.

To assess the ARF of the compounds, we used a spectrophotometric method for measuring the kinetics of the reduction of the stable radical 2,2-diphenyl-1-picrylhydrazyl (DFPG) molecules by antioxidants [141; 180-197-b].

The method is based on the interaction of antioxidants with the stable chromogenic radical 2,2-diphenyl-1-picrylhydrazyl (DFPG). A working solution was prepared from a standard solution of DFPG (5×10^{-4} M) in ethanol acidified with acetic acid, diluted with ethanol in a ratio of 1:10. The resulting solution should have an optical density of not more than 0.9 at 517 nm. To 5 ml of the DFPG working solution, 50 μ l of the food additive under study ASXUM dissolved in DMSO (dimethylsulfoxide) and 30% ethanol was added, mixed, and the kinetics of the decrease in optical density of the solution was recorded for 30 minutes at a wavelength of 517 nm. The DFPG working solution was used as a control sample.

Antiradical activity is determined by the following formula:

$$\text{ARF}\% = \frac{(\text{Anazorat} - A_x)}{\text{Anazorat}} \times 100\%$$

A_x is the optical density of the test solution, A_{control} is the control density of the test sample.

Statistical processing of the obtained results and drawing of figures were carried out using the computer program OriginPro 7.5 (Microsoft, USA). The difference between the values recorded as a result of the effects of quercetin and gliclazide was calculated using the T-test.

Antioxidants can have different mechanisms of action, and it is recommended to study their activity using different methods. When the food additives ASXUM and ASQARAXUM are added to an aqueous solution of DFPG dissolved in DMSO (dimethyl sulfoxide) and 30% ethanol, free radical molecules are converted to non-radical forms.

The study shows the kinetics of the change in the optical density of the DFPG solution when DFPG is added to a solution of the food additives ASXUM and ASQARAXUM dissolved in DMSO (dimethyl sulfoxide) and 30% ethanol.

For quantitative assessment of the antiradical activity of samples t_{50} - that is, the time required for the steady-state radicals to decrease by 50% of their initial concentration when reacting with the compound under study, and IC_{50} - that is, the

concentration of the substance required to reduce the free radical by 50% - were used.

Determination of the pharmaco-toxicological index of the food additives ASXUM and ASQARAXUM used in inflammation

The anti-inflammatory food supplement ASXUM and ASQARAXUM were prepared at Andijan State University from a composite mixture of oils extracted from the seeds of althaea and nigella plants by cold pressing, and were tested for their acute toxicity.

It was presented to the Laboratory of Pharmacology and Screening of Biologically Active Compounds of the Institute of Biorganic Chemistry named after OS Sodiqov of the Academy of Sciences of the Republic of Uzbekistan.

The following samples were prepared for analysis:

1. The oil, obtained by pressing the seeds of the nigella plant, was presented for research in a light yellow color with a characteristic odor.
2. The oil, obtained by pressing the seeds of the althaea plant, was presented for research in a light yellow color with a characteristic odor.
3. ASXUM food supplement – a mixture of oils in a 2:1 ratio obtained by pressing the seeds of nigella and yarrow. This substance was presented for research in a light yellow color with a characteristic odor.
4. ASQARAXUM food supplement is a mixture of oils extracted by pressing althaea and nigella seeds in a 4:1 ratio. This substance was presented for research in a light yellow color with a characteristic odor.

Research method. The acute toxicity assessment of the studied samples by intragastric administration is carried out by administering them in a stepwise manner to a group of animals of the same sex in strictly defined doses in accordance with OECD. Studies on the determination of acute toxicity in the

experiment were conducted on the food additives ASXUM and ASQARAXUM, sedana and gulkhayri oils.

The experiments were conducted on male, outbred white laboratory mice weighing 20 ± 2.0 g. Five mice were taken for each group in the experiment, and their total number was 50.

All pharmacological studies were conducted in healthy, sexually mature mice that had passed a 10-14-day quarantine period. The samples were administered once into the stomach of mice using a special probe (0.1 and 0.2 ml/mouse) at doses of 5000 and 10000 mg/kg. The control group animals were administered an equal volume of purified water. On the first day of the experiments, the general condition of the animals of the experimental and control groups, possible tremors and deaths were observed every hour in laboratory conditions. Over the next 2 weeks, the general condition, activity, fur coat, skin condition, respiratory rate and depth, urine output, body weight changes and other indicators of the animals in all groups were examined daily in vivarium conditions. All study animals were kept on the same usual diet, with unlimited access to water and food [142;944-b].

At the end of the experiment, the median lethal dose (LD_{50}) and toxicity class of the tested substances were determined [134; 2058-2070-b].

§ 3.8 . *In vivo* evaluation of the food additive ASXUM and ASQARAXUM

Determination of anti-inflammatory activity using a carrageenan tumor model

The studies were carried out in a model of acute exudative inflammation induced by subplantar injection of the classic phlogogen - carrageenan. The experiment was conducted in male mice with a body weight of 20 ± 2.0 g. The experiment consisted of 6 groups, 5 mice were taken for each group. As a comparative pharmacopoeial drug, the tablet form of Kupeng (Avison Pharmaceuticals Pvt. Ltd., India) was used and administered to mice at a

therapeutic dose of 55 mg/kg. As research groups, the food additives *Nigella sativa*, marshmallow (*Althaea officinalis*), ASXUM and ASQARAXUM were administered to the stomach in a volume of 0.04 ml for 5 days using a special probe, and 1 hour after the 5th day, a 1% solution of carrageenan was administered to the aponeurosis area of the hind left paw of the mice in a volume of 0.05 ml [144;250-b].

The control group animals were injected with an equal volume of distilled water in the same way. The initial volumes of the hind paws of the animals in the experimental and control groups were measured oncometrically before carrageenan injection. The anti-inflammatory effect of the drugs was recorded 3.5 hours after the inflammation was induced. The tumor volume was estimated based on the difference between the volumes of the non-inflamed and inflamed hind paws. The anti-exudative activity of the drugs was determined in percent by the difference in the reduction of the tumors in the hind paws of the experimental animals compared to the control.

The anti-exudation activity is calculated by the following formula:

$$EQF = \Delta V_{taj} - \Delta V_n / \Delta V_n * 100\% ;$$

When comparing anti-exudation activity to the control group, the following formula is used;

$$100\% - (DV_{taj} - DV_n / DV_{n(taj.)} / DV_{taj} - DV_n / DV_{n(naz.)}) * 100\%$$

where, EQF – anti-exudation activity, in percent; ΔV_n and ΔV_{taj} – hind paw volume of the control and experimental groups.

In the same experiment, a second method was also used to determine anti-inflammatory activity. In this case, the hind legs of the same mice were cut below the knee, the weight of each leg was measured separately, and the anti-exudation activity was determined according to the formula above.

The results of the study were statistically processed using Microsoft Excel using traditional methods to determine the mean value (M) and standard error of the

mean (m); differences were considered statistically significant at a significance level of $p < 0.05$. In the second part of our experiments, 3.5 hours after the injection of carrageenan into all animal groups, the hind paws were cut off below the knee, the weights of the right and left paws were measured, and the average edema volume and anti-exudative activity of each group were determined compared to the volumes of the right paw as a control and the left paw (injected with flagogen) as an experimental group. In this case, the hind paw weight of the control group mice was $36.0 \pm 1.6\%$. The paw weights of the mice injected with the comparative Küpen pharmacopoeia preparation were $30.7 \pm 1.5\%$ on average, which reduced the volume of exudation by 15.9% compared to the control group, and statistically significant differences were achieved ($p = 0.05$). The swelling weight of the paws of the group of mice that received 0.2 ml of nigella oil after carrageenan injection, when measured after 3.5 hours, was $31.1 \pm 3.0\%$, and the anti-exudation activity was 14.8% compared to the control. In this case, the paw weights of the mice in this group increased compared to the control group, but there was no statistically significant difference. In the group of mice that received 0.2 ml of althaea oil, the swelling weight was $28.5 \pm 3.5\%$, and the anti-exudation activity increased by 21.9%, and compared to the control group, there was a tendency towards a decrease in the swelling volume in this group of mice, that is, a trend was observed, but it was not statistically significant ($p = 0.09$). The swelling weight in the group of animals that received the ASXUM food additive was $26.8 \pm 2.0\%$, the anti-exudation activity was 26.6% compared to the control group, which was statistically significant ($p = 0.01$). The average swelling weight of the hind legs in the group of mice administered ASQARAXUM food supplement was $18 \pm 2.5\%$, the anti-exudation activity was 50.7% compared to the control group, which was statistically significant ($p = 0.001$).

Conclusions on Chapter III

1. Optimal conditions for cold-pressing oil extraction from althaea and nigella seeds have been developed.
2. Althaea oils were analyzed elementally using an optical emission spectrometer. The results showed that the oil contained mainly P-phosphorus, Ca-calcium, K-potassium, Na-sodium, and S-sulfur. Toxic and heavy metal salts were not found in the oil.
3. Optical emission spectrometer analysis was performed. As a result, it was determined that our nigella oil mainly contains a high content of S-sulfur, K-potassium, Ca-calcium, Sr-strontium, P-phosphorus, Na-sodium. Toxic and heavy metal salts were not found in our oil.
4. The amount of amino acids in the content of the seeds of the nigella was carried out by the method of Steven A, Cohen Daviel. Their identification was carried out on the Agilent Technologies 1200 chromatograph. 20 different amino acids were identified in the seeds of the sedana. In addition, the analysis of terpanoids in the content of the seeds of the sedana was carried out by the method of gas chromatography - mass spectrometry, using the "Aligent 7890 V" device. Several biologically active terpanoids with various anti-inflammatory properties were identified from the seeds of the sedana.
5. A new food additive named ASXUM and ASQARAXUM was obtained from mixtures of rosehip and cedar oils due to their antioxidant activity and cost.
6. In order to study the biological activity and medicinal properties of the food additives ASXUM and ASQARAXUM, the antioxidant activity of solutions prepared from them was determined by the phosphomolybdenate method.
7. The antiradical activity of the food additives ASXUM and ASQARAXUM, a composite mixture of oils extracted from the seeds of althaea and nigella plants grown locally in Andijan region, was determined using the DFPG method. Analysis of the experimental results obtained in the study of ASXUM and ASQARAXUM food additives showed that these food additives had the highest ARF in relation to the free radical DFPG.

8. The acute toxicity study of ASXUM and ASQARAXUM food additives was conducted by single oral administration to mice, and all pharmacological studies were conducted on healthy, sexually mature mice that had undergone a 10-14 day quarantine period. All study animals were maintained on the same standard diet, with unlimited access to food and water.

9. When ASXUM food supplement was administered to mice, the tumor weight in the animal group was $26.8 \pm 2.0\%$, and the anti-exudation activity was 26.6% compared to the control group, which was statistically significant ($p=0.01$). The average tumor weight of the hind legs in the group of mice administered ASQARAXUM food supplement was $18 \pm 2.5\%$, and the anti-exudation activity was 50.7% compared to the control group, which was statistically significant ($p=0.001$).

CHAPTER IV. NEW PRODUCTS BASED ON OILS OF ALTHAEA AND NIGELLA SEED TECHNOLOGICAL SCHEME FOR OBTAINING FOOD ADDITIVES AND THEIR CLASSIFICATION BASED ON CHEMICAL COMPOSITION

§ 4.1. Preparation and industrial production of food additives called ASXUM and ASQARAXUM based on the plants of Althaea and Nigella to launch

Russian allergist Alexander Ivanov notes that in some cases, rosehip oil can cause allergies. This is manifested by symptoms such as itching and rashes. In addition, long-term use of althaea oil and overdose can lead to stool disorders, nausea and vomiting. Contraindications: individual intolerance; varicose veins; bleeding disorders; thrombophlebitis; chronic constipation; for children under 12 years of age and during pregnancy.

Russian scientists MMTatyanovna, in their research, found that the bulrush plant has the following effects on the human body: protective, emollient, anti-inflammatory, expectorant, analgesic. According to the PubMed article, the main

feature of the bulrush root is that it contains 35% polysaccharide hexazone. The antioxidants included in its composition form a protective layer of the skin, as well as the mucous membrane of the esophagus. In addition, bulrush oil contains lecithin, carotene, phytosterol, macro- and microelements, amino acids.

Ingestion of black cumin oil may cause swelling of the lips, tongue, throat, or face, difficulty breathing, itching, dizziness, nausea, vomiting, diarrhea, and abdominal cramps. Overall, black cumin oil has a very low toxicity level, but it should be taken with caution.

Knowing the beneficial and negative properties of althaea and nigella oil, we decided to create a new food supplement from a combination of them.

As a result of our scientific research on the analysis of the chemical composition of bulrush and sedana oil, it was found that its oil has a very rich chemical composition. Taking into account the ease of cultivation of bulrush and sedana plants in Uzbekistan, their beneficial and healing properties for the human body, the development of a medicinal food supplement from a composite mixture of their oils is currently underway in practice, and in cooperation with “SIFAT AGRO SERVIS” LLC, operating in the Andijan district, the production of a food supplement based on bulrush and sedana oils has been launched. Currently, the “SIFAT AGRO SERVIS” LLC enterprise produces “ASKHUM” and “ASQARAXUM” medicinal products from a composite mixture of althaea and nigella oils. food additives are being produced.

For the production of food additives based on althaea and nigella oils, seeds must comply with the requirements of the state standard, including technical, assortment (variety), raw materials, technical safety in the production process, placement in technological devices, and chemical and biochemical analysis of the manufactured product.

For the industrial production of finished products from althaea and nigella oils, the raw material mixture must meet a number of technical requirements, namely, the raw material mixture must comply with the requirements of the current

state standard and the recipes and technological instructions specified in the state standard regulations.

Gulkhairini is mainly used in Uzbekistan. Among them, there are 3 common types, medicinal althaea (*Altey lekarstvenniy-Althaea officinalis*), Armenian althaea (*Altey armyansky-Althaea armanica*), white althaea (*Altey golotsvetnyy - Althaea nudiflora*) [1; 234-b].

The main types of black cumin in Uzbekistan are wild black cumin (*Nigella integrifolia* Rgl.), cultivated black cumin (*Nigella. Sativa* L.) and Damascus black cumin (*Nigella damasceana* L.).

According to its physicochemical characteristics, the raw material mixture must comply with the requirements specified in Table 4.1:

Table 4.1

Requirements for the physicochemical properties of raw materials

No.	Naming of indicators	Permitted rate	Control methods
1	Permissible limit of moisture content in raw materials (%)	50.0	GOST 28561 GOST 19792
2	Mechanical attachments	Not allowed	GOST 1750 GOST 19792
3	Symptoms of aches and pains	Not allowed	Controlled by direct observation
4	Total acidity, pH minimum permissible limit	7.0	GOST 19792

This standard of the organization applies to the mixture of oils "ASXUM" and "ASQARAXUM" (hereinafter referred to as the product), obtained from vegetable oils, intended for sale in the trade and pharmacy chain, used as a product.

Biologically active food additives "ASXUM" and "ASQARAXUM" can be used as products and raw materials in the food industry.

Meets all the requirements of the standard of this organization and is suitable for certification. Mark for recording products in other documents and (or) when placing an order; “ASXUM” and “ASQARAXUM” Ts 24134509003:2023

Althaea and Nigella oils and materials for product production must have the following valid regulatory documents and certificates of conformity:

Normative indicators;

This organization's standard uses the following normative documents as references:

- GOST 26927-86 Raw materials and food products, methods for determining mercury
- GOST 26929-86 Raw materials and food products sample preparation. Mineralization for the detection of toxic elements
- GOST 26930-86 Raw materials and food products, methods for determining arsenic
- GOST 26932-86 Raw materials and food products, lead content detection methods
- GOST 26933-86 Raw materials and food products, cadmium content detection methods
- GOST 30178-96 Atomic adsorption method for the determination of toxic elements in raw materials and food products
- GOST 11812-66 Vegetable oils. Methods for determining moisture and volatile matter
- GOST 6077-80 Medicinal raw materials. Packaging, marking, transportation and storage

Raw materials containing pesticides, toxic elements, nitrates, radionuclides, and microbiological indicators exceeding the norms established by SanPiN 03662019 are not used in production.

A strict list of raw materials and the ratio of components in them is compiled on the basis of approved and implemented recipes. The replacement of components that require replacement is carried out on the basis of a certificate of conformity or

a permit from the Ministry of Health of the Republic of Uzbekistan based on current regulatory documents [145 ; Ts 24134509-003: 2023].

When preparing a mixture of fenugreek and safflower seeds, technological processes such as receiving and storing raw materials in a warehouse, cleaning them from impurities, crushing raw materials, separating their oil, packaging and storing them, and delivering, receiving, and storing raw materials in a warehouse must be carried out.

Raw materials delivered to the production enterprise must have official documents. The document indicates its number, date of issue, batch number, name, address of the sender and address of the recipient of the shipment, name of the product, weight and quantity of the product, date of collection of the product [136 ; Ts 24134509-003: 2023].

Raw material appearance, smell, taste, degree of ripeness, insects or the degree of contamination by agricultural pests is determined by tasting it, that is, by the organoleptic method. In the preparation of the althaea and nigella-seed mixture, rotten, unripe, crushed raw materials are not used.

Microbiological indicators of oil extracted from marigold and celandine seeds are determined in accordance with SanPiN No. 0366-2019, which is indicated in Table 4.2 of the “Procedure for sanitary and technical control of canned food at production enterprises, wholesale warehouses, retail trade and public catering establishments established by the Ministry of Health” [102;SanPiN].

Table 4.2

Sanitary and hygienic requirements

No	Indicator name	Permissible amount, mg/kg
1	Acid number, tsh KOH/g, should not exceed	2.25
2	Mass fraction of moisture and volatile substances, %, not more than	0.15
3	Mass fraction of fat-free mixtures	No
4	Qualitative reaction to oils	Not available
5	Peroxide number, mmol/kg of active oxygen	10
6	Toxic elements, mg/kg	Not available
7	Lead	0.1
8	Arsenic	0.1
9	Cadmium	0.05
10	Tin	0.03
11	Iron	5
12	Copper	0.5
13	Zinc	5
14	Mycotoxins	0.005
15	Pesticides	-
16	Hexachlorocyclohexane	0.5
17	DDT and its metabolites	0.1
18	Cesium -137 bq/kg	60
19	Strontium -90 bq/kg	80

Each unit of packaging for manufactured products must have an offset printed label or a template containing the following information directly on the packaging material: the manufacturer's name, trademark, its legal and physical address, telephone, product name, composition, net weight, date of manufacture (day, month, year), expiration date, information on nutritional and energy value per 100 g of product, storage conditions, a barcode with the registration number, a mark of conformity in accordance with UzDSt 5.8, a designation of this standard, and the inscription "Made in Uzbekistan" for selling the product outside the territory of the Republic of Uzbekistan.

Each compartment of a shipping container shall be marked with a label, stencil or stamp, which is allowed to be printed and glued in a printing house. The printing must be indelible and odorless. Marking and marking of shipping containers with the inscriptions “Protect from moisture” in accordance with GOST 14192 must comply with the requirements of UzTR.490-022 [136; Ts 24134509-003: 2023].

Products are manufactured in packaged form. Products are packaged in consumer containers in glass bottles in accordance with GOST 5717.1 and bottles in accordance with GOST 10117.2 and other applicable regulatory documents, in ceramic bottles and bottles in accordance with UzDSt 552, in porcelain bottles and bottles in accordance with applicable regulatory documents, in plastic bottles and bottles with a nominal weight of 10.0 g to 2000.0 g, in glass bottles, in bottles made of polymeric materials in accordance with applicable regulatory documents.

Hermetically sealed bags made of heat-sealable composite materials based on polyethylene, polypropylene or a film with a metal coating, made of a combined material according to GOST 12302, bags made of heat-sealable materials according to GOST 10354, as well as combined multilayer materials or packages of the same size manufactured for imported goods according to a certificate of conformity approved for use by the Ministry of Health of the Republic of Uzbekistan, must be filled with inert gas (nitrogen) or other gases permitted by the Republic of Uzbekistan [136 ; Ts 24134509-003: 2023].

In agreement with the consumer, it is allowed to pack the product in other consumer and transport containers of other net weight, approved for use by the Ministry of Health of the Republic of Uzbekistan in accordance with the current SD and certificates of conformity and ensuring the preservation of product quality throughout the shelf life.

Bottles with products are sealed with glass bottles with stoppers in accordance with current regulatory documents, boxes in accordance with current

regulatory documents, plastic caps in accordance with current regulatory documents, and metal screws in accordance with GOST 5541.

Each sealed container or bottle shall be packed in a cardboard box or in a bundle without a cardboard box in accordance with GOST 12301 or other applicable regulatory documents [146 ; TY 305198819-01: 2019].

Then the products are packed in group containers: in cardboard boxes according to GOST 12301 or according to a certificate of conformity with a net weight of not more than 10.0 kg. When delivering products, corrugated cardboard boxes according to GOST 13511 and GOST 13512 should be used for packaging in containers.

Boxes containing products must be sealed with polyethylene tape. Also, the mass of the product transport package must not exceed 30 kg.

There should be no maximum negative deviation from the nominal mass and should not exceed the requirements of UzDSt 8.022.

A certificate of conformity of the goods must be attached to each batch of packaging materials used [136 ; Ts 24134509-003: 2023].

Finished products are accepted in batches. A batch is any number of products of the same name produced in one shift. During the acceptance process, products are subject to periodic certification tests.

Acceptance tests are carried out on each batch of products to determine their organoleptic properties, weight, correct labeling, and packaging quality.

Periodic tests are carried out every 6 months in accordance with all the requirements of this standard.

Control of the content of toxic elements, pesticides and radionuclides is carried out during production control or at least once a quarter.

If, according to the test results, it is found that the products do not meet the requirements of this standard for at least one indicator, repeated tests are carried

out on a new sample of twice the number of these indicators [136; Ts 24134509-003: 2023].

The results of the retest are final for the entire batch. If it is determined that the products do not meet the requirements of this standard, all products are rejected and documented in a report.

Certification tests are conducted in a testing laboratory accredited for all indicators of this standard and the NSS of the Republic of Uzbekistan.

Methods of analyzing the composition of the product are sampling, organoleptic determination of taste and smell according to GOST 19792, appearance, color, packaging quality and correct labeling. Determination of the mass fraction of moisture, determination of mechanical impurities according to GOST 28561, GOST 119 -

Compliance with GOST 1150, determination of fermentation signs, determination of total acidity according to GOST 19792, determination of arsenic in the determination of toxic elements.

Determination according to GOST 26930, determination of lead according to GOST 26932, determination of cadmium according to GOST 26933, determination of pesticides, radionuclides according to approved methods are carried out in the prescribed manner. Determination of mass on scales according to GOST 24104, determination of the mass fraction of iodine and vitamins according to methods approved by the Ministry of Health of the Republic of Uzbekistan.

The products are transported in closed vehicles in accordance with the rules for the transportation of food cargo in force for this type of transport [137 ; TY 305198819-01: 2019].

Products are stored at a temperature not exceeding 20°C and a relative humidity not exceeding 75%.

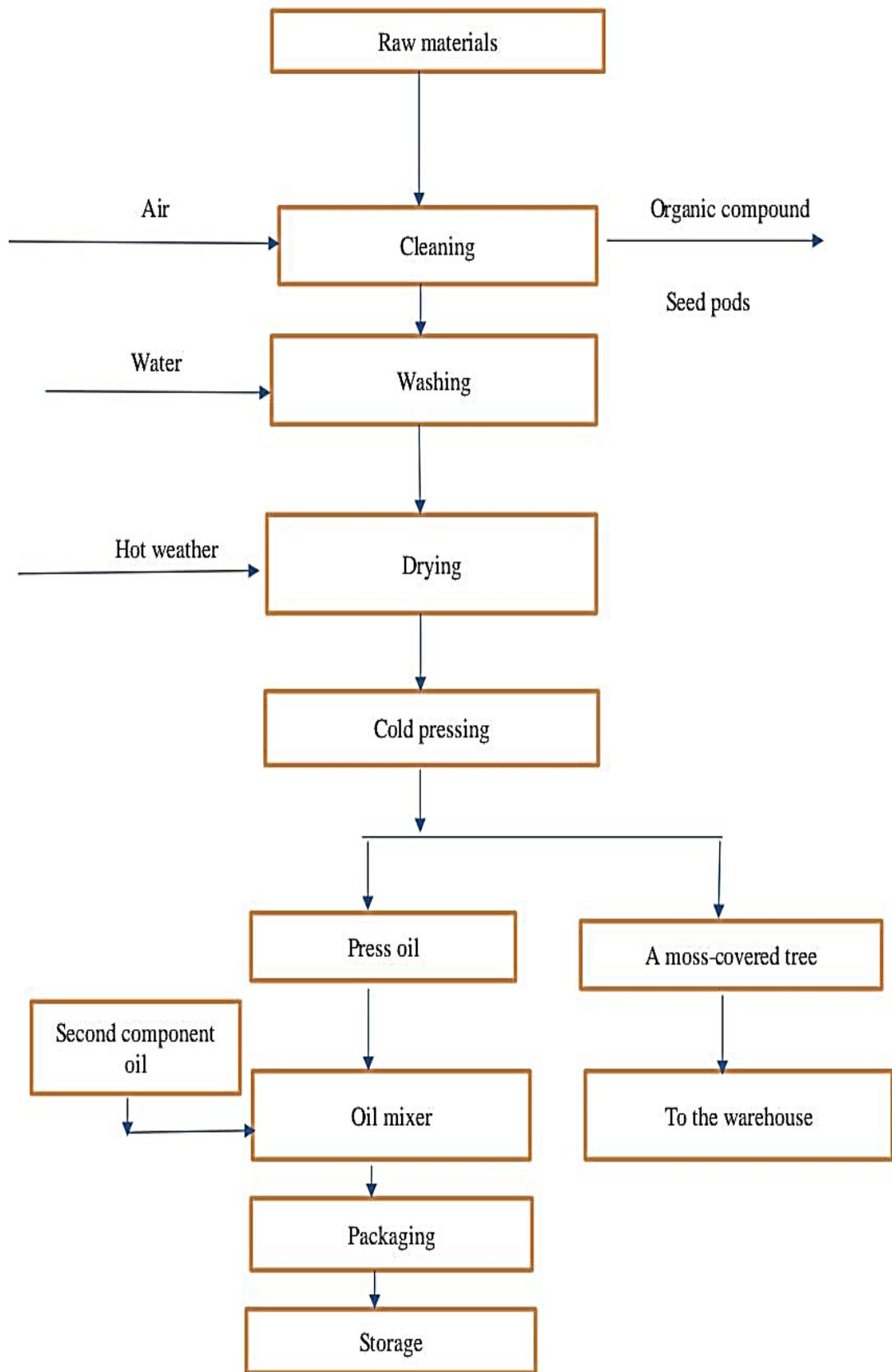


Figure 4.1. Scheme of production of ASXUM and ASQARAXUM food additives

In industry, the production of food additives called “ASKHUM” and “ASQARAKHUM” made from a combination mixture of safflower and safflower oils is carried out in the following sequence. Safflower and safflower seeds are cleaned of organic impurities and broken seeds using an air sprayer. Then the cleaned seeds are washed with water and dried in hot air. After that, the oils are separated in a cold pressing machine. In a cold pressing machine, 2 different products are separated: oil and deoiled kernels. The separated oil is mixed with the second component oil in the appropriate ratio and packaged, then sent to the warehouse.

§ 4.2. ASXUM and ASQARAXUM based on the plants *Althaea* and *Nigella*

Classification and TIF of food additives according to their chemical composition Development of a commodity code according to TN

By the 1950s, as international economic relations developed, naming any manufactured goods, classifying them based on their chemical composition, assigning codes to the appropriate classes, and introducing certificates of conformity for goods became one of the problems in science.

All types of goods produced in Uzbekistan have been subject to international declaration since January 1, 1994.

Based on the UT (Harmonized System) worldwide, all types of goods are classified according to 6 rules that are used in practice and are assigned international code numbers. According to rules 1-5, goods are classified up to 4-digit numbers depending on the position of the goods. The Harmonized System (UT) establishes the basic rules for the classification of goods. These rules require a uniform interpretation in the UT. The Harmonized System (UT) forms the basis of the TIF TN. When classifying goods based on this system, their main indicators are determined: characteristics of materials or components, volume, quality, quantity, weight, value, and potential for foreign trade [147; 27-30-b].

The following rules apply to the classification of goods based on the UT:

Rule 1 – the names of sections, groups and subgroups

The nomenclature is provided for convenience only; 2– the rule is interpreted by the following rules (A) and (B);

A) An optional reference to a good in the heading name shall be deemed to include a reference to such good in an incomplete or incomplete form, provided that the incomplete or incomplete good possesses the essential characteristics of the complete or finished good.

B) Any reference in the text of a heading to a material or substance shall be construed as a reference to a mixture or combination of that material or substance with other materials or substances. Any reference to a good made from a material or substance shall be construed as a reference to a good made wholly or partly from that material or substance. The classification of goods consisting of more than one material or substance shall be carried out in accordance with the requirements of Rule 3.

3- According to the rule, if, by virtue of the requirement of rule 2-(B) or for any other reason, *prima facie (at first sight)*, a good is classifiable under two or more headings, classification shall be made in accordance with the following rules – 3-(A), 3-(B) and 3-(C);

A) The heading which gives a more precise description of the goods shall be given priority over the heading which gives a more general description of the goods. However, where two or more headings each cover only some of the materials or substances in mixtures or multi-component articles, or only some of the goods put up in sets for retail sale, then those headings shall be considered to be of equal value in relation to the goods, even if one of them gives a more complete or precise description of the goods.

B) Mixtures and multi-component articles composed of different materials or made up of different components, and goods put up in sets for retail sale, where they cannot be classified in accordance with Rule 3(A), shall be classified, if

applicable, according to the materials or components which give them their essential characteristics.

C) Goods which cannot be classified in accordance with the requirements of Rules 3-(A) and 3-(B) shall be classified in ascending order of the commodity headings in question, starting with the last digit (if it has the highest order digit).

As a rule, goods that cannot be classified according to the requirements of the above rules are classified under the commodity headings that correspond to the goods that are most similar to the goods being classified.5-the rule is divided into rules (A) and (B);

D) In addition to the above requirements, the following requirements shall apply to the goods listed below: Cases and cases for photographic apparatus, musical instruments, weapons, drawing instruments, jewellery boxes and similar articles, having a special shape, intended for the storage of specific articles or a collection of articles, suitable for long-term use and presented with articles intended for their own use, shall be classified with the articles. However, this rule shall not apply to containers which, when combined with the articles in which they are placed, give the article a special character.

E) Packing materials and containers supplied with the goods in accordance with the provisions of Rule 5(A) above shall be classified together with them if they are of a kind normally used for packing the goods in question. However, this rule shall not be binding if the suitability of such packing materials and containers for repeated use is not in doubt.

The rule is that for legal purposes, the classification of goods in subheadings of a heading shall be made in accordance with the text of that subheading and the notes relating to it, and, *mutatis mutandis*, in accordance with the requirements of the above rules, provided that comparisons are made only between subheadings at the same level. Unless the text otherwise requires, the relevant notes to sections and groups within the scope of this rule may be of less importance [138; 27-30- b].

In the industry, the production of food additives “ASKHUM” and “ASQARAKHUM” made from a composite mixture of bulrush and nigella oils was carried out in the following sequence. The bulrush and nigella seeds were cleaned of organic impurities and broken seeds using an air sprayer. Then the cleaned seeds were washed with water and dried in hot air. After that, the oils were separated in a cold pressing equipment. In a cold pressing equipment, 2 different products were separated - oil and deoiled oilcake. The separated oil was mixed with the second component oil in the appropriate ratio and packaged, then sent to the warehouse.

The discipline of “Chemistry of Goods”, proposed by Uzbek scientists, Doctors of Chemical Sciences, Professors IRAskarov and TTRriskiyev, has led to the rapid development of commodity chemistry. The criteria for determining the correspondence of goods to the 10-digit international code number of the TIF TN are not perfect for many goods, and scientific research is being conducted in many countries in this direction. Determining the international code numbers of goods makes it possible to substantiate the issues of their chemical composition, technological processes of their production, quality control of exported or imported goods, issuing them with quality and other certificates in accordance with the results of scientific research.

Our new food additives made from bulgur and sedum oils have been recommended the following code number according to the commodity nomenclature of foreign economic activity of the Republic of Uzbekistan.

Proposed TIF TN commodity code

Proposed TIF TN commodity code			
TIF TN code	Comment on the position	TIF TN code	Comment on the position
2106	Food products not elsewhere specified or included: – others	2106 90 980 210690980 7	– – others – – – Natural food supplements based on plants containing nigellone, thymoquinone, dithymoquinone, unsaturated fatty acids and vitamin E
2106 90			

The nomenclature of goods for foreign economic activity according to this Table.

According to rules 2 and 3, ASXUM and ASQARAXUM food additives - Code number 210690980 7 was recommended. (Reference of the State Customs Committee of the Republic of Uzbekistan No. 17/05-23-037 dated May 31, 2023).

The fact that additional funds are collected from the state budget through scientific research and customs expertise within the scope of the specialty "Commodity Chemistry" indicates the high economic efficiency of the specialty.

Working at the Department of Chemistry, Andijan State University

As a result of our scientific research on "Analysis of the chemical composition of marigold and celandine oils" conducted in the scientific laboratory of "Commodity Chemistry", the chemical composition of marigold and celandine oils growing in Uzbekistan was studied and biologically active substances were isolated from them. Their composition and structure were studied using modern physicochemical methods. Considering the beneficial and healing properties of marigold and celandine oils for the human body, it was recommended to prepare various food additives from them and consume them for patients.

Conclusions on Chapter IV

1. Optimal conditions have been developed to ensure that the production processes of food additives based on marigold and celandine oils comply with the requirements of the state standard for technical safety, sanitary and hygienic requirements for technological devices, and chemical and biochemical analysis control of the manufactured product.

2. Natural food additives based on plants, containing nigellone, thymoquinone, dithymoquinone, unsaturated fatty acids and vitamin E, were allocated and put into practice under the TIF TN code number -210690980 7 (Reference of the State Customs Committee of the Republic of Uzbekistan dated May 31, 2023 No. 17/05-23-037).

CONCLUSION

As a result of the research conducted on the dissertation work on the topic "**Obtaining and classifying products for folk medicine based on the plants of Gulkhayri and Cedana**", the following general conclusions were reached:

1. A method for extracting oil with high biological activity, purified in accordance with sanitary requirements, from the seeds of bulrush and celandine by cold pressing has been developed. The optimal parameters for oil extraction have been determined.

2. Based on the determination of the content of macro and microelements in the extracted vegetable oils using inductively coupled plasma emission spectrometry, it was determined that the oils are rich in phosphorus, calcium, potassium, sodium, sulfur, magnesium, strontium, and phosphorus, and have a low content of toxic elements and heavy metals.

3. The cost of a mixture of different proportions of rosehip and cedarwood oils was determined and their antioxidant activity was studied. Based on the cost and antioxidant activity values of the oil mixture, it was determined that the highly biologically active

The food supplements "ASXUM" and "ASQARAXUM" have been developed.

4. The antiradical activities of the food additives "ASXUM" and "ASQARAXUM" were shown to be lower than those of quercetin, which is higher than that of glucoside.

5. Pharmacotoxicity of the food additives "ASXUM" and "ASQARAXUM" *in vivo* in laboratory conditions, and the LD₅₀ value of food additives was greater than 10,000 mg/kg, confirming their non-toxicity, and it was determined that our food additives belong to the class of VI non-toxic compounds.

The anti-inflammatory activity of the food additives "ASXUM" and "ASQARAXUM" was studied using a carrageenan tumor model. These food additives showed a higher anti-inflammatory effect than the comparative pharmacopoeial drug Kupene, the anti-inflammatory activity of the Kupene drug in

this study was 56%, the anti-inflammatory activity of the sedum and fennel seed oils was 47.4% and 51.2%, ASXUM-63.6%, ASQARAXUM75%.

6. Technical conditions and technical instructions for the food additives “ASKHUM” and “ASQARAKHUM” were developed, and their production was launched at “SIFAT AGRO SERVIS” LLC. A certificate of conformity (No. UZ.SMT.01.0094 .96108495, “Sanitary-epidemiological” conclusion of the Ministry of Health of the Republic of Uzbekistan No. 31-8/602) was obtained from the National Certification System of the Republic of Uzbekistan.

7. Based on the chemical composition of the obtained new food additives, a new commodity code number 210690980 7 was developed and introduced into customs practice (State Customs Committee of the Republic of Uzbekistan).

Reference No. 17/05-23-037 dated May 31, 2023).

LIST OF REFERENCES USED

1. Askarov I.R. Medical Dictionary.-Tashkent: Mumtoz Soz, 2019. -pp. 234-274
2. Askarov I.R. Mysterious treatment.-Tashkent: Science and Technology Publishing House., 2021. -pp. 124-238
- 3 .Kholmatov Kh. , Ahmedov A.- Pharmacognosy Part I Uzbekistan Republic Academy of Sciences. Science publishing house., 2007.- 232 pages
4. Umarov .M, Usmanov .I, Usmonova .Yo. -Mysteries of medicine and healing. Book 1."Nasaf" publishing house, 2010.-p. 440.
5. Usmanov .I, One Thousand and One Treatment. -Nasaf Publishing House., 2010.-51 p.
6. Gudej J. - Flavonoids Phenolic Acids and Coumarins from the Roots of *Althaea officinalis* - //Planta. Med. 1991, Jun., 57(3). -284-285
7. Karna S. (2013) Phytochemical Screening and Gas Chromatography - Mass Spectrometry and Analysis of Seed Extract of *Nigella sativa* Linn. Int J Chem Studies 1(4).-183-188.
8. Gharby S, Harhar H, William D, Roudani A, Boulbaroud S, et al. (2015) Chemical investigation of *Nigella sativa* L. seed oil produced in Morocco. J Saudi Soc Agric Sci 14(2). 172-1
9. Bourgou S., Ksouri.R, Bellila .A, Phenolic composition and biological activities of Tunisian *Nigella sativa* L. shoots and roots / [et al]// CR Biologies. -2008. - No 331., - P. 48-5
10. Kumar M., Prabha. M, Meenal. G A new naturally acetylated triterpene saponin from *Nigella sativa* / B.M. Kumar, // Carbohydrate Research., - 2009. - № 344. -P. 149-151.
11. Nickavar .B, Mojab. F., Javidnia. K., Chemical composition of the fixed and volatile oils of *Nigella sativa* L. from Iran / et al // Zeitschrift fur Naturforschung. - 2003. - № 58(9-10). - P. 629-631
12. Al-Saleh, I.A., Billedo, G., El-Doush, I.I., Levels of selenium, DL-atocopherol, DLc-tocopherol, all-trans-retinol, thymoquinone and thymol in

- different brands of *Nigella sativa* seeds. *J. Food Compos. Anal.* -2006, 19-P.167–175
13. Burits, M., Bucar, F., Antioxidant activity of *Nigella sativa* essential oil. *Phytother Res.* , -2000.14-P.323–328.
 14. Hajhashemi V., Ghannadi A., Jafarabadi H. Black cumin seed essential oil, as a potent analgesic and anti-inflammatory drug. *Phytother Res.*, 2004. 18,-P.195–199.
 15. Patudin A.V., Mishchenko V.S., Ilyenko L.I. Homeopathic medicines approved in the Russian Federation for use in health care and veterinary medicine / and others. - M.: Znak., 2011. - 352 p.
 16. Mashirova, S.Yu. Study of the component composition of lipids of seed blackberry and Damascus blackberry / *Scientific Bulletin of Belgorod State University. Series. Medicine. Pharmacy.*, - 2012. - Vip.
 17. No. 4(123). - P -223-226.
 18. Medicinal plants used in folk medicine and modern scientific medicine.—T.: Ibn Sino publication.-printing association, 1993.-320 p.
 19. Basch, E.; Ulbricht, C.; Hammerness, P.; Vora, M. Marshmallow (*Althaea officinalis* L.) monograph. *J.Herb.Pharmacother.*, 2003. p. 71
 20. Fink C., Schmidt M., Kraft K. Marshmallow root extract for the treatment of irritative cough: two surveys on users' view on effectiveness and tolerability.
 21. *Complement.Med.Res.*,2018. 25. –P.299-305
 22. Mahboubi M. Marshmallow (*Althaea officinalis* L.) and its potency in the treatment of cough. *Complement.Med.Res.*,2019. 27.-P.1–9.
 23. Sutovska M. Nosalova G., Franova S., Kardosova A. The antitussive activity of polysaccharides from *Althaea officinalis* L., var. *robusta* , *Arctium lappa* L., var. *hercules* , and *Prunus persica* L., Batsch. *Bratisl Lek Listy.*, 2007, -P. 93–99. 24.
 24. Benbassat N., Yoncheva K., Hadjimitova V., Hristova N., Konstantinov S., Lambov, N. Influence of the extraction solvent on antioxidant activity of *Althaea officinalis* L. root extracts. *Cent. Eur. J. Biol.*, 2014, 9, -P.182–188.

25. Elmastas M., Ozturk L., Gokce I., Erenler R., Aboul-Enein HY Determination of antioxidant activity of marshmallow flower (*Althaea officinalis* L.). *Anal. Lett.*, 2004, 37, -P.1859–1869.
26. Sadighara P., Gharibi S., Jafari A., Jahed Khaniki M., Salari G. The antioxidant and flavonoid contents of *Althaea officinalis* L. flowers based on their color. *Avicenna J. Phytomed.*, 2012. 2,-P. 113–117.
27. Rezaei M., Dadgar Z., Noori-Zadeh A., Mesbah-Namin S. A., Pakzad I., Davodian E., Evaluation of the antibacterial activity of the *Althaea officinalis*L. leaf extract and its wound healing potency in the rat model of excision wound creation. *Avicenna J. Phytomed.*, 2015. 5,-P.105–112
28. Zaghlool S. S., Shehata B. A., Abo-Seif A. A., Abd El-Latif H. A., Protective effects of ginger and marshmallow extracts on indomethacin-induced peptic ulcer in rats. *J. Nat. Sci., Biol. Med.* 2015. 6,-P.421–428.
29. Dergarabetian E.M., Ghattass K.I., El-Sitt. Thymoquinone induces apoptosis in malignant T-cells via generation of ROS. *Front Biosci. (Elite Ed.)* 2013.5, 706–719.
30. Mansour M.A.Nagi, M.N. El-Khatib. Effects of thymoquinone on antioxidant enzyme activities, lipid peroxidation and DT-diaphorase in different tissues of mice: a possible mechanism of action. *Cell Biochem. Funct.* 2002.20, -P.143–151.
31. Karna S., (2013) Phytochemical Screening and Gas Chromatography - Mass Spectrometry and Analysis of Seed Extract of *Nigella sativa* Linn. *Int J Chem Studies* 1(4): -P.183-188.
32. Banerjee S., Padhye S., Azmi A. Review on molecular and therapeutic potential of thymoquinone in cancer. *Nutr. Cancer* 2010.62, -P.938–946
33. Sankaranarayanan C., Pari L., Thymoquinone ameliorates chemical induced oxidative stress and b-cell damage in experimental hyperglycemic rats. *Chem. Biol. Interact* 2011.190, -P.148–154.

34. Sayed-Ahmed M.M., Aleisa A.M., Al-Rejaie S.S. Thymoquinone attenuates diethylnitrosamine induction of hepatic carcinogenesis through antioxidant signaling. *Med. Cell Longev.* 2010.3, 254–261.
35. Ahn K.S., Aggarwal B.B., Transcription factor NF- κ B: a sensor for smoke and stress signals. *Ann. NY Acad. Sci.* 2005.1056., -P.218–233.
36. Chehl N., Chipitsyna G., Gong Q. Anti-inflammatory effects of the *Nigella sativa* seed extract, thymoquinone, in pancreatic cancer cells. *HPB (Oxford)* 2009.11, -P.373–381.
37. Sethi G., Ahn K.S., Aggarwal B.B., 2008. Targeting nuclear factor κ B activation pathway by thymoquinone: role in suppression of antiapoptotic gene products and enhancement of apoptosis. *Mol. Cancer Res.* 2008.6., -P.1059–1070.
38. El-Gazzar M.A., El-Mezayen R., Nicolls M.R., 2007. Thymoquinone attenuates proinflammatory responses in lipopolysaccharide-activated mast cells by modulating NF- κ B nuclear transactivation. *Biochim. Biophys. Acta* 2007.1770., -P. 556–564.
39. Aljabre SH., Alakloby.M., Randhawa A., Dermatological effects of *Nigella sativa* . *J Dermatol Dermatologic Surgery* 2015. 19(2): -P.92-98.
40. Ivanova R.I. “Natural antioxidants of polyphenolic nature (antiradical properties and prospects of use)”. *Food Ingredients. Raw Materials and Additives.*, 2004. No. 2. P. 76–78.
41. Yashin Ya.I., Vedenin A.N., Yashin A.Ya. Natural antioxidants-
42. an integral part of healthy and nutritious nutrition and protection of a person from dangerous diseases and aging: -M.: “Interlab”, 2016, pp. 7-14
43. Petrova S.N., Ivkova A.V. Chemical composition and antioxidant properties of species of the genus *Rosa* L /*Chemistry of plant materials*, 2014, No. 2. P.13-19.
44. Ryabinina E.I., Zotova E.E., Ponomareva N.I., Ryabinin S.V. Comparative study of lemon balm and sage for polyphenol content // *VSU Bulletin. Series: Chemistry. Biology. Pharmacy.* 2009. No. 2. P. 32–36
45. Khairullina V.R., Garifullina G.G., Gerchikov A.Ya. Antioxidant activity of plant extracts from the families Geraniaceae and Rosaceae using a model reaction

- of isopropyl alcohol oxidation as an example // *Chemical-Pharm. Journal*. 2005. No. 3. pp. 28–30.
46. Khasanov V.V., Ryzhova G.L., Maltseva E.V. Methods for studying antioxidants // *Chemistry of plant raw materials*. 2004. No. 3. P. 63–75.
47. Tsytko T.G., Petrakova I.S., Brilenok N.S. et al. Determination of total antioxidant content by the FRAP method // *Analytics and Control*. 2011. Vol. 15. No. 3. P. 287–298.
48. Abdulin I.F., Turova E.N., Budnikov G.K. Organic antioxidants as objects of analysis // *Factory laboratory. Diagnostics of materials*. 2001. Vol. 67. No. 9. P. 3–13.
49. Budnikov G.K., Ziyatdinova G.K. Antioxidants as objects of bioanalytical chemistry // *Journal of Analytical Chemistry*. 2005. Vol. 60. No. 7. P. 678–691.
50. Braynina Kh.Z., Ivanova A.V., Sharafutdinova E.N. Evaluation of antioxidant activity of food products by potentiometry // *News of universities. Food technology*, 2004. No. 4. P. 73–75.
51. Lapin A.A., Zelenkov V.N., Muzychuk A.S. Antioxidant capacity of water-soluble polysaccharides of plant raw materials // *Abstracts of materials IV All-Russian Scientific Conf. "Chemistry and Technology of Plant Substances"*. – Syktyvkar. 2006. P. 257.
52. Malakhova A.I., Fedorovsky N.N. Study of the composition of lemon balm herb and its aqueous extract // *Human Sciences: Proceedings of the VIII Congress of Young Scientists and Specialists*, Tomsk, 2007. Pp. 230–231.
53. Khasanova S.R., Plekhanova T.I., Gashimova D.T., Galiakhmetova E.Kh., Klysh E.A. Comparative study of the antioxidant activity of herbal preparations // *Vestnik of VSU. Series: Chem. Bio. Pharm.* 2007. No. 1. Pp. 163–166.
54. Misin V.M., Sazhina N.N., Zavyalov A.Yu., Yashin Ya.I. Measurement of phenol content in medicinal herb extracts and their mixtures by the amperometric method // *Chemistry of plant raw materials*. 2009. No. 4. pp. 127–132. 54. Yudina T.P., Tsybulko E.I., Ershova T.A., Cherevach E.I., Babin Yu.V.

55. Antioxidant and antiradical activity of saponin-containing raw materials used in the production of plant emulsifier // Modern science-intensive technologies. - 2004. No. 2. - P. 77-78;
56. Volkov V.A., Volkova L.A., Pakhanov P.M. Spectrophotometric method for determining the antiradical activity of low-molecular antioxidants in extracts of food and medicinal plants. Bull. No. 9. 2011 P.119
57. in vitro experimental study of the antioxidant and antiradical properties of the drugs cytoflavin, vinpocetine, actovegin and ethylmethylhydroxypyridine succinate in donors and patients who suffered ischemic stroke // Journal of Neurology and Psychiatry, No. 7, 2016, pp. 46-49.
58. Halliwell B. Reactive Species and Antioxidants. Redox Biology Is a Fundamental Theme of Aerobic Plant Physiol. 2006; 141(2):312-322.
59. Abdugafforov F.S., Rozimamatova G.S., Khozhikulov A.S., Yuldasheva N.T. Collection of materials of the Republican scientific and practical conference), Andijan - 2018. pp. 235-236.
60. Basov AL., Fedosov SR, Kanus I.S., Yeremina T.V. Modern methods of standardization of antioxidant drugs and biologically active supplements. Modern problems of science and education. (Appendix No. 1). 2006; 4 P.149-154.
61. Trofimova S.A., Dubinina E.E., Valunov O.L., Leonova N.V. Antioxidant therapy of the consequences of ischemic strokes, from the standpoint of evidence-based medicine. Blueprint of medical internet conferences. 2012; 9(2): P. 646.
62. Gunars T. Gr/egor/ V. Determination of antiradical and antioxidant activity: basic principles and new insights. 2010; 1(57) : 139-142.
63. Berezovsky V.M. "Chemistry of Vitamins" / -M.: Food Industry, 1973. P. 632.
64. Seifried H. E., McDonald S.S., Anderson D. E., Greenwald P., Milner J. A. The antioxidant conundrum in cancer. (АНГЛ.) // Cancer research. — 2003. — Vol. 63, no.,15. -P. 4295–4298.
65. Fasmon C.S., Cole Pi., Williams A.J., Hastings M., The measurement of opsonic and phagocytic (U)ction by iuminol-dependt chemiluminescence. Immunology. 1980; 41: -P.67-74.

66. Glavind J., Antioxidants in animal tissue. *Acta Chem Scand.* 1963; 13(17): P.1635-1640.
67. Kotok VA, Potapovich AI, Kovpeva ZV A simple sensitive method for determining the activity of superoxide dismutase based on the oxidation reaction of quercetin. *Problems of medicinal chemistry.* 1990, 2(36): -P.88-91. 67. Kochikyan AT, Ananikyan VV, Eribekyan MI, Topchyan AV, Revazova LV Study of antiradical activity of some medicinal and food plants // *J: Medical Science of Armenia NAS RA No. 3., 2009, pp. 126-131.*
68. Ananikyan V. V., Yeribekyan M. I., Mnatsakanyan V. A. Accelerated method for detecting the antiradical activity of organic compounds. *Globe of Science.* 2007. 7.-P. 31-33.
69. Mnatsakanyan V.A., Yeribekyan M.I., Ananikyan V.V. Comparative assessment of antiradical activity of some isoquinoline alkaloids. *Globe of Science., 2009. S. -P. 31-33.*
70. Bandvopadhjay D., Chattopadhyay A., Ghosh G, Datta A.G. Oxidative stress-induced ischemic heart disease: protection by antioxidants. *Curr. Med. Chem.. 2004.vol.II. 3., -P. 369-387.*
71. Contestabile A. Antioxidant strategies for neurodegenerative diseases. *Expert. Opin. Therapeutic Patients., 2001. vol.II. 4. -P.573-585.*
72. Medina JH, Viola H., Wo If in an C. et al. Neuroactive flavonoids: new ligands for the benzodiazepine receptor. *Phytomedicine., 1998. vol. 5. -P.235-243.*
73. Olinski R., Gaskowski D., Foksinski M., Rosalski R, Roszkowski K., Jaruga P. Oxidative DNA damage: assessment of the role in carcinogenesis. *Atherosclerosis and acquired immunodeficiency syndrome. Free Radic. Biol.Med.. 2002.vol.33. 2. -P.192 - 200.*
73. Kaminsky I.P., Ermilova E.V., Kadyrova T.V., Larkina M.S., Anti-radical activity of extracts from plants of the genus *Centaurea* of the Siberian flora // *Chemistry of plant materials, 2019, No. 4. P. 173-179.*
74. Sharafutdinova E.N., Ivanova A.V., Matern A.I., Braynina H.Z. Food quality and antioxidant activity // *Analytics and control., 2011. Vol. 15. No. 3. P. 281–286.*

75. Yashin A.Ya., Yashin Ya.I., Chernousova N.I. et al. Methods for determining the antioxidant activity of food products and dietary supplements // World of Measurements. 2012. No. 1. pp. 30–35.
76. Maslennikov P.V., Chupakhina G.N., Skrypnik L.N. et al. Content of low molecular weight antioxidants in medicinal plants
77. Kaliningrad region // Chemistry of plant raw materials, 2012.No.3 P127–133.
78. Madrakhimov G.N., Khozhikulov A.S., Khakimova L.A. Antioxidants in food and their properties. // Collection of materials of the international scientific and technical conference - Namangan, 2019. pp. 53-55.
79. Makarova M.N., Makarov V.G., Zenkevich I.G. Antiradical activity of flavonoids and their combinations with other antioxidants // Pharmacy. 2004. No. 2. P. 30–32.
80. Lutsenko S.V., Feldman N.B., Bykov V.A. Plant flavolignans. Biological activity and therapeutic potential. - M. 2006. 236 p.
81. Sergeeva E.O., Dorkina E.G. et al. Study of the antioxidant effect of hesperidin, diosmin, flavicin and quercetin in vitro // Collection of scientific papers: "Development, research and marketing of new pharmaceutical products". – Pyatigorsk., 2012. Issue 67. Pp. 372–374.
82. Khairullina V.R., Yakubova L.R. et al. Antioxidant properties of bicomponent compositions based on quercetin and dihydroquercetin // Abstracts of the materials of the V All-Russian scientific conf. "Chemistry and technology of plant substances". - Ufa. 2008. P. 308.
83. Palsev MA, Anichkov NM Pathological anatomy. Textbook for medical universities (V 2 volumes). — M.: Medicine, 2001 (1st ed.), 2005 (2nd ed.), 2007 (3rd ed.).98
84. Paukov V.S., Hitrov N.K. Pathology Textbook for medical schools. - M.: Meditsina, 1989. - S. 98—112. — 352
85. Medzgitov, R. (2021). The spectrum of inflammatory responses. Science, 374(6571), 1070-1075. PMID 34822279 doi:10.1126/science.abi5200 Shilov V. N.

(2006) Molecular mechanisms of structural homeostasis. Moscow, publishing house "Intersignal". 286 s., 238.

86. Khaitov RM, Ilyina.M (Allergology and immunology: National handbook \ edition, NI. GEOTAR-MEDIA, 2009.-656 p.- ISBN 978-5- 9704-0903-9 /

87. Serova V.V., Paukova V.S. - Inflammation. A Guide for Doctors / Ed.: Medicine, 1995. - 640

88. Shilov V. N. (2006) Molecular mechanisms of structural homeostasis.

89. Moscow, publishing house "Intersignal". 286 p., p. 238.

90. Kumar V., Cotran R., Robbins S. Acute and Chronic Inflammation. - in - Robbins basic Pathology. - 2003. - 7th Edition. —Chapter 2. — P. 33–60.

91. Kumar P., Clark M. Rheumatology and bone disease in—Clinical Medicine.

92. 2002. - 5th Edition. ,— Chapter 10. — P. 511–586.

93. Ozbekiston milliy encyclopedias., 2011. 11 volume. – 451

94. Mamirov I.G., Namozov A.A., Sulstonova U.N. Specific aspects of teaching the subject of classification and certification of goods based on their chemical composition // Problems and prospects of classification and certification of goods based on their chemical composition: Proceedings of the Scientific and Practical Conference. –Andijan., 2008. -P. 43.

95. Askarov I.R., Madumarov T.A., Kyrgyzov Sh.M., Jo'raev A.M., Safarov M.J., Samadov S.J. Problems of creation and certification of biostimulants based on ferrocene // Problems and prospects of classification and certification of goods based on their chemical composition: Scientific-practical conference. materials. - Andijan., 2008. -B. 35.

96. Imomova M.Yo., Abduganiyev B.Yo., Askarov I.R. History and achieved results of customs expertise in the Republic of Uzbekistan / Problems and prospects of classification and certification of goods based on their chemical composition.

97. Scientific and practical conference. materials.-Tashkent., 2013.-B. 27-33.

98. Karimkulov K.M. Priority directions of improving customs expertise in customs bodies / Problems and prospects of classification and certification of

goods based on their chemical composition. Proceedings of the Scientific and Practical Conference. –Tashkent., 2013. –P. 14-19.

99. Ismonova G.B., Khozhimatov M.M., Abdullaev O.Sh. Problems of certification of ferrocene derivatives // Classification and certification of goods based on chemical composition: Proceedings of the Scientific and Practical Conference. –Andijan, 2008. –P.123.

100. Abduganiyev B.Yo. Customs expertise, international certification of goods. – T.: Textbook. Publishing house of the State Customs Committee., 2014. – 349

101. Karimkulov K., Abduganiyev B., Hamrokulov G. Nomenclature of goods of foreign economic activity. –T.: Textbook "Science and Technologies" Center., 2008. –167

102. Shorakhmedov Sh., Karimkulov K. Classification of goods - T.: 2005.-106

101. Eleanor. F, Marthinus .J, Rensburg .J, Jannie C. Swarts Synthesis, crystal structure and comparative electrochemistry of metallocenyldiphenyl-phosphines of ruthenocene, osmocene, ferrocene and cobaltocenium hexafluorophosphate // Journal of Organometallic Chemistry., -2014 -Vol.754. -P.80

103. Rustamov S.A., Tokhtaboev N.H. Oil and gas resources of Uzbekistan and problems of their classification and certification // Andijan. Scientific Bulletin., - 2016. No. 2.-P. 31-33.

104. Khozhimatov M.M. Economic efficiency of classification and certification of biostimulants // Scientific achievements and innovation

105. Problems of small business development based on technologies from the point of view of young scientists: Scientific and practical conference materials. – Tashkent., 2011. –P. 254-255.

106. Khozhimatov M.M., Holboev Yu.Kh. Problems of certification of compounds used in hematology containing ferrocene in the molecule // Classification and certification of products based on chemical composition: Scientific-practical conference. materials. -Andijon., 2008. -B. 98.

107. Madikhonov N., Kochkarov K., Abdugofurov I.A., Muzaffarov O.A. Classification and certification of biologically active 3-propyn-2-yl-quinazolin-4

chlorohydrate based on chemical composition / Problems and prospects of classification and certification of goods based on chemical composition.

Ilmiy-Amaly Conf. materiallari. -Tashkent, 2013. -B. 70.

108. Rustamova H.E., Stozharova N.K., Nurmamatova K.Ch., Abdurashidova Sh.

a. // Tibbiyot tarihi // Tashkent. 2014. 13

109. Aknazarova D.B., Duschanov B.A// IBN SINO VA TIBBIYOT ILMI// the value of the scientific and cultural heritage of Ibn Sina, its influence on the development of sciences IX international Avicenn readings., Bukhara. 2017, B-5

109. Ibrohimzhon Asqarov // Ўзбекистон табобат ағедасиаси аъзолари// Tashkent, 2019. 4-275

110. I.R. Askarov, M.Ashuralieva “CHEMICAL ELEMENTS IN THE HUMAN ORGANISM” Tashkent-2012 “TAVAKKUR” publishing house, pages 21-51.

111. SanPin of the Republic of Uzbekistan #0366-19 dated May 25, 2019.

112. V.A. Karimov, A.Sh. Shomahmudov. Medicinal plants used in folk medicine and scientific medicine.–T:Ibn Sino Publishing and Printing Association, 1993. 320 p.

113. Brosnan JT Interorgan amino acid transport and its regulation. (English) // Journal of Nutrition. - 2003. - vol. 133, no. 6 Flexible 1. - B. 2068-2072.

114. Glutamine. Vitamins and health supplements. Retrieved November 1, 2007. Archived from the original on February 19, 2012

115. Steven A., Cohen Daviel J. Amino acid analysis utilizing phenylisothiocyanata derivatives // Jour. Analytical Biochemistry – 1988. – V.17.- No.1.-P.1-16.

116. A.Ya.Ibragimov. Shifobakhsh nematlar.- Tashkent, 2016.-243 b.

117. A.G. Kurmukov, I.V. Belolipov. Wild medicinal plants of Uzbekistan. - Tashkent; - Extremum press., 2012. - 246 p.

118. Tu'tem, E., Apak, R., Gu'naidi, E., and So'zgen, K. (1997) Talanta, 249–255

119. V.I.Petrov, A.A.Spasov. Russian encyclopedia of biologically active additives.–M.: Geotar-Media., 2007. –P.57-59.

120. Prieto.P, Pineda.M, Aguilar.M Spectrophotometric Quantitation of Antioxidant Capacity through the Formation of a Phosphomolybdenum Complex:
121. Specific Application to the Determination of Vitamin E1// Analytical Biochemistry 269, 337–341 (1999)
122. Combs, G. F. (1992) *The Vitamins: Fundamental Aspects in Nutrition and Health*, Academic Press, San Diego. 241
123. Halliwell, B., Gutteridge, J. M. C., and Cross, C. E. (1992) *J. Lab.Clin. Med.* 6, 598–620
124. Chipault .J, Mizuno. R, Hawkins. J and Lundsberg, W.O. *Food res*// 46-55
125. Fiske, C. H., and Subbarow, I. P. (1925) *J. Biol. Chem.* 66,375–379
126. Tu'tem,E., Apak, R.,Gu'naidi,E., and So'zgen, K. (1997) *Talanta* 4 249– 255
127. Madsen, H. L., Bertelsen, G., and Skibsted, L. H. (1997) *ACS Symp. Ser.* 660, 176–187.
128. Zengin G, Aktumsek A, Guler GO, Cakmak YS, Yildiztugay E. Antioxidant properties of methanolic extract and fatty acid composition of *Centaurea urvillei* DC. subsp. hayekiana Wagenitz. *Records of Natural Products*. 2011;5(2): 123–132.
- 128.Albakry, Z.; Karrar, E.; Ahmed, I.A.M.; Oz, E.; Proestos, C.; El Sheikha, A.F.; Oz, F.; Wu, G.; Wang, X. Nutritional Composition and Volatile Compounds of Black Cumin (*Nigella sativa* L.) Seed, Fatty Acid Composition and Tocopherols, Polyphenols, and Antioxidant Activity of Its Essential Oil. *Horticultrae* 2022, 8, 575. [CrossRef]
130. Apak. R, Guclu .K, Ozyurek .M, Celik. SE. 2008. Mechanism of antioxidant capacity assays and the CUPRAC assay. *Microchimica Acta*, 160: 413–419.
131. Al-Nasiry, S, Hanssens. M, Luyten. C, and Pijnenborg, R. (2007). The use of alamar blue assay for quantitative analysis of viability, migration and invasion of choriocarcinoma cells. *Hum. Reprod.* 22, 1304–1309. doi: 10.1093/humrep/dem011
- Chipault.J, Mizuno .R, Hawkins .J and Lundsberg, *Food Techol* 10, 209-211.
132. Mironova A.N. *Guidelines for conducting preclinical studies research . Part one / Ed. M.: Grif I K, 2012. – 944 p.*

133. OECD (2002), Test No. 420: Acute Oral Toxicity - Fixed Dose Procedure ,
134. OECD Guidelines for the Testing of Chemicals, Section 4, OECD Publishing, Paris 2058-2070.
135. Kaur C., Kapoor H. Antioxidants in fruits and vegetables – the millennium's health // Int. J. Food Sci. Technol. – 2001. – V. 36. – P.703–725.
136. Melnichuk V.A. Express method for determining the antiradical activity of medicinal substances // Khim. Pharm. Zhurn. – 1985. – V.5. – P. 565-567.
137. Kaur C., Kapoor H. Antioxidants in fruits and vegetables – the millennium's health // Int. J. Food Sci. Technol. – 2001. – V. 36. – P.117–121.
138. Melnichuk V.A. Express method for determining the antiradical activity of medicinal substances // Khim. Pharm. Zhurn. – 1985. V.5. P. 565567.
139. Asma .M, Hanane.KI , Camela.M ID Nigella sativa L. oil: Study of its toxicity, antiradical activity, and effect on circulating xanthine oxidoreductase// J Herbmед Pharmacol. 2023; 12(1): 128-134.
140. Gramza .A, “Antiradical methods in evaluating the antioxidant potential of preparations of plant origin,” Medicinal and Aromatic Plant Science and Biotechnology, vol. 1, no. 2, pp. 227–233, 2007.
141. Popovici. C and Saykova. I, “Evaluation de l' activit´e antioxydant des composes ph ´ enoliques par la r ´ eactivit ´ e avec le ´ radical libre DPPH,” G´enie Ind.vol. 15, pp. 26–39, 2009
142. Huyut.Z, Beydemir.SAntioxidant and Antiradical Properties of Selected Flavonoids and Phenolic Compounds // Biochemistry Research International Volume 2017, Article ID 7616791, 180-197.
143. Mironova .M Guidelines for conducting preclinical studies Research . Part One / Ed.: Grif i K, 2012. – 944 p.
144. OECD (2002), Test No. 420: Acute Oral Toxicity - Fixed Dose Procedure ,
145. OECD Guidelines for the Testing of Chemicals, OECD Publishing, Paris 20582070

146. Mironov A.N., Bunyatyan N.D. Methodological recommendations for preclinical studies of non-steroidal anti-inflammatory drugs// “Preclinical studies of drug efficacy” Part I, 2012, et al., 2012. P. 250-s.
147. Technical instructions. TC 24134509-003: 2023 TY 305198819-01: 2019
148. Askarov I.R., Kirgizov Sh.M., Karimkulov K.M., Abduganiev B.Yo., Zhuraev A.M., Imomova M.Yo. “Commodity nomenclature of foreign economic activity of the Republic of Uzbekistan” - Toshkent - 2017, pp. 100-101..

APPENDICES

Appendix 1.

НАЦИОНАЛЬНАЯ СИСТЕМА СЕРТИФИКАЦИИ РЕСПУБЛИКИ УЗБЕКИСТАН

Орган по сертификации «Uz-TEST» ДУК кошидаги «Озик-овқат ва парфюмерия-косметика
маҳсулотларини сертификатлаштириш органи, O'ZAK.MS.0094
Адрес: г.Ташкент, Яккасарайский район, улица Бойибўстон, дом 210, Тел.: +998 (90) 325-15-40
(наименование органа по сертификации, адрес, № в Государственном реестре)

СЕРТИФИКАТ СООТВЕТСТВИЯ



Зарегистрирована в Государственном реестре
От 24 июля 2023 г.
№ UZ.SMT.01.0094.96108495
Действительна до 11 мая 2024 г.
Код ТН ВЭД 2106909808

(справочно)

“SIFAT AGRO SERVIS” MChJ., УЗБЕКИСТАН
(наименование предприятия, страна-экспортитора)

Настоящий сертификат удостоверяет, что идентифицированная должным образом продукция:

- 1) “Asxum” s/b ostidagi 30 ml. dan qadoqlangan, Sedana va gulxayri moyining aralashmasi. 2) “Asqaraxum” s/b ostidagi 30 ml. dan qadoqlangan, Sedana va gulxayri moyining aralashmasi

(наименование, тип, марка)

- 1). miqdori - 100 dona; 2). miqdori - 100 dona;

(количество или серийное производство)

соответствует требованиям нормативной документации UzTR.724-023:2020 ning 9.2 bandi, Ts 24134509-003:2023 ning 4.2.1 bandi, 1- jadvali, 4.2.2 bandi, 2- jadval.

Схема сертификации: 7 (Семь)

Заявитель (заказовладелец, продавец): SIFAT AGRO SERVIS MChJ
(нужны подчеркнуть)

Андижон вилояти, Андижон тумани, Гумбаз шаҳарча, Дархон маҳалласи

(фактический и юридический адрес)

Сертификат выдан на основании:

а) документов “UzTest” DM “Oziq-ovqat va pafyumeriya-kosmetika mahsulotlarini” SO ning 27-0615 qarori. Namangan viloyati Uchqo'rg'on tumani SEO va JCX ning 2023 yil 17 maydagi 387408 sonli Sanitariya-epidemiologik xulosasi.

б) испытания образца “UzTest” DM SNML (O'ZAK.SL.0207) ning 2023 yil 21 iyul 109 sonli, Namangan viloyati Uchqo'rg'on tumani SEO va JCX (O'ZAK.SL.0201) ning 11.05.2023 yildagi № 29; 15.05.2023 yildagi № 349/414; 16.05.2023 yildagi № 260-261 sinov bayonnomalari.

в) акт проверки производства Chizmada ko'rsatilmagan

Инспекционный контроль осуществляется с периодичностью:
Chizmada kursatilmagan

Особые отметки: 2023 yil 17 iyuldagi 05-2023 sonli omborxonani ta'limotnomasi. Muvofiqlik sertifikatini mahsulotni to'g'ri saqlash va tashish shartlariga rioya qilinganda xaqiqiy hisoblanadi.

Знак соответствия предоставляется: Фойдаланилади

Руководитель органа по сертификации: Yu.N.Erimshilova
Экспорт: S.O.Qayumov



961084



МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РЕСПУБЛИКИ УЗБЕКИСТАН
 «Служба Санитарно-эпидемиологического благополучия и общественного здоровья»
(таъдбирот узибистон, воблақат санитарно-эпидемиологическое аҳолининг)
Учкурганский отдел Наманганской области O'ZAK.SL.0201.
(bu o'zAK.SL.0201 bo'limining tarkibiy qismidir)

САНИТАРНО-ЭПИДЕМИОЛОГИЧЕСКОЕ ЗАКЛЮЧЕНИЕ
 № 387408

от « 17 » Мая 20 23 г. действителен до « 17 » Мая 20 24 г.

Настоящее заключение выдано: **ООО «SIFAT AGRO SERVIS», Узбекистан.**
 Ts 24134509-003:2023. UzTR.724-023:2020 Приложение № 4, 5, 6, 7, 8. СанПин 0366-19.п. 7.1; прил № 3. Заявка на добровольной основе, Акт отбора и идентификации образцов СЭБ и ОЗ Андijanской области от 12.05.2023 г.
(Информация документа или обоснования документа на производимую, ввозимую продукцию)

На производимую (ввозимую) продукцию: **1. Смесь масел черного тмина и алтая «АСХУМ» всего 100 шт. 2. Смесь масел черного тмина и алтая «АСКАР АХУМ» всего 100 шт.**
 Все продукты упаковано по 50 ml в пластиковых тарях.

Согласно: На основании протоколов испытания сан.-гиг. и рад. лаб. от 16.05.2023 года № 260-261 токсичные элементы, микотоксины (афлатоксин В-1), пестициды: ГХЦГ изомера, ДДТ метаболиты, перекисное и кислотное число, Протокол испытания ССЭБ и ОЗ Уз. Рес № 349/414 от 15.05.2023 г. бенз(а)пирен радиологические показатели в данном виде продукции UzTR.724-023:2020. Прил. № 4, 5, 6, 7, 8. СанПин РУз 0366- 7.1, прил № 3.

СООТВЕТСТВУЕТ требованиям санитарных норм и правил.

Получатель заключения: **ООО «SIFAT AGRO SERVIS», Узбекистан, ИНН:304571521**
 Андijanская область Андijanский район МФИ Дирекция (юридический адрес)
(фактический адрес производителя)

Область применения и назначения: **Товарное производство**

Необходимые условия использования, хранения, транспортировки и меры безопасности: Согласно требованиям Санитарно-гигиенических норм и правил.

Особые отметки: Копия данного заключения действительна при заверении подписью и печатью органа выдавшего заключение, заверение нотариусом или держателем подлинника.

 **М.П.** **М. Мамадатова**
(информация документа или обоснования документа на производимую, ввозимую продукцию)

от « 17 » Мая 20 23 г.



**O‘ZBEKISTON RESPUBLIKASI IQTISODIYOT VA MOLIYA
VAZIRLIGI HUZURIDAGI BOJXONA QO‘MITASINING
MARKAZIY BOJXONA LABORATORIYASI**
CENTRAL CUSTOMS LABORATORY OF THE CUSTOMS COMMITTEE UNDER
THE MINISTRY OF ECONOMY AND FINANCE OF THE REPUBLIC OF UZBEKISTAN
100003, Toshkent shahri, Islom Karimov ko‘chasi 3. tel. (+55) 502-76-00. mbi@ecsfat.uz. mbi@rustoms.uz

2023 йил “ 30 ” май

№17/05-23-0371

“ТАСДИҚЛАЙМАН”

Божхона қўмитасининг Марказий
божхона лабораторияси бошлиғи,
божхона хизмати подполковниги
Б.Караманов
“ 30 ” 2023 йил



Хусанов Умиджон Шокиржоновичнинг “Гулхайри ва седана ўсимликлари асосида халқ таъбиоти учун товарлар олиш ва уларни синфлаш” мавзусидаги кимё фанлари бўйича фалсафа доктори (PhD) диссертацияси илмий натижаларини амалиётга жорий қилишга қабул қилиниши юзасидан

МАЪЛУМОТНОМА

Андижон давлат университети Кимё кафедраси эркин тадқиқотчиси У.Ш.Хусанов томонидан кимё фанлари доктори, профессор И.Р. Асқаров ва кимё фанлари доктори, профессор М.Мўминов илмий раҳбарлигида Ўзбекистонда ўсадиган гулхайри ва седана ўсимликлари уруғидан ажратиб олинган мойлар асосида инсон организмидаги ички ва ташқи яллиғланиш касалликларини даволаш ва олдини олиш хусусиятига эга бўлган, таркибида нигелон, тимохинон, дитимохинон, тўйинмаган ёғ кислоталари ва витамин Е каби биологик фаол бирикмалар сақлаган, “Асхум” ва “Аскарорхум” номи табиий, шифобахш биологик фаол озик-овқат қўшилмалари ишлаб чиқилган.

Ушбу гулхайри ва седана уруғи мойи асосида ишлаб чиқилган “Асхум” ва “Аскарорхум” биологик фаол озик-овқат қўшилмалари инсон организмида учрайдиган ташқи ва ички яллиғланишларни даволаш ва олдини олишга самарали таъсир этиш хусусиятига эга эканлиги исботланган. “Асхум” ва “Аскарорхум” номи табиий биологик фаол озик-овқат қўшилмалари

лаборатория текширувлари ва клиник синовлардан ўтказилган, ҳамда амалиётга жорий қилинган. Ўтказилган барча текширувларда “Асхум” ва “Аскарохум” озик-овқат қўшимчаларининг ноҳўя таъсирлари кузатилмаган.

У.Ш.Хусанов томонидан гулхайри ва седана ўсимликлари уруғидан ажратиб олинган мойлар асосида инсон организмидаги ички ва ташқи ялғизлашиш касалликларини даволаш ва олдини олиш мақсадида ишлаб чиқилган “Асхум” ва “Аскарохум” номли табиий биологик фаол озик-овқат қўшимчалари товар сифатида сифланиб, уларга ташқи иқтисодий фаолиятдаги товарлар номенклатураси бўйича қуйидагича: “таркибида нигелон, тимохинон, дегимохинон, тўйинмаган ёғ кислоталари ва витамин Е сақлаган, ўсимликлар асосида ишлаб чиқилган табиий озик-овқат қўшимчалари” учун – 2106 90 980 7 код рақами тавсия этилди.

Юқоридагиларни инобатга олган ҳолда, мазкур код рақамлари Товарларни таснифлаш ва кодлашнинг уйғунлаштирилган тизим асосида жорий этилган Ташқи иқтисодий фаолиятга товар номенклатурасининг навбатдаги тахририни ишлаб чиқиш жараёнида кўриб чиқиш учун қабул қилинди.

Марказий божхона лабораторияси бошлиғи
Ўринбосари ТИФ ТН бошқармаси бошлиғи  Р.Мурзаев

Марказий божхона лабораторияси ТИФ ТН
бошқармаси ТИФ ТН юритиш бўлими катта
инспектори  Э.Нурмонов

Ts 24134509-003:2023

ТАШКИЛОТНИНГ СТАНДАРТИ
«АСХУМ» ВА АСКАРАХУМ
СЕДАНА ВА ГУЛХАЙРИ МОЙИНИНГ АРАЛАШМАЛАРИ

Техникавий шартлар

СТАНДАРТ ОРГАНИЗАЦИИ

СМЕСЬ МАСЕЛ ЧЕРНОГО ТМИНА И АЛТЕЯ
«АСХУМ» И АСКАРАХУМ

Технические условия

Ташкент - 2023 г.

СТАНДАРТ ОРГАНИЗАЦИИ

СМЕСЬ МАСЕЛ «АСХУМ» И АСКАРАХУМ Технические условия

«АСХУМ» ВА АСКАРАХУМ» МОЙЛАР АРАЛАШМАЛАРИ

Техникавий шартлар

Дата введени с _____ 2023 г.
Срок действия до _____ 2028 г. I

Область применения

Настоящий стандарт организации распространяется на смесь масел «Асхум» и «Аскарахум» (далее по тексту - продукт), получаемые из сырья растительного происхождения, используемые в качестве продукта и предназначенные для реализации в торговой и аптечной сети.

«Асхум» и «Аскарахум» можно использовать в пищевой промышленности как продукт и сырьё для приготовления биологически активной добавки к пище.

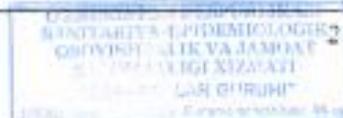
Все требования настоящего стандарта организации являются обязательными и пригодны для сертификации.

Пример записи продукции в другой документации и (или) при заказе:
«Асхум» и «Аскарахум» Ts 24134509-003:2023

2. Нормативные ссылки

2.1 В настоящем стандарте организации использованы ссылки на следующие нормативные документы:

ГОСТ 12.0.004-2015	ССБТ. Организация обучения безопасности труда. Общие положения.
ГОСТ 12.1.005-88	Система стандартов безопасности труда. Общие санитарно-гигиенические требования к воздуху рабочей зоны
ГОСТ 12.1.007-76	Система стандартов безопасности труда. Вредные вещества. Классификация и общие требования безопасности
ГОСТ 12.1.004-91	Система стандартов безопасности труда. Пожарная безопасность. Общие требования.
ГОСТ 12.2.003-91	Система стандартов безопасности труда. Оборудование производственное. Общие требования безопасности.
ГОСТ 12.3.002-2014	Система стандартов безопасности труда. Процессы производственные. Общие требования безопасности
ГОСТ 17.2.3.02-2014	Правила установления допустимых выбросов вредных веществ промышленными предприятиями.





O'ZBEKISTON RESPUBLIKASI
BOSH DAVLAT SANITARIYA VRACHI

CHIEF STATE SANITARY DOCTOR OF THE REPUBLIC OF UZBEKISTAN

"28" 04 2023 yil 31-A/2022-son

"Sifat Agro Servis"
MChJ direktoriga

O'zbekiston Respublikasi Sanitariya-epidemiologik osoyishtalik va jamoat salomatligi qo'mitasi Sizing 2023-yil 30-martdagi murojaat xatingiz orqali kelishish uchun taqdim etilgan, "Asxum" va "Asqaraxum" sedana va gulxayri moyining aralashmalari. Texnikaviy shartlar" Ts 31614405-01:2023-sonli tashkilot standarti loyihasi bo'yicha quyidagilarni ma'lum qiladi.

"Asxum" va "Asqaraxum" sedana va gulxayri moyining aralashmalari. Texnikaviy shartlar" Ts 31614405-01:2023-sonli tashkilot standarti loyihasida xom ashyolar, oziq-ovqat qo'shimchalari va ishlab chiqariladigan mahsulotlarning xavfsizlik ko'rsatkichlari amaldagi 0366-19-sonli "Oziq-ovqat mahsulotlari xavfsizligi gigiyenik normativlari" SanQvaN talablariga asoslanganligi uchun amaliyotda foydalanish bo'yicha e'tirozlar yo'q.

Shuning bilan birga, mazkur tashkilot standartida belgilangan talablar bajarilmasa (ishlab chiqarish jarayonida xom ashyolarni almashtirish, ruxsat etilmagan xom ashyolardan foydalanish, yaroqlilik muddatini o'zgartirish, mahsulotlarni saqlash sharoitlari va tashish qoidalariga rioya qilmaslik) ishlab chiqaruvchi sifatida shaxsan javobgar ekanligingizni eslatib o'tamiz.

O'zbekiston Respublikasi
Bosh davlat sanitariya vrachi

B.K. Yusupaliyev

✉ N.I.Ematov
☎ 78-888 01 01 (055)



100007, O'zbekiston Respublikasi, Toshkent-shahri, Buvoltoy ko'chasi, 46-son
Telefon: 78-888-01 01 (055); 78-888-01 01 (040)
E-mail: sanqva@uzstat.gov.uz, sanqva@uzstat.gov.uz, www.sanqva.gov.uz, www.uzstat.gov.uz