



**BIOLOGICALLY ACTIVE SUBSTANCES CONTAINED IN THORNY  
ARTICHOKE AND ITS USE IN MEDICINE**

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**БИОЛОГИЧЕСКИ АКТИВНЫЕ ВЕЩЕСТВА, СОДЕРЖАЩИЕСЯ В  
ТЕРНИСТОМ АРТИШОКЕ, И ЕГО ПРИМЕНЕНИЕ В МЕДИЦИНЕ.**

**Аннотация.** В статье широко обсуждаются богатый биологически активными соединениями состав артишока, высокое содержание БФМ, отмеченное в листьях артишока колючего, а также высокий удельный вес листьев в общей биомассе растения. Кроме того, несмотря на широкий спектр фармакологической активности артишока и полученных из него лекарственных форм, большинство исследователей подчеркивают его явное гепатопротекторное и желчегонное действие.

**Ключевые слова:** лопаточно-члениковые, опушенные, серовато-зеленые, безполосчатые, полосчатые, редуцированные, ланцетные, перистые, зубчатые.

**ТИКАНЛИ АРТИШОКНИНГ ТАРКИБИДАГИ БИОЛОГИК ФАОЛ  
МОДДАЛАР ВА УНИНГ ТИББИЁТДА ҚЎЛЛАНИЛИШИ**

**Аннотация.** Мақоланинг асосий мақсади Артишокнинг бой биологик фаол бирикмалардан иборатлиги, тиканли артишок баргларида БФМ микдорининг юқорилиги, шунингдек ўсимликнинг бутун биомассасида барглар солиштирма оғирлигининг юқорилиги мисоллар асосида кенг ёритиб беришдир. Бундан ташқари, тиканли артишок ва унинг асосида олинган доривор шаклларининг кенг фармакологик фаоллик спектрига қарамай, аксарият тадқиқотчилар унинг яққол гепатопротектор ва ўт ҳайдовчи таъсирига урғу беришган.

**Калит сузлар:** ланцетсимон, патсимон, тишсимон, кураксимон сегментли, тукланган, кулрангсимон-яшил, бандсиз, бандли, редуцияланган.





## **BIOLOGICALLY ACTIVE SUBSTANCES CONTAINED IN THORNY ARTICHOKE AND ITS USE IN MEDICINE**

**Introduction.** Artichoke is known as a very useful medicinal plant in many nations. The chemical nature of the biologically active substances contained in artichokes has not been known for many years. Due to its widespread use as a food, fodder and medicinal plant, active research on the chemical composition of this plant began in the 20th century. A number of Italian scientists contributed greatly to the study of the phytochemistry of this valuable plant. To date, the biochemical composition of artichoke has been studied by many scientists and found to be very useful [187; 378 p.], [201; 351 p.], [203; pp. 198–199].

Due to its medicinal properties and rich biochemical composition, artichoke is included in the register of medicinal plants in many countries [105; p. 1277] Chlorogenic (1) and caffeic (2) acids were also isolated from fresh leaves of artichoke by M. L. Scarpati and his colleagues [147; pp. 253–260]; [153; p. 1147].

The study of phenolic acids and flavonoids contained in artichoke was also the object of research by scientists from the CIS countries. Based on the study of the composition, quantity and healing properties of these substances, scientists have given valuable recommendations for its use in medicine.

5-caffeic acid and 4-caffeic acid were isolated from prickly artichoke and named neochlorogenic acid (3) and cryptochlorogenic acid (4), respectively [124; pp. 191–199].

Along with the mentioned acids, they managed to isolate isochlorogenic acid from artichoke and proved that it is a mixture of the following three acids: 4,5-, 3,4- and 3,5-dicofeylquinic acids. The total acids extracted from thorny artichoke are as follows: cynarin, chlorogenic, caffeine, neochlorogenic, cryptochlorogenic, isochlorogenic - they are collectively called "oxycorinic acids", "caffeic acids", "oxycinnamoylic acids", "orthodioxypyhenols", "polyphenols" in the literature.[126; pp. 285–286]; [127; p. 361]; [139; pp. 1–7]; [141; pp. 993–994].

One of the main problems of standardization of artichoke raw materials and preparations derived from them is the selection of various standard substances, for example,





dry leaves contain 1.7-4.2% orthodioxycinnamic acid based on caffeic acid, and 0.9-1.4% phenolic acid based on cynarin. and 0.02-1.4% caffeic acid should be present based on chlorogenic acid [215; pp. 1117–1121].

In the course of vegetation, plant metabolites are formed in the following sequence in different parts of the plant: chlorogenic acid - chlorogenic acid + scolimoside - chlorogenic acid + scolimoside + cinaroside - scolimoside - chlorogenic acid + scolimoside + cinaroside + cynarin. In this case, the amount of chlorogenic acid decreases as other orthodiphenols increase in different parts of the plant.

Another group of biologically active substances of artichoke are flavonoid compounds. Flavonoids were first isolated from artichoke leaves by French researchers. The two predominant compounds have been identified as 7-O-glucoside luteolin (cinaroside) and 7-O-rutinoside luteolin (scolimoside).

Other flavonoid compounds were also found in lesser amounts in the leaves and other parts of artichoke: 7-rutinoside-4-glucoside luteolin (cinarothrizide) [45; pp. 16–20], 7-glucoside, 7-rutinoside and 7,4-diglucosidapigenin, 3-glucoside, 4-glucoside and 7,4-diglucoside luteolin, naringenin, 7-glucoside and 7-rutinoside naringenin [128; pp. 178–180], quercetin, rutin, hesperidin, hesperidoside, as well as oxycoumarins - scopoletin and 6-glucosidesculetin [44; pp. 98–104]; [134; pp. 163–169]; [138; pp. 95–98]; [160; p. 494]. Along with oxycinnamic acids and flavonoid compounds, sesquiterpene lactones were also found in artichoke leaves: cinaropicrin, dihyd-rocinaropicrin, grosgamein, cinarotriol.

In addition, artichoke contains steroid compounds (stigmasterol, V-sitosterol, cynarogenin) [165; pp. 205–209], glycol, glycerol acids, inulin, carotene, amino acids, as well as additives and other biologically active substances have been identified. The above ground part of the artichoke.

**The conclusion** is that Artichoke is rich in biologically active compounds: oxycinnamic acids (cynarin, chlorogenic, caffeine, neochlorogenic, crypto-chlorogenic, isochlorogenic), flavonoids (cinaroside, scolimoside, cinarotrizide, quercetin, rutin, hesperidin, hesperidoside), sesquiterpene lactones (cinaropicrin, cinarotriol), additives, coumarins,





steroid compounds, carbohydrates, fatty acids represent the prospect of using both individual parts of the plant and the whole plant for food and medical purposes. Considering the high content of BFM noted in the leaves of thorny artichoke, as well as the high specific gravity of the leaves in the whole biomass of the plant, its use as a raw material seems obvious.

Despite the wide spectrum of pharmacological activity of artichoke and medicinal forms derived from it, most researchers have emphasized its obvious hepatoprotective and choleric effects. This situation is confirmed by the inclusion of artichoke extract in the list of vital and important medicines. However, it should be noted that registered medicines based on thorny artichoke (total preparations, monopreparations, combined preparations) are produced only abroad, but the demand for this plant is very high in Uzbekistan.

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