American Journal Of Biomedical Science & Pharmaceutical Innovation

VOLUME Vol.05 Issue06 2025
PAGE NO. 19-24
DOI 10.37547/ajbspi/Volume05Issue06-05

Technology for Obtaining the Biologically Active Supplement "Cardioherb"

Ishonkulova N.F
Tashkent Scientific Research Institute of Vaccines and Serums, Uzbekistan

Mahmudjanova K.S.
"ALFRAGANUS UNIVERSITY" non-governmental higher education organization, Uzbekistan

Ashurov A.A.
Tashkent Scientific Research Institute of Vaccines and Serums, Uzbekistan

Received: 22 April 2025; **Accepted:** 18 May 2025; **Published:** 20 June 2025

Abstract: Currently, cardiovascular diseases are the leading cause of death and disability among humans [1,2]. In this regard, the development of herbal medicines not only for treatment but also for prevention is considered highly relevant. Dietary supplements (biologically active food additives or BAFAs) are mainly used as preventive agents [3].

Keywords: Biologically active, preventive agents, scientific research.

Introduction: It is well known that for a long time, plant-based medications such as hawthorn and Geranium collinum have proven to be effective cardioprotective agents [4]. These plants have been widely used not only in folk medicine but also in scientific research. Numerous studies indicate that these plants are rich in various biologically active compounds, making them highly valuable in medicine.

Research Objects. The research utilized hawthorn fruits (Crataegus) and roots/rhizomes of Geranium collinum, which grow in the Republic of Uzbekistan.

Research Objective. The literature contains data on obtaining extracts from hawthorn fruits and the underground parts of Geranium collinum [5]. However, despite numerous studies, no combined phytopreparation from these two plants currently exists. The goal of our research is to develop a technology for obtaining extracts from hawthorn fruits and Geranium collinum roots and rhizomes, and on this basis, to produce a dietary supplement in capsule form named "Cardioherb."

Research Results. During the development of extraction technology, several factors were considered: degree of raw material grinding, type of extractant, extraction method, chemical composition, etc.

Hawthorn fruits were ground into sizes of 1–2 mm, 3–5 mm, and 7–8 mm. Extracts were obtained using maceration, repercolation, and the method of VNIIF (All-Union Scientific Research Institute of Pharmacy). The content of flavonoids—dihydroquercetin, luteolin, rutin, rosavin, quercetin, salidroside—was determined in the extracts using HPLC (High Performance Liquid Chromatography) (see Figure 1).

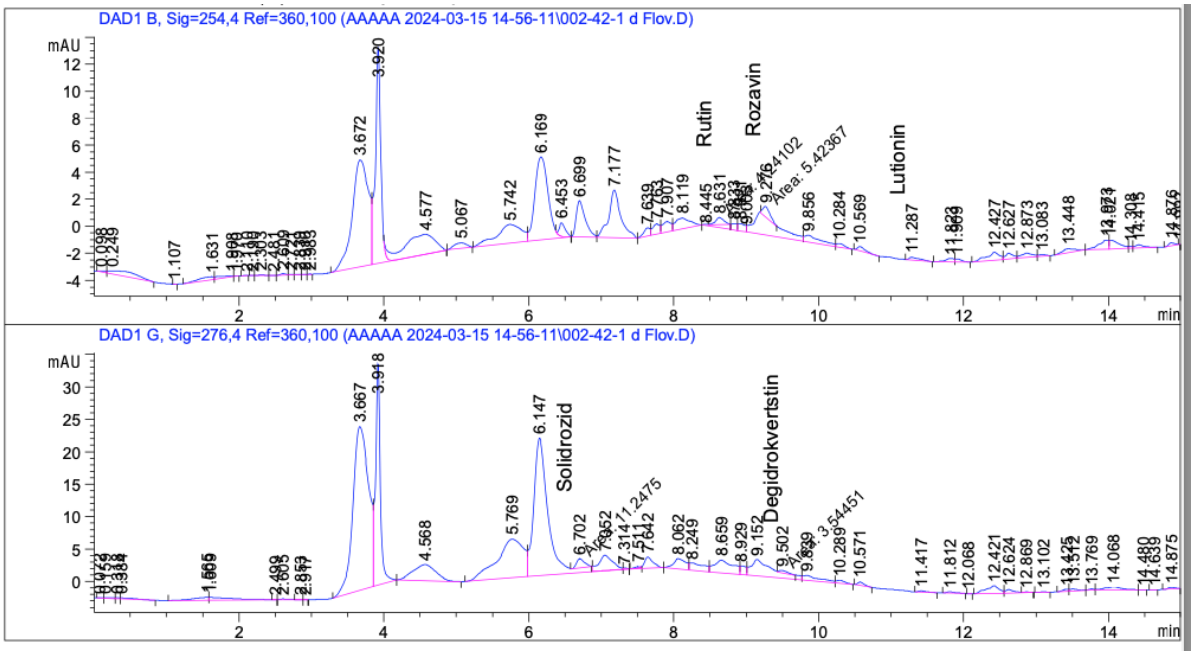

Figure 1. Flavonoid content in hawthorn extracts

Ethanol at different concentrations (30%, 50%, 70%) was used as the extractant (Tables 1–3).

Table 1.
Content of extractive substances in hawthorn extract (maceration method)

Article size (mm)	Flavonoids	Ethanol concentration, %		
		30	50	70
		Flavonoid content mg/g		
1-2	Dihydroquercetin	0,012	0,017	0,015
	Luteolin	0,0098	0,012	0,010
	Rutin	0,037	0,041	0,035
	Rosavin	0,113	0,123	0,121
	Quercetin	0,0095	0,011	0,010
	Salidroside	1,62	1,65	1,58
3-5	Dihydroquercetin	0,017	0,018	0,0186
	Luteolin	0,012	0,013	0,0131
	Rutin	0,041	0,045	0,0453
	Rosavin	0,123	0,125	0,126
	Quercetin	0,011	0,013	0,0137
	Salidroside	1,65	1,68	1,68
7-8	Dihydroquercetin	0,016	0,015	0,012
	Luteolin	0,011	0,010	0,0098
	Rutin	0,039	0,035	0,037
	Rosavin	0,122	0,121	0,113
	Quercetin	0,011	0,010	0,0095
	Salidroside	1,62	1,58	1,62

Table 2.
Content of extractive substances in hawthorn extract (repercolation method)

Article size (mm)	Flavonoids	Ethanol concentration, %		
		30	50	70
		Flavonoid content mg/g		
1-2	Dihydroquercetin	0,012	0,017	0,015
	Luteolin	0,0098	0,011	0,010
	Rutin	0,037	0,041	0,032
	Rosavin	0,112	0,123	0,121
	Quercetin	0,0095	0,011	0,010
	Salidroside	1,62	1,65	1,59
3-5	Dihydroquercetin	0,017	0,018	0,018
	Luteolin	0,012	0,013	0,013
	Rutin	0,041	0,043	0,049
	Rosavin	0,121	0,125	0,126
	Quercetin	0,011	0,013	0,013
	Salidroside	1,65	1,69	1,69
7-8	Dihydroquercetin	0,016	0,015	0,012
	Luteolin	0,011	0,010	0,0098
	Rutin	0,038	0,035	0,036
	Rosavin	0,112	0,121	0,113
	Quercetin	0,011	0,010	0,0093
	Salidroside	1,62	1,58	1,54

Table 3.
Content of extractive substances in hawthorn extract (VNIIF method)

Article size (mm)	Flavonoids	Ethanol concentration, %		
		30	50	70
		Flavonoid content mg/g		
1-2	Dihydroquercetin	0,015	0,016	0,008
	Luteolin	0,012	0,011	0,0005
	Rutin	0,041	0,03	0,016
	Rosavin	0,113	0,11	0,095
	Quercetin	0,011	0,012	0,0093
	Salidroside	1,65	1,71	1,43
3-5	Dihydroquercetin	0,018	0,02	0,009
	Luteolin	0,013	0,014	0,0005
	Rutin	0,045	0,05	0,02
	Rosavin	0,125	0,13	0,097
	Quercetin	0,013	0,014	0,0095
	Salidroside	1,68	1,77	1,45

7-8	Dihydroquercetin	0,013	0,014	0,008
	Luteolin	0,011	0,009	0,0005
	Rutin	0,038	0,02	0,02
	Rosavin	0,098	0,11	0,094
	Quercetin	0,087	0,011	0,0093
	Salidroside	1,58	1,69	1,38

Tables 1 to 3 show the concentration of flavonoids in hawthorn extracts obtained via maceration, repercolation, and VNIIF methods, respectively. Experimental data show that the highest yield of active compounds was achieved using the VNIIF method. Optimal results were obtained using 3–5 mm particle size and 50–70% ethanol. For further research, 50% ethanol was chosen as the extractant.

The second stage of the study focused on developing a technology for producing a dry extract from Geranium collinum roots and rhizomes. While previous studies (Z. Pazylbekova et al.) obtained such an extract using 40% ethanol and the percolation method [6], they did not use the VNIIF method. We applied the VNIIF method using 30%, 50%, and 70% ethanol (see Table 4).

Table 4.
Content of extractive substances in Geranium collinum extract (VNIIF method)

Article size (mm)	Ethanol concentration, %		
	30	50	70
	Gallic acid content, mkg/kg		
3-5	721,64	771,74	765,84

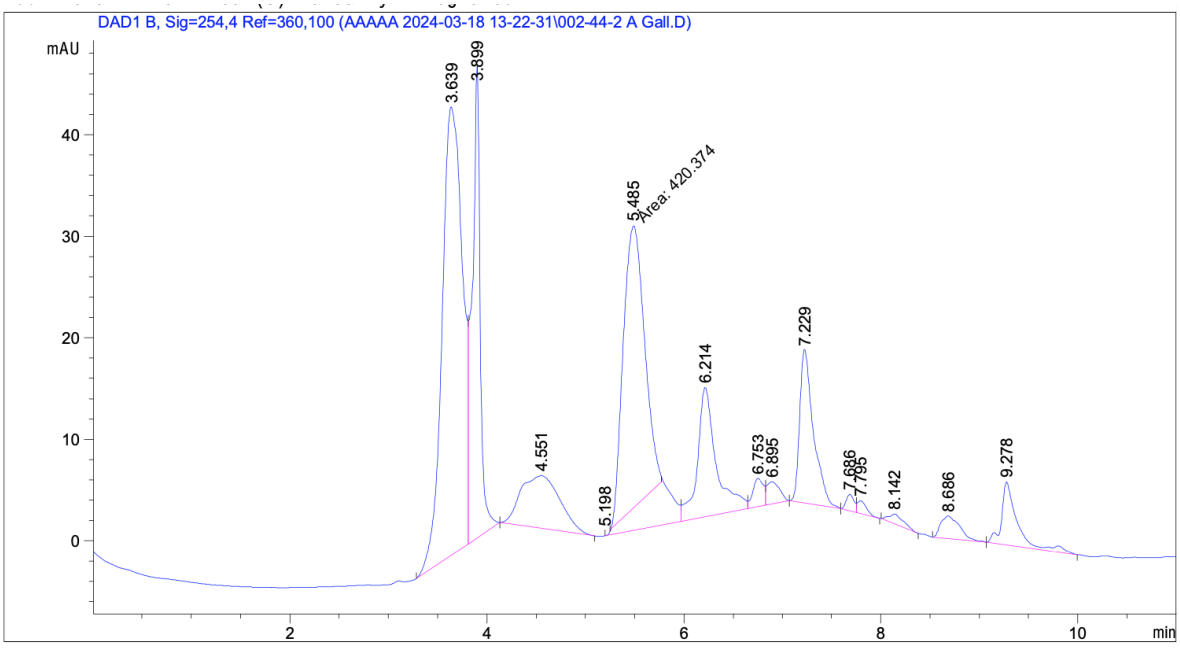

Figure 2. Gallic acid content in Geranium collinum extract

The data show that the extracts contain a high amount of bioactive substances when using 50% and 70% ethanol.

Based on the experimental data and to accelerate extraction, we developed a technology for obtaining a complex extract using a 2:1 ratio of hawthorn to Geranium collinum. Both raw materials were ground to 3–5 mm, extracted via the VNIIF method with 50% ethanol, and the resulting dry extract was conditionally named “Cardioherb.”

Further studies involved qualitative and quantitative analysis of the dry extract. The appearance, authenticity, moisture content, heavy metal concentration, and active substances were determined. Results are shown in Table 5.

Table 5.
Quality characteristics of the dry extract "Cardioherb"

Indicator		Analysis Result
Appearance		Brown-colored extract with a distinct taste and odor
Authenticity:	Flavonoids	2 g of the dry extract is extracted with 20 ml of 70% ethanol for 20 minutes. After filtration, 2-3 drops of a 2% aluminum chloride solution are added to 2 ml of the extract. The appearance of yellow color indicates the presence of flavonoids.
	Tannins	1 g of the extract is heated and extracted in 10 ml of distilled water for 15 minutes at a temperature of 60 ° C. After filtering the extract, 3-5 drops of 1% ferric (III) chloride solution are added to 2 ml of the extract. The formation of a blue-black color indicates the presence of tannins.
Moisture		4,01%
Heavy metals, %		0,007%
Active substances:		
Flavonoids, mg/g	Dihydroquercetin	0,23
	Luteolin	0,05
	Rutin	13,76
	Rosavin	26,3
	Quercetin	0,097
	Salidroside	11,62
Gallic acid, mkg/kg		1295,42

As can be seen from the data presented in Table 5, the dry extract of the complex composition "Cardiogerb" meets the requirements of the pharmacopoeia in all respects, and subsequently, on its basis, the technology of dietary supplements in the form of capsules was developed for use as a cardioprotective agent.

CONCLUSION

For the first time, a technology was developed to produce a complex dry extract named "Cardioherb", intended as a cardioprotective agent for the prevention of cardiovascular diseases.

REFERENCES

Cardiovascular diseases. WHO Fact Sheet No. 310, 2015.

Available: http://www.whogis.com/mediacentre/factsheets/fs317/ru/

Medik V.A. Public health and healthcare: a medico-

sociological analysis. Moscow: IC RIOR, INFRA-M; 2012.

A.V. Pogozheva. The role of dietary supplements in preventing cardiovascular diseases. Consilium Medicum 2016, Vol. 18, No. 12; pp. 55–59.

Ammon N.R.T., Raul R. Effects of hawthorn extracts, flavonoids and proanthocyanidins on the cardiovascular system. Planta Medica 118.

Bekbolatova E.N., Sakipova Z.B., Ibragimova L.N., et al. Validation of the process of obtaining liquid extract from Crataegus almaatensis fruits. Medical Bulletin of Bashkortostan, Vol. 13, No. 2 (74), 2018; pp. 60–63.

Pazylbekova Z.T., Makhmudzhanova K.S., Zokirov S.Kh. (2011). Obtaining an enriched dry extract from the roots and rhizomes of Geranium collinum growing in Uzbekistan. Proceedings of the International Scientific-Practical Conference “Innovative Technologies in Education: Integration of Pharmaceutical Science and Practice”, dedicated to the 60th anniversary of the pharmaceutical faculty of KazNMU named after D. Asfendiyarov. – Almaty, pp. 60–62.