

Brief information about the project

Name of the project	AP19677518 «Development of a rational technology for obtaining new substances from Kazakhstani wild-growing plants, their standardization, introduction of technological scheme of their production»
Relevance	<p>The relevance and importance of developing technology for production of new highly effective and safe medicinal substances obtained based on Kazakh plants that meet pharmacopoeial requirements lies in the need to increase the share of domestic medicines in the pharmaceutical market of Kazakhstan. The lack of necessary medicines in the country is also evidenced by negative data on the provision of medicines to the population in the context of COVID-19. The implementation of this Project will have great scientific and practical significance not only on a national but also on an international scale, since it will contribute to the production of highly effective substances, based on which safe and high-quality medicines with pronounced immunomodulatory and anti-inflammatory activity will be obtained. The implementation of the Project results into production will have an impact on the country's export potential and on strengthening its image in the international market.</p>
Purpose	<p>Development and creation of a rational and effective technology for obtaining new, original, import-substituting medicinal substances with immunomodulatory and anti-inflammatory effects based on domestic wild plants: Begger's rose hips (<i>Rosa beggeriana</i> Schrenk), sea buckthorn (<i>Hippophae Rhamnoides</i> L.) and narrow-leaved kermek (<i>Limonium leptophyllum</i>), their standardization and production of pilot industrial batches in accordance with pharmacopoeial requirements and international standards.</p>
Objectives	<p>Task 1:</p> <ul style="list-style-type: none"> -Harvesting of plants growing in Kazakhstan: <i>Rosa beggeriana</i>, <i>Hippophae rhamnoides</i>, <i>Limonium leptophyllum</i>, their processing, assessment of quality; -Extraction by different methods: maceration, ultrasound-assisted and CO₂ extraction of optimal technologies for obtaining substances from <i>Rosa beggeriana</i> (RbS-1, RbS-2, RbS-3), <i>Hippophae rhamnoides</i> (HR-1, HR-2, HR-3), <i>Limonium leptophyllum</i> (L-1, L-2, L-3); <p>Task 2:</p> <ul style="list-style-type: none"> -Isolation of fractions of hydrophobic and flavonoids from substances, their separation and identification of obtained individual compounds by a complex of physical and chemical methods; -Periodic control of stability of stored samples; - obtaining three pilot industrial series of substances selected during the experiment for each type of drug, validating their production technologies with the preparation of reports. <p>Task 3:</p> <ul style="list-style-type: none"> - Isolation of hydrolyzable, condensed tannins and polysaccharides from substances, their separation and identification of isolated individual compounds; - periodic monitoring of the stability of the test samples; - and report preparation; - development and preparation of regulatory documents for the samples under study.

<p>Expected and achieved results</p>	<p>An optimal technology for obtaining the substances RbS-1, RbS-2, RbS-3, HR-1, HR-2, HR-3, L-1, L-2, L-3 has been developed, based on determining the degree of grinding of the drug, choosing the appropriate extractant, varying its ratio with raw materials, temperature, duration and frequency of extractions with assessment of the yield of substances and the quantitative content of the main groups of biologically active substances in them. The quality indicators of the obtained substances were determined and their development was carried out. Samples were laid to check the stability of the studied samples of plants and substances by monitoring their quality indicators to establish their shelf life, storage and transportation conditions. The immunomodulatory and anti-inflammatory activities of the substances RbS-1, RbS-2, RbS-3, L-1, L-2, L-3 have been established. Previously, the chemical composition of rose hips of the <i>Rosa beggeriana</i> Schrenk species has not been studied, so there are no articles on isolated compounds from this plant species. Fractionation of leaves and fruits of <i>Rosa beggeriana</i> Schrenk led to the isolation and structure elucidation of 7 compounds, including phytosterols, triterpenoids, polyphenols and a mixture of fatty acids. β-sitosterol, betulin, (+)-catechin, lupeol and ethyl linoleate have already been isolated from the genus <i>Rosa</i>, but not from <i>Rosa beggeriana</i> Schrenk. Compounds such as 3b,23-dihydroxyur-12-ene and ethyl linolenoate were first isolated for <i>Rosa</i> and <i>Rosa beggeriana</i> Schrenk. Based on these results, an article was published in a highly rated journal.</p>
<p>Research team members with their identifiers (Scopus Author ID, Researcher ID, ORCID, if available) and links to relevant profiles</p>	<p>Zhusupova Galiya Eventaevna – Leading Researcher - h-index – 6 (WoS и Scopus)</p> <ul style="list-style-type: none"> • Web of Science ResearcherID: B-1053-2015; https://www.webofscience.com/wos/author/record/1060841 • ORCID: 0000-0001-9133-2040 https://www.scopus.com/redirect.uri?url=https://orcid.org/0000-0001-9133-2040&authorId=8323897200&origin=AuthorProfile&orcidId=0000-0001-9133-2040&category=orcidLink • Scopus Author ID: 8323897200, https://www.scopus.com/authid/detail.uri?authorId=8323897200 <p>Aituarova Aigerim Shakirovna - Researcher - h-index – 1 (WoS и Scopus)</p> <ul style="list-style-type: none"> • Web of Science ResearcherID: GYD-7218-2022). https://www.webofscience.com/wos/author/record/34877436 • ORCID: https://orcid.org/0000-0002-4317-2334. https://www.scopus.com/redirect.uri?url=https://orcid.org/0000-0002-4317-2334&authorId=57330660400&origin=AuthorProfile&orcidId=0000-0002-4317-2334&category=orcidLink • Scopus Author ID: 57330660400 https://www.scopus.com/authid/detail.uri?authorId=57330660400 <p>Abilov Zharylkasyn Abduvakhitovich - Leading Researcher - h-index – 10 (Scopus), 9 (WoS)</p> <ul style="list-style-type: none"> • Web of Science ResearcherID:CCA-1361-2022 https://www.webofscience.com/wos/author/record/611967 • Scopus author ID: 6602837088 https://www.scopus.com/authid/detail.uri?authorId=6602837088

	<p>Zhusupova Aizhan Izbasarovna – Senior Researcher - h-index – 3 (WoS и Scopus)</p> <ul style="list-style-type: none"> • Web of Science ResearcherID O-2108-2014, (https://www.webofscience.com/wos/author/record/110980) ORCID ID 0000-0001-6561-2268, (https://www.scopus.com/redirect.uri?url=https://orcid.org/0000-0001-6561-2268&authorId=35148696500&origin=AuthorProfile&orcid=0000-0001-6561-2268&category=orcidLink) • Scopus Author ID 35148696500 (https://www.scopus.com/authid/detail.uri?authorId=35148696500) <p>Budach Yaroslavna Mikhailovna – Senior Researcher Omarova Gulshara Orazovna - engineer Asetova Aizhan Askarkyzy - laboratory assistant Asetova Balzhan Askarkyzy - laboratory assistant Sapashov Atabek Tolkynovich - laboratory assistant Kazhiakbarova Madina Kuanyshevna - laboratory assistant Seitova Dana Alisherovna - laboratory assistant</p>
List of publications with links to them	<p>Aituarova, Aigerim, Galiya E. Zhusupova, Aizhan Zhussupova, and Samir A. Ross. "Study of the Chemical Composition of Rosa beggeriana Schrenk's Fruits and Leaves." <i>Plants</i> 12, no. 18 (2023): 3297. Ссылка на сайт: https://www.mdpi.com/2223-7747/12/18/3297 PDF версия: https://www.mdpi.com/2223-7747/12/18/3297/pdf</p>
Patents	

Photos of the studied plant species are attached









