Brief information about the project

Title	A comprehensive study of three species of the plant Tagetes erecta L., with a view to their potential use in production
Relevance	The project aims to comprehensively study the biologically active substances in three species of Tagetes erecta L. (Yellow Stone, Tiger's Eye, and Taishan) using modern extraction methods and chromatographic analysis. Tagetes erecta L., also known as marigold, attracts the attention of scientists due to its high content of flavonoids, carotenoids, and essential oils with antioxidant, antimicrobial, and anti-inflammatory properties. However, the chemical composition and pharmacological activity of various varieties of this plant in Kazakhstan remain poorly understood, which complicates their industrial use in areas such as medicine, cosmetology, and agriculture. This project aims to fill these gaps and create a scientific basis for the development of drugs based on natural components isolated from marigolds.
Goal	A comprehensive study of the chemical composition and biologically active compounds of three species of *Tagetes erecta L.* plants, varieties "Yellow Stone", "Tiger's Eye" and "Taishan". To assess the influence of the selected extraction methods on the yield and composition of biologically active substances, as well as their pharmacological properties, for the purpose of application in medicine, cosmetology and agriculture.
Tasks	Within the framework of the implementation of this project, 5 main tasks will be completed: *No. 1.* Planting of Tagetes erecta L. varieties "Yellow Stone", "Tiger's Eye", "Taishan" in the village of Almalybak to obtain test material. *№2.* Carrying out extraction of plants of Tagetes erecta L. varieties «"Yellow Stone","Tiger's eye" and "Taishan" by various extraction methods (subcritical CO_2 extraction, ultrasonic extraction, Soxhlet extraction and hot extraction). *No. 3.* Conducting a comprehensive analysis of plant extracts of Tagetes erecta L. varieties ""Yellow Stone","Tiger's eye" and "Taishan" by chromatographic methods. *No. 4.* Study of antimicrobial activity (Micobacterium citreum, Mikobacterium rubrum, Sarcina flava, Salmonella dublin, Pseudomonas aeruginosa, Aspergillus, Penicillium, Fusarium and Candida) of Tagetes erecta L. plant extracts of the varieties "Yellow Stone", "Tiger's Eye" and "Taishan". *No. 5.* Evaluation of the influence of extraction methods on the yield and composition of biologically active substances from different varieties of Tagetes erecta L., as well as their pharmacological properties for use in medicine, cosmetology and agriculture.

Expected and Achieved Results	- *for task No. 1.*The seeds will be prepared and planting will be carried out.plantsTagetes erecta L. cultivar 'Yellow Stone',"Tiger's Eye" and "Taishan"in the village of Almalybak. Conditions and care will be provided to promote uniform plant growth. Optimization of growing parameters will allow obtaining sufficient plant material for research. - *for task No. 2 Extractions of Tagetes erecta L. plants of the varieties "Yellow Stone", "Tiger's Eye" and "Taishan" will be carried out using four methods: subcritical CO_2 extraction, ultrasonic extraction, Soxhlet extraction and hot extraction.* - *for task No. 3.* Identification and qualitative determination of the main biologically active compounds in extracts obtained by various methods will be carried out.*Tagetes erecta*L. varieties ""Yellow Stone","Tiger's Eye" and "Taishan". Creation of chemical composition profiles for each extraction method, which will allow establishing the relationship between the method and the resulting extract composition.Extractswill be analyzed using chromatographic methods to determine their chemical composition. - *for task No. 4.* The study will examine the antimicrobial activity of Tagetes erecta L. plant extracts of the Yellow Stone, Tiger Eye and Taishan varieties against pathogens such as Micobacterium citreum, Mikobacterium rubrum, Sarcina flava, Salmonella dublin, Pseudomonas aeruginosa, as well as fungi of the genera Aspergillus, Penicillium, Fusarium and Candida. It is planned to establish a relationship between the content of specific biologically active components and the level of antimicrobial activity of the extracts. - *for task 5.* Data will be collected asqualitativelyboth the yield and composition of biologically active substances extracted using various extraction methods. The results of the study will help determine which method provides the maximum concentration of target components with minimal loss of activity. An analysis of the pharmacological properties of the extracts, including their antibacterial activity, will also be conducted, which will help assess their potential for use in medicine, cosmetology and agriculture.
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Publications list with links to them	In progress

Patent information	Not available