

OPTIMIZATION OF OBTAINING MEDICINAL PRODUCTS FROM VALERIAN IN THE CONDITIONS OF THE FERGANA REGION

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<https://doi.org/10.5281/zenodo.21918947>

Abstract. This study addresses the prospects for optimizing the technology of obtaining medicinal products from valerian (*Valeriana officinalis* L.), taking into account the natural and climatic conditions of the Fergana region. Particular attention is devoted to the rational harvesting of medicinal plant raw materials, their primary processing, drying, storage, and the extraction of biologically active substances. The necessity of adapting technological parameters to regional cultivation conditions is substantiated in order to enhance quality and ensure the standardization of the resulting phytoproducts.

Keywords: *Valeriana officinalis*, valerian, medicinal plant raw material, extraction, phytopharmaceuticals, biologically active substances, Fergana region.

Under contemporary conditions, the development of the domestic pharmaceutical industry is closely tied to expanding the raw material base of medicinal plants and improving phytopharmaceutical production technologies. One promising direction is the rational utilization of valerian (*Valeriana officinalis* L.), whose rhizomes and roots are traditionally employed in the formulation of sedative pharmaceuticals. Valerian raw materials contain a complex of biologically active compounds, including essential oil components, valerenic acids, and other substances that dictate its pharmacological value.

The natural and climatic conditions of the Fergana region establish favorable prerequisites for the cultivation of various medicinal plants. However, the efficiency of their utilization in pharmaceutical manufacturing depends not only on crop yield but also on the proper organization of raw material harvesting, drying, storage, and processing. Violations of technological parameters may lead to a degradation of biologically active compound content and, consequently, a reduction in the quality of the final medicinal product.

The objective of this study was to substantiate approaches to optimizing the production of medicinal products from valerian cultivated under the conditions of the Fergana region.

The object of the study comprised valerian rhizomes with roots obtained from plants cultivated under the natural and climatic conditions of the region. The analysis of the technological process spanned the stages of raw material harvesting, cleaning, size reduction, drying, storage, and the subsequent extraction of biologically active components. Particular emphasis was placed on preserving active ingredients throughout all stages of processing.

In the production of phytopharmaceuticals from valerian, the quality of the starting raw material serves as a key determining factor. Optimization must initiate at the stage of plant cultivation and harvesting. A rational selection of the harvesting period for underground parts yields raw materials with higher concentrations of pharmacologically significant compounds. Following excavation from the soil, timely cleaning and preparation for drying are essential.

The thermal regimen during drying plays a critical role. Excessively high temperatures accelerate the loss of volatile components and degrade the organoleptic and pharmacognostic

characteristics of the material. Consequently, gentle drying regimens utilizing adequate ventilation and protection from direct sunlight represent a viable approach. Standardizing the duration and temperature of this stage promotes maximum retention of biologically active components.

A further direction for optimization involves refining the extraction process. The extraction efficiency of active substances depends on the degree of comminution, the nature of the extractant, the raw material-to-solvent ratio, temperature, and process duration. Rational selection of these parameters enhances the yield of target biologically active substances while simultaneously reducing raw material and technological resource consumption.

For the manufacture of valerian preparations, the deployment of standardized locally sourced plant raw materials followed by the production of liquid or dry extracts is highly promising. Quality control must encompass the evaluation of raw material identity, moisture content, extractive substance yield, and key groups of biologically active components. This approach is fundamental to ensuring the reproducibility of the pharmacological action of the final products.

The conducted analysis demonstrates that comprehensive optimization of valerian processing technology in the Fergana region must integrate the standardization of all stages—from plant cultivation to the production of the finished dosage form. The utilization of regional plant raw materials can reduce the pharmaceutical industry's reliance on imported active pharmaceutical ingredients (APIs), promote the rational use of local natural resources, and expand the range of domestic phytopharmaceuticals.

Conclusions. The natural and climatic conditions of the Fergana region allow valerian (*Valeriana officinalis* L.) to be considered a promising source of plant raw materials for pharmaceutical manufacturing. The most significant directions for optimization include standardizing the harvesting timeframe for rhizomes and roots, employing gentle drying regimens, maintaining strict storage conditions, and refining the extraction parameters of biologically active substances. An integrated approach to processing local raw materials can enhance the quality and stability of valerian preparations, providing a foundation for expanding the regional production of herbal medicines.

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