

Review of the book: Minarchenko V.M. et al. "Atlas of morphological and anatomical features of raw materials of wild related species of medicinal plants of Ukraine" / Minarchenko V.M., Timchenko I.A., Dvirna T.S., Futorna O.A., Makhinya L.M., Glushchenko L.A. – Kyiv: Palivoda A.V., 2022. – 406 p.

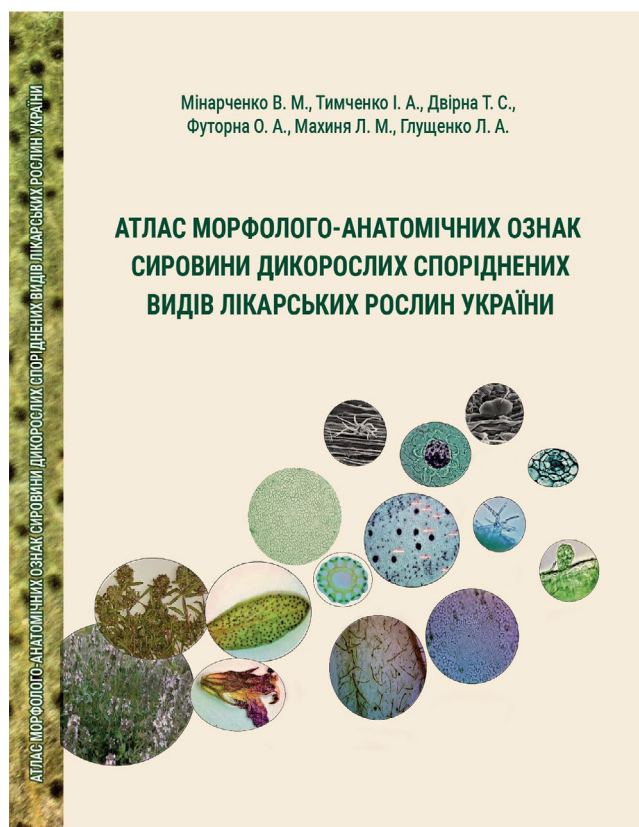
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Many scientific and popular science books, handbooks, monographs are devoted to medicinal plants and medicinal plants raw materials, and are written by botanists, pharmacists, medical workers, etc. The first, as a rule, pay special attention to plants, places of

their growth, methods and terms of harvesting raw materials, more concisely - to the chemical composition and very schematically indicate their medical use. The authors of the medical profile, on the other hand, describe diseases, methods of their treatment using medicinal plants, and quite schematically - plants, their chemical composition and methods of obtaining medicinal products. As for the characteristics of medicinal plant raw materials, the peculiarities of establishing their identity and quality, these issues are covered mainly in regulatory documents without comprehensive coverage of many diagnostic characteristics of raw plant parts. There are very few such works that would combine a detailed description of species-specific anatomical and morphological features of raw materials with original illustrative material, and for the most part they are inaccessible to the general public, in particular to practitioners. Therefore, the monograph "Atlas of morphological and anatomical features of raw materials of wild related species of medicinal plants of Ukraine" has innovative scientific significance and contains very valuable applied information.

One of the important sources for the creation of medicinal products is the medicinal plant raw material, and the mandatory condition for its use is its authenticity and

appropriate quality. According to the Directive 75/318/EEC and the Law of Ukraine “On Medicinal Products” (1996, amended on 08.08.2021), to ensure the implementation of the state policy in the field of quality control and safety of medicinal products, an important component of control is the accurate and detailed description of the raw materials for the manufacturing of medicines. The development of regulatory documents for medicinal plant raw materials is based on multi-vector research of a certain type of plant by botanists, pharmacognostics, and phytochemists.

Establishing diagnostic features of raw materials of medicinal plant species is an important condition for their introduction into official medicine, inclusion in the pharmacopoeia of any country, including the State Pharmacopoeia of Ukraine, as well as further practical use in medicine, food industry, and pharmacy. It is worth noting that all pharmacopoeial monographs contain a section on the identification of raw materials with a description of the micro- and macroscopic features of raw materials of a specific plant species, but they do not provide detailed characteristics of most related species, which are often an admixture of raw materials. Moreover, most types of official medicine of Ukraine are distributed only in certain regions, and in others, related species, including invasive species, are common. Therefore, raw materials of various related non-pharmacopoeial species may enter processing enterprises. Without a detailed description of their raw materials (with corresponding illustrations of micro- and macroscopic diagnostic signs), it is difficult to identify and determine the identity and quality of medicinal plant raw materials, both when they are collected from the natural environment and during cultivation. The lack of appropriate auxiliary materials, which would simplify the process of establishing the good quality of medicinal plant raw materials, is accompanied by unintentional or intentional falsification.

The problem of falsification of medicines and raw materials has been known to mankind for thousands of years. However, only at the end of the 20th century, the falsification of medicines and raw materials for their production turned into a global problem.

For the first time, the medical community on behalf of the World Health Organization (WHO) drew attention to the problem of counterfeit medicines in 1948, and in 1985 it classified counterfeit medicines as a crime. In Ukraine, falsified medicinal products were first discovered in 1999. The problem of falsification of medicines and raw materials for their manufacture is relevant today all over the world. Pharmaceutical production is one of the most profitable types of business after arms, drugs, alcohol, and gasoline trade, and it creates the temptation to make easy money through counterfeiting and the development of appropriate measures for authenticity and quality control.

Despite the growing vigilance regarding quality control and responsibility for violation of current requirements, which increased with the introduction of European Union norms, in particular GMP and GACP standards, the issue of identification of raw materials by morphological features and the search for convenient methods to distinguish plant raw materials of medicinal species from raw materials of related species still remains open and a solution is needed as soon as possible for the needs of science and practice.

The reviewed work “Atlas of morphological and anatomical features of raw materials of wild related species of medicinal plants of Ukraine” by a team of highly qualified scientists: V.M. Minarchenko, I.A. Timchenko, T.S. Dvirna, O.A. Futorna, L.M. Makhinya, L.A. Glushchenko, which was published at the end of 2022, contains a large volume of extremely necessary information for solving the problem of identifying the species of medicinal plants and their raw materials. The work highlights the main diagnostic macro- and micromorphological features of raw materials of related 63 species of medicinal plants of Ukraine from 12 genera – *Achillea*, *Artemisia*, *Bidens*, *Crataegus*, *Equisetum*, *Hypericum*, *Persicaria*, *Petasites*, *Plantago*, *Thymus*, *Tussilago*, *Viola*, which allow to identify and distinguish plant raw materials of medicinal plants from raw materials of closely related species. In the monographic scientific edition of 406 pages, in addition to a detailed anatomical-morphological and pharmacotherapeutic description of each species, photographs of diagnostic signs, made with the help of a scanning electron microscope,

arranged in 74 drawings are presented. Sixty three appendices contain illustrations of diagnostic signs of raw organs of each species, performed using light microscopy.

To prepare the monograph "Atlas of morphological and anatomical features of raw materials of wild related species of medicinal plants of Ukraine", scientists of the National Academy of Sciences of Ukraine, the National Academy of Agrarian Sciences of Ukraine and the Faculty of Pharmacy of the O.O. Bogomolets National Medical University combined their effort and experience.

This work is an example of the successful solution of important scientific and practical tasks, it is significant for the improvement of the regulatory and methodical basis for improving the quality control of raw materials used for the manufacture of medicinal products of plant origin.

Currently, monographs on the raw materials of only certain species of such genera as *Hypericum*, *Achillea*, *Bidens*, *Crataegus*, *Equisetum*, *Plantago*, *Thymus* and others have been developed, although these genera are represented in Ukraine by a significant number of species, the raw materials of which can be an impurity. The degree of research into the quality of medicinal plants of species of these genera differs significantly, and is often fragmentary with the detailing of individual characteristics

The authors of the monograph at the current level and for the first time carried out a complex morphological-anatomical and resource study of 63 species of 12 genera and found the main diagnostic macro- and micromorphological features of raw materials of related species of medicinal plants of Ukraine, which will allow identification and differentiation of plant raw materials of medicinal plant species, including those included in the appendices of the State Pharmacopoeia of Ukraine, from raw materials of related species.

During the research, the authors used their own scientific and methodological work, the results of analysis of morphological and anatomical features, resource assessment, herbarium materials collected during preliminary research on the diversity of medicinal plants of different botanical and geographical regions of Ukraine, samples of raw materials from collections of living plants, as well as herbarium materials of the National

Herbarium of Ukraine (KW). The authors have carefully supplemented their own research with information on the results of the latest research by scientists from various countries around the world.

The material of the monographic edition is differentiated into sections, according to the name of the genera. Species in sections are placed in alphabetical order by Latin name. Species names meet the modern requirements of international nomenclature, taking into account priority or acceptability in Ukrainian taxonomy. In separate sections, where the characteristics of many related species are presented, information is briefly provided about the characteristics of representatives of the genus and selected objects. For each species, the material includes a morphological and anatomical description with an illustration of diagnostic features using electron microscopy (in the text) or light microscopy (in the appendices). Information on biologically active ingredients and their effect on the human body is provided by the authors based on the latest literature. Horology, ecological and coenotic features of the species, their resource significance and features of the protection status (if available) are presented both based on the results of the creative team's own long-term research, and based on the analysis of the results from the latest published information sources. The text is accompanied by a list of references and an index of Latin and Ukrainian species names.

The monograph "Atlas of morphological and anatomical features of raw materials of wild related species of medicinal plants of Ukraine" is a complex, fundamental work, which is significant for botanists, pharmacognostics, phytochemists, specialists of pharmaceutical enterprises that work with medicinal plant raw materials, suppliers and agronomists, specialists in the cultivation of medicinal plants. Its content, scientific novelty, accessibility of the presentation of the material, illustrative support and visualization of information, a significant volume of analyzed information sources will undoubtedly attract the attention of a wide range of researchers and practitioners.

The book can also serve as a guide in the educational process for the preparation of students and postgraduates in biological, pharmaceutical and agricultural areas.

Information on the main diagnostic macro- and micromorphological features of raw materials of related species of medicinal plants from the genera *Achillea*, *Artemisia*, *Bidens*, *Crataegus*, *Equisetum*, *Hypericum*, *Persicaria*, *Petasites*,

Plantago, *Thymus*, *Tussilago*, *Viola* can be used in the preparation of new or additions to existing monographs on medicinal plant raw materials of the State Pharmacopoeia of Ukraine.