Original article

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MEDICINAL PLANT RAW MATERIALS IN THE PHARMACEUTICAL MARKET OF KAZAKHSTAN: A COMPARATIVE ANALYSIS OF REGISTERED PRODUCTS IN 2020 AND 2025

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ABSTRACT

Medicinal plant raw materials are the basis of herbal preparations in medical practice, and studying their range on the pharmaceutical market of Kazakhstan allows us to assess development trends, product expansion, and improvement of quality control standards. The aim of the study was to conduct a comparative analysis of the range, morphological groups, and composition of domestic producers of medicinal plant raw materials registered in the State Register of Medicines of the Republic of Kazakhstan in 2020 and 2025, identifying changes in the nomenclature and distribution according to the ATC (Anatomical Therapeutic Chemical) classification. Open data from the register was used, a retrospective analysis of the quantity and distribution of raw materials by morphological groups and ATC categories was carried out, and information about manufacturers was systematized with verification of botanical names in Microsoft Excel. The results showed that the total number of registered raw materials remained stable (26 items), with Zerde-Fito LLP being the main manufacturer. The emergence of new manufacturers – Daulet-Farm LLP and Karaganda Pharmaceutical Plant LLP was accompanied by the registration of previously absent species, including parmelia thalli and salt marsh grass. The ATC categories have expanded to include new therapeutic areas, and the nomenclature of some species has been refined. The market for medicinal plant raw materials in Kazakhstan remains stable in terms of quantity, while at the same time, there is a structural renewal of the product range, the emergence of new manufacturers, and harmonization of the nomenclature, reflecting the development of phytotherapy and the strengthening of the national pharmaceutical sector.

Keywords: medicinal plants; pharmacognosy; drug industry; registries; Kazakhstan, classification.

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1. INTRODUCTION

Medicinal plants with high therapeutic value are increasingly being utilized in medicine. Alongside the market for ready-made medicines and medical devices, there is also a market for medicinal plant raw materials, which plays an important role in the pharmaceutical industry [1, 2]. Their widespread use is due to their lower incidence of side effects and low toxicity [3, 4].

Medicinal plant raw materials (MPRM) are plants or parts of plants that can be fresh or dried. Such raw materials are used in pharmaceutical practice to produce medicines both industrially and in the manufacture of preparations in pharmacy conditions [5, 6]. Various parts of plants are used as raw materials, including leaves, flowers, roots, rhizomes, stems, and others, which contain biologically active substances that have therapeutic effects and are used to promote health, treat, and prevent diseases [7, 8].

The pharmaceutical market is a complex and knowledge-intensive system directly linked to society's main resource: human health. As a result, it plays a key role in shaping strategies for maintaining the health of the working-age population, which is significant for the economy and the country's demographic potential as a whole [9]. According to reported data, in 2023, the global pharmaceutical market exceeded US$1.661 trillion, equivalent to more than 764 trillion tenge [10]. At the same time, at the national level in Kazakhstan, there was an increase in sales: the volume of the commercial segment of the pharmaceutical market amounted to 568.2 billion tenge, which is 8% higher than the previous year [11].

The pharmaceutical market in Kazakhstan was formed relatively recently and began to develop actively only in the second half of the 1990s. It was during this period that a transition was made from a shortage of medicines to providing the population with a variety of ready-made dosage forms and medical products. The development of the industry was accompanied by an improvement in the quality of pharmaceutical services, which was made possible by the strengthening of the economy and growth in the country's citizens' welfare [12].

In recent years, Kazakhstan has seen a growing interest in the use of medicinal products as a promising direction for the development of the domestic pharmaceutical industry. The increase in demand for natural medicines is driven by the desire to use safer and more environmentally friendly therapies. In this regard, it is significant to study the state and trends of the pharmaceutical market for natural medicinal products in the country, as well as to analyse its structure, range, and dynamics in comparison with previous years.

The aim of the study is to conduct a comparative analysis of the range, morphological groups, and composition of domestic producers of MPRM registered in the State Register of Medicines of the Republic of Kazakhstan in 2020 and 2025, identifying changes in the nomenclature and distribution according to the ATC classification.

2. MATERIAL AND METHODS

The study was conducted as a retrospective analysis of data from the State Register of Medicines of the Republic of Kazakhstan for the years 2020 and 2025, with the aim of assessing the composition of domestic manufacturers and the range of registered products. The data source consisted of official information available on the website of the Ministry of Health of the Republic of Kazakhstan [13].

A total of 7,449 medicinal products were analyzed for 2020 and 6,782 for 2025; in both periods, the number of MPRM was 26.

The sample included plant-derived products presented as raw materials or individual plant parts (leaves, flowers, roots, herbs, etc.) as specified in the "dosage form" field, rather than based on the classification of medicinal products. Products containing processed plant materials (e.g., extracts, tinctures) were excluded from the analysis. This approach made it possible to identify MPRM regardless of their formal classification in the register.

Information on manufacturer name, trade name, morphological type of plant raw material, and year of registration was systematized. The data were manually checked for completeness and accuracy, followed by verification.

The unit of analysis was an individual registration record in the State Register of Medicines. Absolute and relative indicators were used to assess the structure, followed by comparison of proportions across groups. The comparative approach was based on two time points (2020 and 2025), allowing identification of key structural changes in the product range and manufacturer composition over the study period; however, it does not allow for detailed assessment of intermediate trends. It should be noted that the study reflects the structure of registered items rather than actual production or sales volumes.

Descriptive statistical methods were applied, including calculation of absolute and relative frequencies, as well as data visualization using tables and figures. Data processing and structuring were performed using Microsoft Excel.

The study did not involve human or animal subjects and was based on publicly available governmental data without personal information; therefore, ethical approval was not required.

3. RESULTS

According to data from the State Register of Medicines of the Republic of Kazakhstan for 2025, a total of 6,782 medicinal products are registered on the national pharmaceutical market, of which 26 (0.38%) correspond to medicinal plant raw materials (MPRM). These items are presented as raw plant materials and are distributed across ten categories: leaves, flowers, bark, rhizomes and roots, rhizomes with roots, roots, fruits, thalli, and stigmas (corn silk with stigmas). In the official list of registered medicinal products, no imported MPRM were identified.

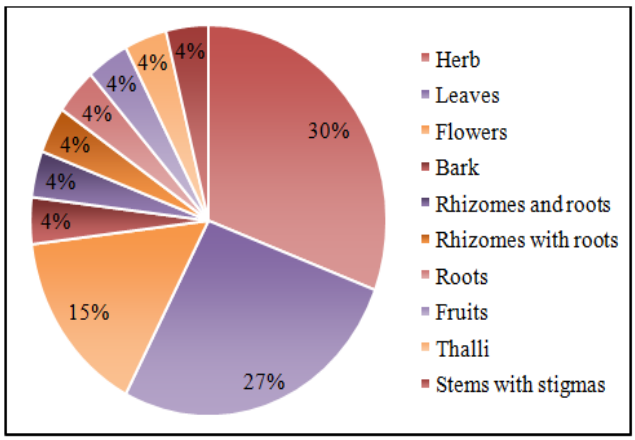

Figure 1 – Share of different types of MPRM in registered items.

The distribution of registered MPRM by morphological groups in 2025 is presented in Figure 1. Herbs account for eight registered items and represent the largest group. This category includes yarrow herb, wormwood herb, St. John's wort herb, celandine herb, bidens herb, saltwort herb, Bunge's ziziphora herb, and Turkestan motherwort herb. Leaves account for seven items, including plantain leaves, nettle leaves, senna leaves, bearberry leaves, lingonberry leaves, mint leaves, and sage leaves. Flowers are represented by four items: linden flowers, immortelle flowers, chamomile flowers, and calendula flowers. The remaining categories are represented by one item each: rosehip fruit, oak bark, corn silk with stigmas, parmelia thallus, burdock roots, elecampane rhizomes and roots, and valerian rhizomes and roots.

Table 1 summarizes the distribution of registered MPRM among domestic manufacturers in the Republic of Kazakhstan in 2025. Zerde-Fito LLP accounts for 21 registered MPRM, representing 80.8% of the total number of registered MPRM and indicating its dominant position in the domestic market. The product range includes various plant parts used in pharmaceutical practice: leaves, flowers, bark, roots, rhizomes, fruits, and pistils. The range includes raw materials such as yarrow herb, wormwood herb, St. John's wort herb, celandine herb, and bidens herb; linden, chamomile, calendula, and immortelle flowers; plantain, nettle, senna, bearberry, lingonberry, mint, and sage leaves; rosehip fruits, valerian rhizomes with roots, and elecampane rhizomes and roots, as well as oak bark and corn silk with stigmas.

Fitoleum LLP accounts for three registered MPRM (11.5% of the total), representing a smaller share of the domestic MPRM market. Its product range includes Bunge's ziziphora herb, Turkestan motherwort herb, and burdock roots.

Table 1 – List of domestic manufacturers and MPRM produced by them, registered in the State Register of the Republic of Kazakhstan as of 2025.

№	Manufacturer	Trade name of MPRM
1	LLP «Zerde-Fito»	1. Yarrow; 2. Wormwood; 3. St. John's wort; 4. Celandine; 5. Bidens; 6. Linden; 7. Immortelle; 8. Chamomile flowers; 9. Calendula flowers; 10. Plantain; 11. Nettle leaves; 12. Senna; 13. Bearberry; 14. Lingonberry; 15. Mint; 16. Sage; 17. Rosehip fruit; 18. Elecampane; 19. Valerian; 20. Oak bark; 21. Corn silk with stigmas.
2	LLP «Fitoleum»	1. Ziziphus bunge herb; 2. Turkestan motherwort herb; 3. Burdock roots.
3	LLP «Daulet-Pharm»	1. Parmelia thallus.
4	LLP «Karaganda Pharmaceutical Plant»	1. Sossurea salt marsh grass.

Daulet-Farm LLP and Karaganda Pharmaceutical Plant LLP each account for one registered MPRM (3.8%), reflecting a limited contribution to the overall market structure. Daulet-Farm LLP produces parmelia thallus, whereas Karaganda Pharmaceutical Plant LLP produces saltwort herb.

Table 2 presents the list of domestic manufacturers of MPRM registered in 2020. In that year, three domestic manufacturers were identified: Zerde-Fito LLP, Fitoleum LLP, and Eco-Pharm LLP. A total of 7,449 medicinal products were registered, of which 26 (0.35%) corresponded to MPRM.

The product range of Zerde-Fito LLP in both 2020 and 2025 includes 21 MPRM (80.8% of the total number of MPRM), accounting for the majority of registered items, and covers various morphological groups: herbs, leaves, flowers, fruits, bark, roots, rhizomes, and pistils. A difference in nomenclature is noted for elecampane: in 2020 it was registered as rhizomes with roots, whereas in 2025 it is designated separately as rhizomes and roots. The product range of Fitoleum LLP includes three types of MPRM (11.5%) in both 2020 and 2025, constituting a smaller portion of the registered assortment: Bunge's ziziphora herb, Turkestan motherwort herb, and burdock roots.

In 2020, Eco-Farm LLP produced two types of MPRM (7.7%), representing a minor part of the overall structure: motherwort herb and rosehip fruit. In 2025, Eco-Farm LLP was not listed in the State Register of Medicinal Products of the Republic of Kazakhstan.

Table 2 – List of domestic manufacturers and MPRM produced by them, registered in the State Register of the Republic of Kazakhstan as of 2020.

№	Manufacturer	Trade name of MPRM
1	LLP «Zerde-Fito»	1. Yarrow; 2. Wormwood; 3. St. John's wort; 4. Celandine; 5. Bidens; 6. Linden; 7. Immortelle; 8. Chamomile flowers; 9. Calendula flowers; 10. Plantain; 11. Nettle leaves; 12. Senna; 13. Bearberry; 14. Lingonberry; 15. Mint; 16. Sage; 17. Rosehip fruit; 18. Elecampane; 19. Valerian; 20. Oak bark; 21. Corn silk with stigmas.
2	LLP «Fitoleum»	1. Ziziphus bunge herb; 2. Turkestan motherwort herb; 3. Burdock roots.
3	LLP «Eco-Pharm»	1. Motherwort; 2. Rosehip.

In 2025, new manufacturers appeared, including Daulet-Farm LLP and Karaganda Pharmaceutical Plant LLP. Figure 2 shows the distribution of MPRM across ATC classification groups in 2020 and 2025.

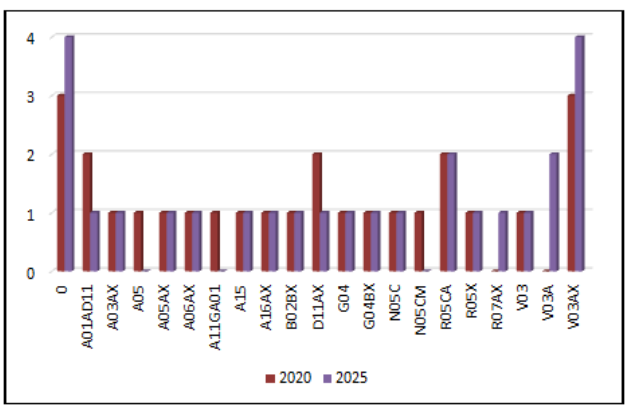

Figure 2 – Dynamics of ATC group distribution of MPRM (2020–2025).

In 2025, the largest number of registered items belonged ATC group V03AX (4 items: corn silk with stigmas, calendula flowers, nettle leaves, and rosehip fruit), indicating a predominance of broadly classified therapeutic agents. Groups R05CA and V03A included two items each, while the remaining ATC groups were represented by single items, reflecting a fragmented distribution of MPRM across therapeutic areas.

Category "0" included items without an assigned ATC classification (saltwort herb, Bunge's ziziphora herb, Turkestan motherwort herb, and burdock roots), suggesting limitations of the ATC system for certain types of plant raw materials.

Compared with 2020, moderate changes in the ATC distribution were observed. The number of items in group V03AX increased from three to four, while groups such as R07AX (parmelia thallus) and V03A (bidens, sage) appeared only in 2025. At the same time, several groups present in 2020 were not represented in 2025. Overall, these findings indicate a partial restructuring of the ATC distribution rather than substantial expansion, consistent with the overall stability in the total number of registered MPRM.

4. DISCUSSION

The obtained results make it possible to characterize the pharmaceutical market of MPRM in the Republic of Kazakhstan as quantitatively stable, yet limited in terms of product range and number of manufacturers. Despite the unchanged number of registered items in 2020 and 2025, structural changes were identified, related to the redistribution of manufacturers and refinement of the nomenclature of certain types of raw materials. The analysis is based on two discrete time points (2020 and 2025), which limits the ability to assess long-term trends and temporal dynamics.

The analysis revealed a high degree of concentration in MPRM production, with the majority of registered items attributed to a single manufacturer. The high proportion of MPRM produced by a single manufacturer indicates a high level of market concentration. These findings suggest structural changes rather than substantial expansion of the market. This highlights the significant role of individual enterprises in shaping the range of plant raw materials on the national pharmaceutical market. At the same time, the study was primarily based on descriptive analytical methods, which limits a more in-depth assessment of market structure. In this regard, the application of quantitative indicators, such as concentration ratios or the Herfindahl–Hirschman Index, would improve the robustness of the analysis and may serve as a direction for future research.

It should be noted that no imported MPRM were identified in the official list of registered medicinal products, indicating the predominance of domestically sourced raw materials in this category. However, this finding should not be interpreted unequivocally as complete dominance of domestic production, as it may be influenced by several factors. In particular, regulatory and classification features may affect the representation of imported MPRM in the State Register. In addition, the availability of substantial natural resources of medicinal plants within the Republic of Kazakhstan enables the domestic market to be supplied primarily by local raw materials [14]. Similar patterns have been reported in other countries, where the production of medicinal plants is oriented toward the use of local resources, thereby reducing the need for imports of similar products.

The findings are consistent with international studies showing that in countries with a well-developed natural resource base of medicinal plants, the market is characterized by a predominance of local production and limited dependence on imports [15, 16]. In contrast, countries actively involved in the global trade of medicinal plants tend to exhibit a higher share of imported raw materials [15]. In this context, the MPRM market in the Republic of Kazakhstan demonstrates a clear orientation toward the use of local resources and a high level of production concentration.

The analysis of the distribution of MPRM according to the ATC classification showed that a substantial proportion of plant raw materials falls within categories with broad therapeutic applications, whereas most other groups are represented by single items, indicating limited representation of MPRM in narrowly specialized therapeutic areas.

Additional interpretation of the results can be obtained by linking MPRM to their pharmacotherapeutic uses. Although most items are represented by single entries, they cover a wide range of therapeutic areas. In particular, oak bark is used as an anti-inflammatory agent for the oral cavity, mint for functional gastrointestinal disorders, immortelle as a hepatoprotective agent, senna as a laxative, wormwood as an appetite stimulant, St. John's wort as a metabolic agent, yarrow as a haemostatic agent, celandine in dermatological practice, lingonberry and bearberry as uroseptic agents, valerian as a sedative, linden as an antitussive, parmelia thallus for respiratory conditions, and chamomile flowers as a general therapeutic agent. This confirms the broad pharmacological activity of MPRM and their multifaceted use in clinical practice.

Thus, the pharmaceutical market of MPRM in the Republic of Kazakhstan is characterized by quantitative stability, a high level of production concentration, and a clear orientation toward the use of local resources. The findings expand current understanding of the structure of the national MPRM market and may be useful for further research and development of approaches to the rational use of plant resources in pharmaceutical practice.

CONTRIBUTION OF THE AUTHORS

Conceptualization, A.J; formal analysis, Sh.A; resources, Sh.A; preparation of original draft, A.J and Sh.A; writing review and editing, A.J. All authors have read and agreed with the published version of the manuscript.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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АНАЛИЗ ФАРМАЦЕВТИЧЕСКОГО РЫНКА ЛЕКАРСТВЕННОГО РАСТИТЕЛЬНОГО СЫРЬЯ В РЕСПУБЛИКЕ КАЗАХСТАН: ДИНАМИКА ИЗМЕНЕНИЙ МЕЖДУ 2020 И 2025 ГОДАМИ

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АБСТРАКТ

Лекарственное растительное сырьё является основой растительных препаратов в медицинской практике, а изучение его ассортимента на фармацевтическом рынке Казахстана позволяет оценить тенденции развития, расширение продукции и совершенствование стандартов контроля качества. Цель исследования заключалась в сравнительном анализе ассортимента, морфологических групп и состава отечественных производителей лекарственного растительного сырья, зарегистрированных в Государственном реестре лекарственных средств Республики Казахстан в 2020 и 2025 годах, с выявлением изменений в номенклатуре и распределении по АТХ классификации. Использованы открытые данные реестра, проведён ретроспективный анализ количества и распределения сырья по морфологическим группам и классам АТХ, а также систематизация информации о производителях с проверкой ботанических названий в Microsoft Excel. Результаты показали, что общее количество зарегистрированного сырья оставалось стабильным (26 наименований), при этом основным производителем является ТОО «Зерде-Фито». Появление новых производителей – ТОО «Даулет-Фарм» и ТОО «Карагандинский фармацевтический завод» – сопровождалось регистрацией ранее отсутствовавших видов, включая слоевища пармелии и траву соссюреи солончаковой. Категории АТХ расширились за счёт новых терапевтических областей, а номенклатура некоторых видов уточнена. Рынок лекарственного растительного сырья в Казахстане сохраняет стабильность по количеству, при этом происходит структурное обновление ассортимента, появление новых производителей и гармонизация номенклатуры, что отражает развитие фитотерапии и укрепление национального фармацевтического сектора.

Ключевые слова: лекарственные растения; фармакогнозия; фармацевтическая промышленность; реестры; Казахстан; классификация.

ҚАЗАҚСТАН РЕСПУБЛИКАСЫНДАҒЫ ДӘРІЛІК ӨСІМДІК ШИКІЗАТЫНЫҢ ФАРМАЦЕВТИКАЛЫҚ НАРЫҒЫН ТАЛДАУ: 2020–2025 ЖЫЛДАР АРАЛЫҒЫНДАҒЫ ӨЗГЕРІСТЕР ДИНАМИКАСЫ

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АБСТРАКТ

Дәрілік өсімдік шикізаты медициналық тәжірибеде өсімдік препараттарының негізі болып табылады, оның Қазақстан фармацевтикалық нарығындағы ассортиментін зерттеу даму тенденцияларын, өнімнің әртараптандырылуын және сапаны бақылау стандарттарын жетілдіруді бағалауға мүмкіндік береді. Зерттеудің мақсаты – 2020 және 2025 жылдары Қазақстан Республикасы Дәрілік заттардың мемлекеттік реестрінде тіркелген отандық дәрілік өсімдік шикізатының ассортименті, морфологиялық топтары мен өндірушілер құрамын салыстырмалы талдау жасап, номенклатурадағы өзгерістер мен АТХ жіктемесі бойынша таралуын анықтау. Ашық деректерді пайдалана отырып, шикізат саны, оның морфологиялық топтары мен АТХ жіктемесі бойынша таралуы ретроспективтік талданды, сондай-ақ өндірушілер туралы ақпарат жүйелендірілді, ботаникалық атаулар Microsoft Excel бағдарламасында тексерілді. Нәтижелер бойынша тіркелген шикізат саны тұрақты болып, 26 атаудан өзгермеген, негізгі өндіруші – «Зерде-Фито» ЖШС. Жаңа өндірушілер – «Даулет-Фарм» ЖШС және «Қарағанды фармацевтикалық зауыты» ЖШС – бұрын жоқ түрлерді, оның ішінде пармелия талломдары мен сортаң соссюрея шөбін тіркеді. АТХ санаттары жаңа терапиялық бағыттар бойынша кеңейтілді, ал кейбір түрлердің номенклатурасы нақтыланды. Қазақстандағы дәрілік өсімдік шикізатының нарығы саны бойынша өзгеріссіз қалып, ассортимент құрылымының жаңаруы, жаңа өндірушілердің пайда болуы және номенклатураның үйлесуі фитотерапияның дамуын және ұлттық фармацевтикалық сектордың нығаюын көрсетеді.

Түйін сөздер: дәрілік өсімдіктер; фармакогнозия; фармацевтикалық өнеркәсіп; тізілімдер; Қазақстан; жіктеме.