

MARKET OVERVIEW OF L-ARGININE-CONTAINING MEDICINAL PRODUCTS REGISTERED IN UZBEKISTAN

Salokhiddinov Khabibullo Adhamjon ogli

ORCID: <http://orcid.org/0009-0007-6236-1951>

Assistant at the Department of Oncology and Radiology,

Tashkent State Medical University

Physician at the Republican Specialized Scientific and Practical

Medical Center of Pediatric Oncology, Hematology and Immunology

Abstract: *L-arginine is a biologically active amino acid with broad therapeutic potential and wide clinical use in cardiovascular, metabolic, hepatological, and restorative medicine. The growing role of amino acid-based preparations in modern pharmacotherapy requires a systematic evaluation of their availability in the national pharmaceutical market. This study presents a structured analysis of medicinal products containing L-arginine registered in the Republic of Uzbekistan between 2020 and 2023. The investigation focused on their proportion within the total number of registered medicines, country of origin, dosage forms, and pharmacotherapeutic classification. The findings demonstrate a steady increase in the registration of L-arginine-containing medicines over the observed period, reflecting expanding demand and broader therapeutic utilization. At the same time, the analysis reveals a relatively limited share of domestic products and a predominance of infusion forms among the registered preparations. The results may be useful for pharmaceutical market forecasting, import substitution strategies, and the development of new combination formulations in domestic pharmaceutical practice.*

Keywords: *L-arginine, pharmaceutical market, dosage forms, State Register, Uzbekistan, marketing analysis.*

Introduction

In recent years, the pharmaceutical sector has shown increasing interest in amino acid-based medicinal products due to their physiological compatibility and therapeutic versatility. Among them, L-arginine occupies a particularly important place because of its involvement in metabolic regulation, endothelial function, immune response, detoxification processes, and tissue repair.

L-arginine is considered a conditionally essential amino acid. Under normal physiological conditions, endogenous synthesis may be sufficient; however, in states of stress, trauma, inflammation, liver dysfunction, cardiovascular pathology, or increased metabolic demand, the body's requirement for arginine may rise significantly. This explains its active use in various fields of medicine.

Clinically, L-arginine has attracted attention due to its role as a precursor of nitric oxide, which contributes to vasodilation, improvement of endothelial function, and regulation of blood flow. Because of these mechanisms, arginine-containing preparations are often used in supportive treatment for cardiovascular disorders, hepatic dysfunction, metabolic imbalance, asthenic conditions, and parenteral nutrition programs.

The increasing clinical relevance of L-arginine has naturally influenced the pharmaceutical market. Therefore, studying the assortment and registration dynamics of L-arginine-containing medicines in Uzbekistan is important not only from a marketing perspective, but also for understanding current therapeutic trends and opportunities for local pharmaceutical production.

Aim of the Study

The aim of this study was to evaluate the range and structure of medicinal products containing L-arginine registered in the Republic of Uzbekistan during the period 2020–2023, with emphasis on their quantitative growth, manufacturer geography, dosage forms, and pharmacotherapeutic groups.

Materials and Methods

The study was carried out using a content and comparative market analysis approach. The main source of information was the State Register of Medicines, Medical Devices, and Medical Equipment of the Republic of Uzbekistan for the years 2020, 2021, 2022, and 2023. These official registers were used as the primary database for identifying medicinal products containing L-arginine.

The analysis was conducted according to the following indicators:

proportion of L-arginine-containing medicines among all registered medicines;

distribution according to manufacturing country or territorial origin;

classification by dosage form;

classification by pharmacotherapeutic group.

The obtained data were systematized and interpreted to determine the overall market tendencies for this category of medicinal products.

Results and Discussion

1. Growth in the Number of Registered L-Arginine Preparations

The analysis demonstrated that the number of medicines containing L-arginine in the State Register of Uzbekistan increased during the study period. In 2020, the total number of registered L-arginine-containing products was relatively limited, whereas by 2023 the segment had expanded considerably.

When compared to the total number of all registered medicines, the share of L-arginine-containing products remained numerically modest, but a clear upward trend was observed. Over the four-year period, the proportion increased from 0.46% to approximately 1.0–1.1%, indicating a nearly twofold rise in representation within the pharmaceutical registry

This tendency suggests that L-arginine-based preparations are becoming more relevant in clinical and pharmaceutical practice. Such growth may be associated with several factors:

increasing use of metabolic and supportive therapy;
wider application of amino acid-based infusion products;
growing interest in endothelial and hepatoprotective agents;
rising demand for parenteral nutritional support.

Although the absolute market share is still relatively small, the upward trajectory indicates a stable and expanding niche.

2. Manufacturer Distribution and Market Dependence

One of the important findings of the study is the geographical imbalance in the supply of L-arginine-containing medicines. Despite the presence of domestic manufacturers, a significant proportion of the registered products originated from foreign pharmaceutical enterprises.

The share of locally produced preparations reached only about 40.7%, while the remaining segment was represented mainly by imported products. Among foreign manufacturers, the largest contribution was associated with China and India, which appear to dominate this market category in Uzbekistan

This result has several practical implications:

Dependence on imports remains substantial in this therapeutic segment.

The local pharmaceutical industry still has room to expand production of amino acid-based medicines.

The market may be vulnerable to external supply fluctuations, pricing changes, and import logistics.

From a strategic perspective, the relatively low proportion of domestic production indicates an opportunity for Uzbek pharmaceutical manufacturers to strengthen their presence by developing competitive analogues or novel combination products containing L-arginine.

3. Dosage Form Structure

The dosage form analysis revealed a very clear pattern: the overwhelming majority of registered L-arginine-containing medicines in Uzbekistan were presented as solutions for infusion.

This dosage form consistently accounted for the dominant share of the market throughout the study period, reaching approximately 86–90% of all registered L-arginine-based products

Other dosage forms identified in the register included:

injectable solutions;

oral solutions;

granules;

concentrates for infusion solution;

film-coated tablets;

inhalation solutions (in isolated cases).

The predominance of infusion forms is clinically understandable. L-arginine is frequently used in conditions requiring rapid systemic action, supportive inpatient therapy, vascular correction, and parenteral administration. This makes infusion formulations especially relevant in hospital-based treatment settings.

However, the low diversity of dosage forms also highlights an underdeveloped segment of outpatient and patient-friendly formulations, such as oral preparations and combination products. Expanding this segment could improve accessibility and convenience for long-term supportive therapy.

4. Pharmacotherapeutic Distribution

The pharmacotherapeutic classification showed that the majority of registered L-arginine-containing medicines belong to the category of parenteral nutrition agents. This group represented approximately 71% of all analyzed products.

The second major category consisted of agents used for the correction of metabolic processes, accounting for around 24% of the total assortment. The remaining share was distributed among smaller therapeutic groups such as: hepatoprotective agents; angioprotectors; nootropics; adaptogens and general stimulants

These findings reflect the multifunctional pharmacological role of L-arginine. Although the substance has a broad spectrum of possible clinical applications, its actual market representation in Uzbekistan remains concentrated mainly in infusion therapy and metabolic support.

This may indicate that the pharmaceutical market has not yet fully realized the broader therapeutic potential of L-arginine in areas such as:

cardiometabolic support, endothelial dysfunction correction, liver protection, rehabilitation medicine, adjunctive therapy in chronic disease states.

Thus, the pharmacotherapeutic profile of the current assortment appears narrower than the full clinical potential of the substance.

Scientific and Practical Significance

The present analysis is relevant for both pharmaceutical marketing and drug development planning. The observed increase in the number of registered L-arginine-containing medicines confirms growing medical and commercial interest in this active substance.

At the same time, several practical conclusions emerge:
the market remains heavily concentrated in infusion dosage forms;
there is a noticeable dependence on imported products;
domestic pharmaceutical production in this segment remains insufficiently developed;
the existing assortment does not yet fully reflect the therapeutic versatility of L-arginine.

Therefore, this market segment can be considered promising for:
expansion of local manufacturing;
development of innovative dosage forms;
creation of fixed-dose combinations with hepatoprotective, metabolic, or cardiovascular agents;
diversification of products for both inpatient and outpatient use.

Conclusion

The conducted analysis showed that medicinal products containing L-arginine occupy a small but steadily growing segment of the pharmaceutical market of Uzbekistan. Between 2020 and 2023, the share of these medicines in the State Register increased approximately twofold, indicating a positive growth trend and increasing clinical demand.

The study also demonstrated that:

domestic products account for only a limited proportion of the total assortment;

the market is dominated by foreign manufacturers, particularly from China and India;

infusion solutions remain the leading dosage form;

the principal pharmacotherapeutic groups are parenteral nutrition agents and metabolic correctors.

Overall, the findings suggest that the Uzbek pharmaceutical market has significant potential for the further development, diversification, and local production of L-arginine-containing medicines. In particular, the creation of combined formulations and more patient-oriented dosage forms may represent a promising direction for future pharmaceutical innovation.

REFERENCES

1. Almakaeva L.G., Litvinova E.V. Arginine and its use in medicine and pharmacy. *Journal Faces of Ukraine*. 2011;1(5):23–26.
2. Stepanov Yu.M., Kononov I.N., Zhurbina A.I. Arginine in medical practice: literature review. *Academy of Medical Sciences of Ukraine*. 2004;10(1):340–352.
3. Golubkov E.P. *Marketing Research: Theory, Practice and Methodology*. Moscow: Finpress; 2012.

4. Zuparova Z.A., Khaydarov V.R. Study of the range of choleretic medicines registered in the Republic of Uzbekistan. *Pharmaceutical Journal*. 2019;(2):3–6.
5. Ilkhamova N.B., Yunusova Kh.M., Tashmatova M.A. Analysis of antidiabetic medicines in the pharmaceutical market of the Republic of Uzbekistan. *Pharmvestnik*. 2022;(4):22–25.
6. Mirzakamalova D.S., Flisyuk E.V., Karieva Y.S. Analysis of the domestic market of medicines with mucolytic action. *Pharmvestnik*. 2022;(4):15–22.
7. State Register of Medicines, Medical Devices and Medical Equipment of the Republic of Uzbekistan. Editions 24–27 (2020–2023).