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STRUCTURED ANALYSIS OF DRUGS CONTAINING ANTIBIOTICS USED IN THE REPUBLIC OF UZBEKISTAN

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ABSTRACT

A structured analysis of antibiotics by comparing the qualitative and quantitative characteristics registered and used in the Republic of Uzbekistan has been carried out. An increase in the registration of antibiotics of the macrolide group by foreign manufacturers has been revealed. The need for the development and introduction into domestic pharmaceutical production of antibiotics of the macrolide group in the form of transdermal and soft combined dosage forms containing antihistamine, antibacterial and anti-inflammatory drugs is noted.

KEYWORDS: Antibiotics, classification, registry, macrolides, pharmacotherapy, chemical structure.

INTRODUCTION

One of the most urgent problems of the antibacterial drugs use, recognized at the world level, is the growth of microorganisms resistance. The consequence of antibiotic resistance is an increase in material costs, the number of deaths, and a decrease in control in the field of healthcare. The World Health Organization's global strategy to contain antimicrobial resistance has proposed an intervention framework to reduce the spread of resistance, including by improving access to antimicrobial medicines and supporting the introduction of new drugs to the market.[1,2] Antibiotics are widely used in medicine for the prevention and treatment of infectious diseases, 80% of which are used in most countries in stationary conditions.[3] The main purpose of antibiotics in outpatient practice is for the treatment of acute respiratory infections, as well as acute urinary tract infections.[4,5] In outpatient practice, widely used antibiotics are derivatives of quinolone and fosfomycin, including penicillins, cephalosporins, and macrolides. The most widely used group of antibacterial agents are macrolides.

Relevance. Antibacterial drugs are a non-renewable resource, due to the continuous development of antibiotic resistance in microorganisms. The overuse of antibiotics by the population, misconceptions and underestimation of the problem of resistance by doctors and pharmacists lead to the spread of resistance. There is also the problem of the presence of falsified samples on the pharmaceutical market, which makes the development of unified and fairly expressive methods for quality control of drugs containing macrolides, and in particular azithromycin, relevant. In connection with the above, the task of developing a new transdermal and soft dosage form containing azithromycin is topical.[5]

Objective: conducting a content analysis of medicines containing antibiotics presented on the pharmaceutical market of the Republic of Uzbekistan.

MATERIALS AND METHODS

The object of the study is the nomenclature of drugs containing antibiotics included in the State Register of medicinal preparations (MP), medical devices (MD) and medical equipment (ME) of the Republic of Uzbekistan, a structured analysis.

In the process of conducting content analysis, as an object of research, data on the registration of drugs containing antibiotics according to the materials of the State Register of medicinal preparations (MP), medical devices (MD) and medical equipment (ME) of the Republic of Uzbekistan for the period 2020-2022 (1st half of the year), the list of essential drugs.[6]

RESULTS AND DISCUSSION

Research was carried out using a formalized method for studying textual graphic information, which consists in interpreting the studied information into quantitative indicators and its statistical processing. In view of the wide range of antibiotics drugs of a number of different world brands, a structured analysis of the nomenclature of antibiotics by country was carried out. Currently, 957 trade names of medicines containing antibiotics are

registered in the Republic of Uzbekistan, taking into account various nomenclature positions of forms and packaging. The distribution and change in the nomenclature of antibiotics by producing countries are presented in Table 1 and Figure 1.

Table 1: Analysis of changes in the ratios of nomenclature positions of antibiotics by country for 2020-2022 (1st half of the year).

Years	Total quantity	Foreign countries		CIS countries		Domestic	
		quantity	%	quantity	%	quantity	%
2020	826	488	59	146	17.67	192	23.24
2021	886	536	60,5	138	15.57	212	23.93
2022	957	601	62,8	140	14.63	216	22.57

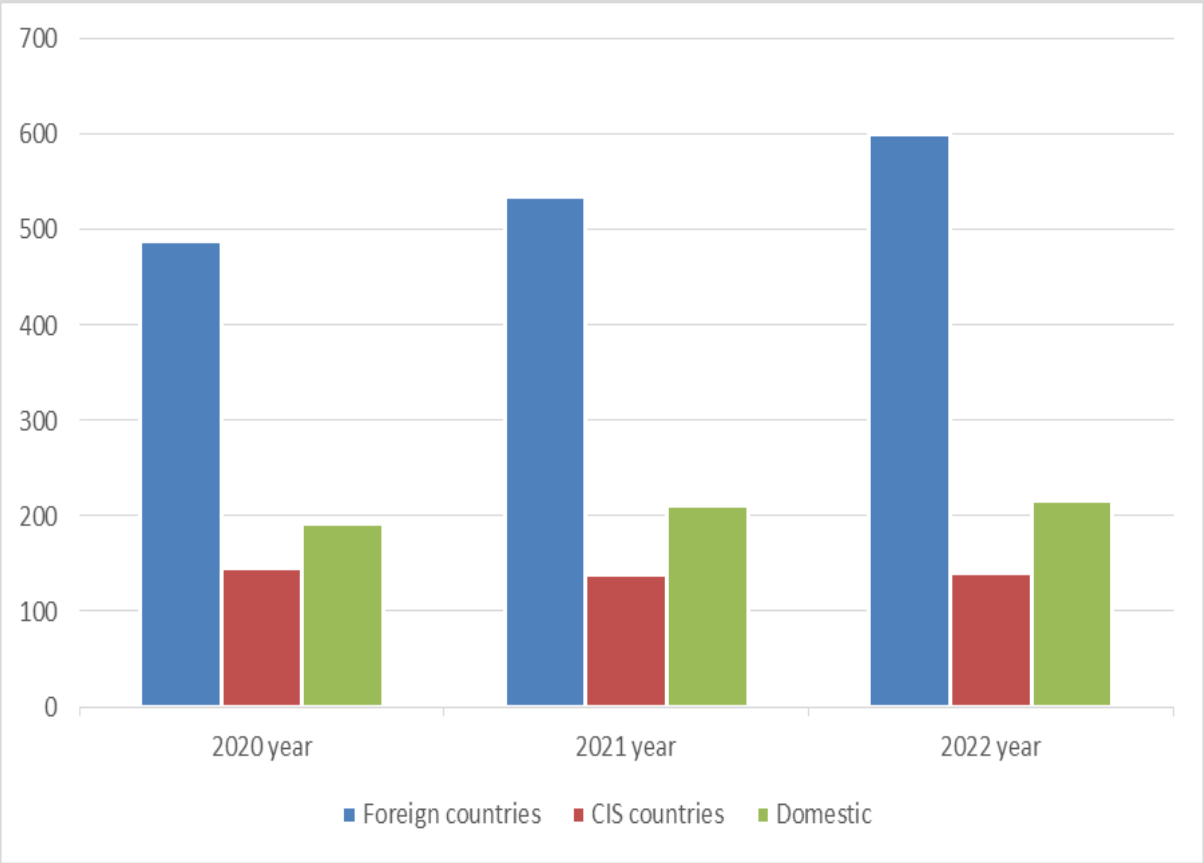

Fig. 1: Quantitative ratio of nomenclature positions of antibiotics by country for 2020-2022 (1st half of the year).

The data presented in Table 1 indicate a significant increase in registered antibiotics for 2020, 2021 and for the first half of 2022–826; 886; 957 respectively. In digital and in % ratio from foreign manufacturers for 2020 - 488, (59%) are registered, for 2021 - 536, (60.5%) and for 2022 - 601, (62.8%). The indicators of the CIS countries registered from manufacturers for 2020 are 146, (17.67%), 2021 -138, (15.57%), 2022 - 140, (14.63%). While domestic manufacturers registered -192 (23.24%) in 2020, 212 (23.93%) in 2021, 216 (22.57%) respectively in 2022.

An analysis of registered antibiotics by dosage forms was also carried out. For 2022, antibiotics sold on the market of the republic by dosage forms are unevenly distributed (Table 2, Figure 2).

Table 2: Analysis of changes in the ratios of nomenclature positions in the quantitative and % ratio of antibiotics by dosage forms for 2020-2022 (1st half of the year).

Dosage form	Total quantity	Foreign countries		CIS countries		Domestic	
		quantity	%	quantity	%	quantity	%
Powder for the preparation of an injection solution	1464	994	67.9	226	15.44	244	16.67
Tablet	572	361	63.11	59	10.31	152	26.57
Ointment	75	24	32	21	28	30	40
Capsules	194	66	34	25	12.88	103	53
Solution for injections	135	69	51.11	35	25.92	31	22.96
Eye drops	51	21	41.17	12	23.53	18	35.29
Lyophilizate for solution for injection	18	4	22.22	7	38.89	7	38.89
Suspension for oral administration	42	25	59.52	7	16.67	10	23.8
Vaginal suppositories	12	5	41.67	4	33.33	3	25
Liniment	29			10	34.48	19	65.51
Granule	40	36	90	2	5	2	5
Vaginal cream	14	12	85.7	2	14.28		
Alcohol solution for external use	107	69	64.48	0	0	38	35.51
Aerosol	3	3	100	0	0	0	0
Gel	4	4	100	0	0	0	0
Spray	2	0	0	2	100	0	0

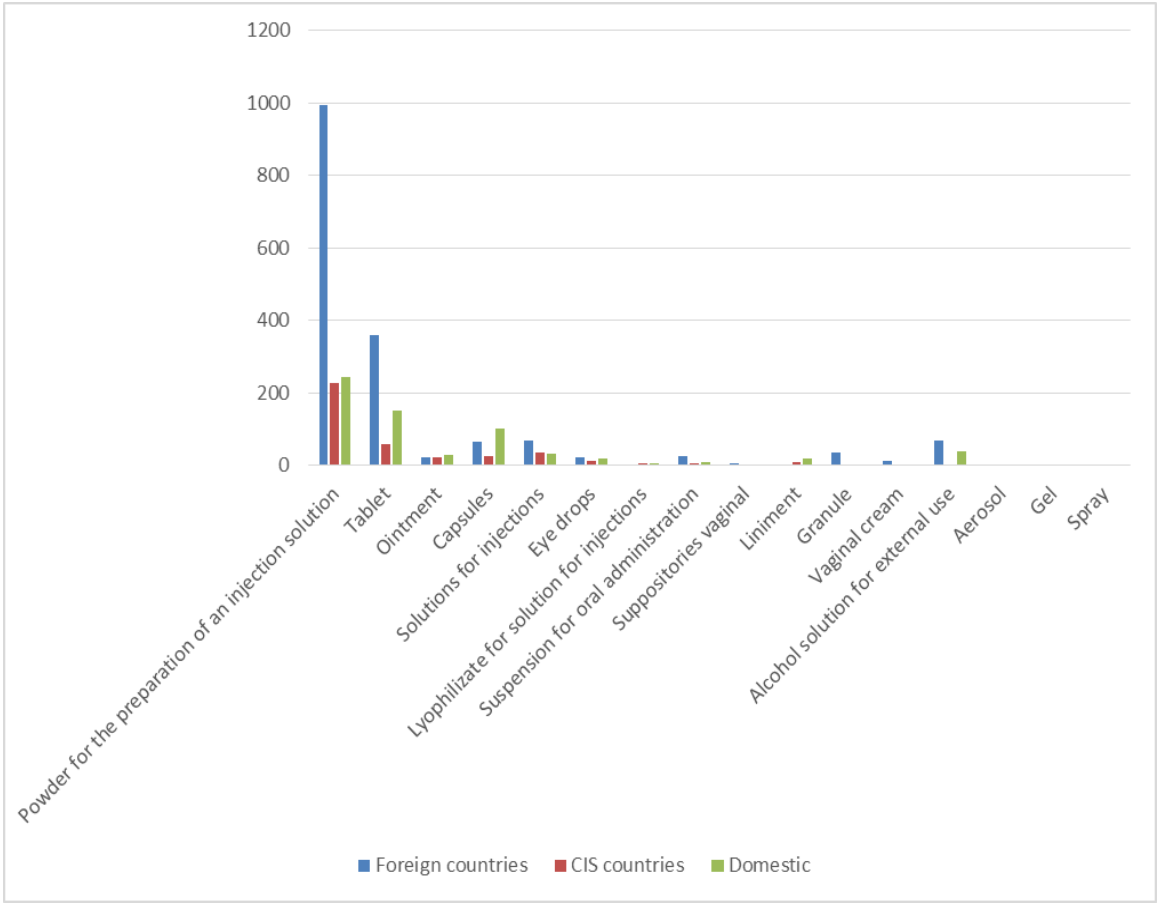

Figure 2: Analysis of changes in the ratios of nomenclature positions of antibiotics by dosage forms for 2020-2022 (1st half of the year).

The data presented in Table 2 indicate that the ratio of the nomenclature positions of antibiotics by dosage forms in the form of a powder for the preparation of an injection solution occupy a leading position. Powder for the preparation of an injection solution from foreign manufacturers was registered 994 (67.9%), from manufacturers of the CIS countries - 226 (15.44%); domestic manufacturers registered 244 (16.67%). Next in descending order are tablets, soft dosage forms (suppositories, gels, creams) make up only a small part.

Table 3: Analysis of changes in the ratios of nomenclature positions of antibiotics by chemical structure for 2020-2022 (1st half of the year).

Chemical structure	Total quantity	Foreign countries		CIS countries		Domestic	
		Quantity	%	Quantity	%	Quantity	%
Penicillins	281	75	26.7	38	13.52	168	59.8
Chloramphenicol	125	50	40	11	8.8	64	51.2
Aminoglycoside	122	72	59	30	24.6	20	16.39
Lincosamines	80	30	37.5	15	18.75	35	43.75
macrolides	421	226	53.68	43	10.21	152	36.10
Tetracyclines	35			20	57.14	15	42.86
Glycopeptides	18	4	22.22	7	38.89	7	38.89
Cefolasporins	1021	796	77.96	105	10.28	120	11.75
Lincomycins	12	5	41.67	4	33.33	3	25
Lincosamines	29			10	34.48	19	65.51
Fluoroquinolones	40	36	90	2	5	2	5
Carbopenims	14	12	85.7	2	14.28		

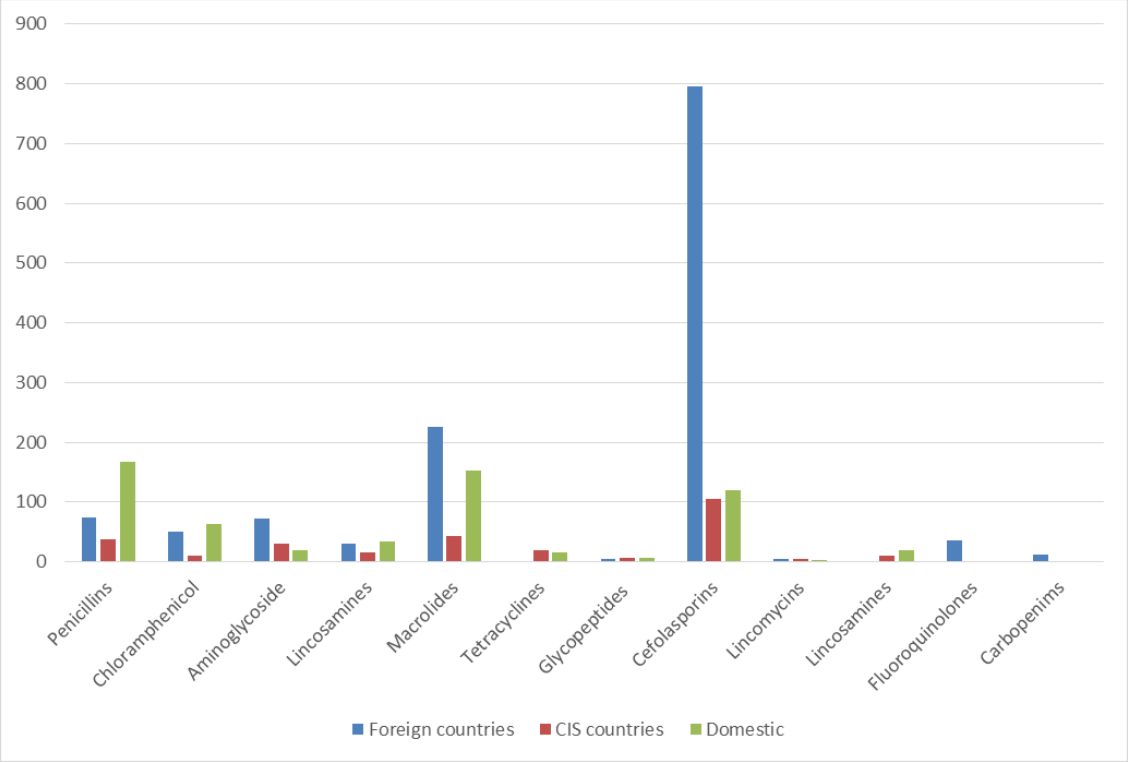

Figure 3: Analysis of changes in the ratios of nomenclature positions of antibiotics by chemical structure.

Analysis of changes in the ratios of nomenclature positions of antibiotics by chemical structure (Table No.3 and Figure 2) showed that cefolasporins, macrolides are most of all registered from foreign manufacturers. Registered cefolasporins from the CIS countries account for 105 (10.28%), from foreign countries - 796 (77.96%), while macrolides from the CIS countries account for 43 (10.21%), from foreign countries - 226 (53.68%). Analysis of changes in the ratios of nomenclature positions of macrolide antibiotics in the context of countries for 2020-2022 are presented in Table 4 and Figure 3.

Table 4: Analysis of changes in the ratios of nomenclature positions of macrolide antibiotics by country for 2020-2022.

Years	Total quantity	Foreign countries		CIS countries		Domestic	
		quantity	%	quantity	%	quantity	%
2020	123	78	63.44	10	8.11	35	28.45
2021	145	81	55.86	17	11.72	47	32.41
2022	153	82	52.94	15	9.80	56	36.60

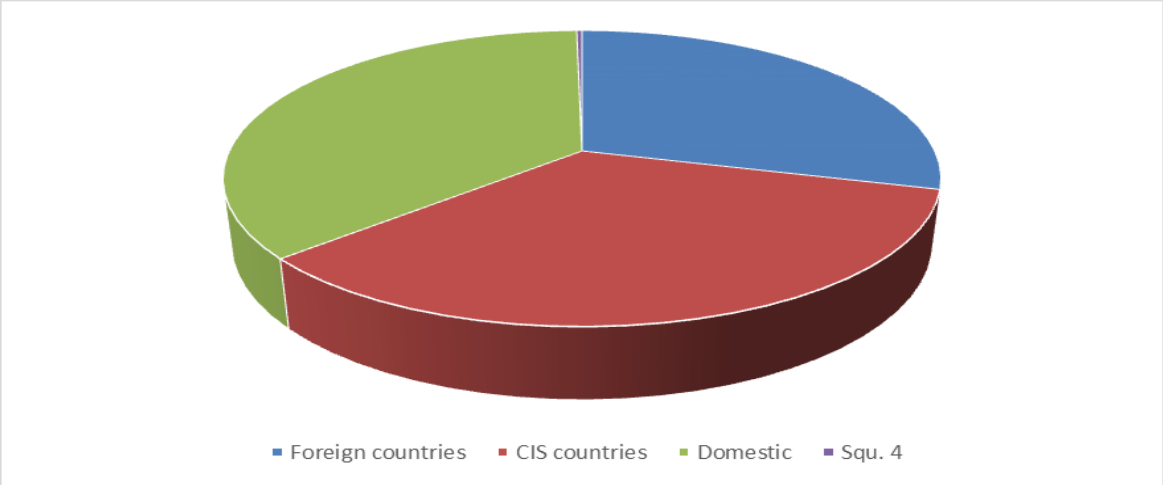

Figure 4: Analysis of changes in the ratios of the nomenclature of macrolide antibiotics by country for the period 2020-2021 and the first half of 2022.

The data presented in Table 4 indicate that antibiotics of the macrolide group in terms of numbers and percentages show a significant increase over the years. For 2020-2022 -123; 145; 153, respectively, which indicates the growth of registered from foreign manufacturers. From foreign manufacturers for 2020 - 78 (63.44%) were registered, for 2021 - 81 (55.86%) and 2022 - 82 (52.84%), respectively. The indicators of the CIS countries registered from manufacturers for 2020 are 10 (8.11%), 2021 - 17 (11.72%), 2022 - 15 (9.8%). While domestic producers registered 35 (28.45%) in 2020, 47 (32.41%) in 2021, in 2022 - 56 (36.6%) respectively.

In addition, an analysis of registered antibiotics of the macrolide group according to dosage forms was carried out. According to the indicators of antibiotics for 2022 sold on the market of Uzbekistan, dosage forms are distributed unevenly, powders for the preparation of an injection solution occupy a leading position.

Table 5: Analysis of changes in the ratios of the nomenclature positions of macrolide antibiotics by dosage forms for 2020-2022 (1st half of the year).

Dosage form	Total quantity	Foreign countries		CIS countries		Domestic	
		quantity	%	quantity	%	quantity	%
Powder for the preparation of an injection solution	120	46	39.33	10	8.33	64	53.33
Tablet	210	120	57.14	25	11.90	65	30.95
Capsules	40	12	30	8	20	20	50
Eye drops	6	3	50	3	50		
Lyophilizate for injection solution	4	3	75	1	25		
Suspension for oral administration	41	13	31.70	8	19.51	20	47.78

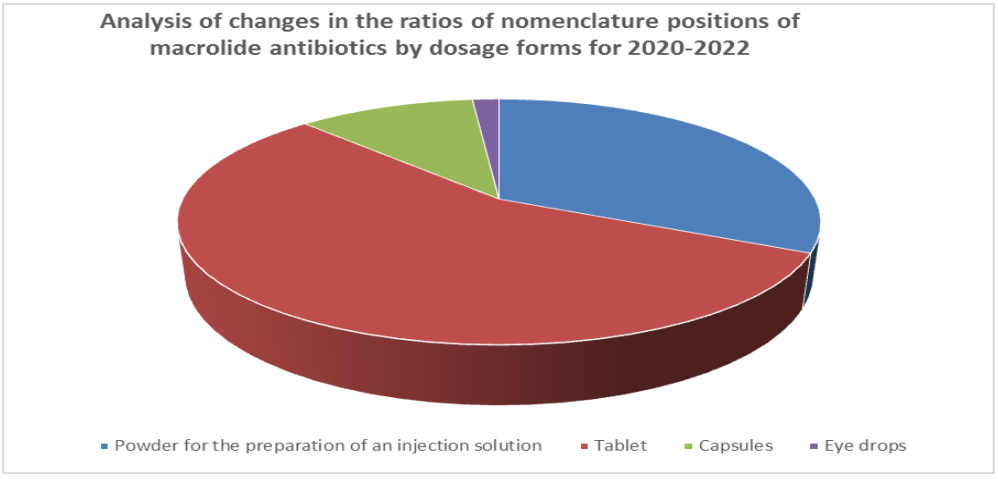

Figure 5: Analysis of changes in the ratios of the nomenclature positions of macrolide antibiotics by dosage forms for 2020-2022 (1st half of the year).

The data presented in Table 5 indicate that the ratio of nomenclature positions of antibiotics of the macrolide group according to dosage forms are presented in the form of tablets, occupy a leading position. 120 (57.14%) tablets were registered from foreign manufacturers, 25 (11.90%) - from CIS manufacturers, 65 (30.95%) items were registered by domestic manufacturers.

CONCLUSION

A structured content analysis of drugs containing antibiotics was carried out by comparing the qualitative and quantitative characteristics according to the criteria: chemical classification, nomenclature position, dosage forms, origin of the range of non-CIS countries (CIS) and the Republic of Uzbekistan. There is an increase in foreign items, relative to local ones, and from the CIS countries, imported for the period from 2020 - 2022 (first half of the year).

It was revealed that, according to the ratio of the nomenclature positions of antibiotics according to the chemical structure of cefolasporins, macrolides are the most registered from foreign manufacturers. Registered cefolasporins from the CIS countries are -105 (10.28%), from foreign countries - 796 (77.96%), while macrolides from the CIS countries are 43 (10.21%), from foreign countries - 226 (53, 68%). The foregoing indicates the relevance of replacing imported drugs with local ones in the form of soft dosage forms of combined action.

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