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Hormonal drugs for veterinary use in the pharmaceutical market: assortment analysis

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Abstract. Medicines are successfully used to correct physiological and biochemical processes, primarily to intensify the development of the animal organism in agriculture. Registered medicinal products for veterinary use comprises 2384 units. Modern pharmacology has a wide range of drugs that contribute to faster development to increase the muscle mass of the animal and significantly reduce costs for obtaining marketable products. Hence the attention paid to hormonal drugs by zootechnical and veterinary services. The results of a marketing study of the veterinary use drugs range that are officially registered in the specialized market of the Russian Federation are presented. The study was conducted to ensure the target consumer market. The results obtained will increase the awareness of specialized specialists, expand their professional horizons and, as a result, improve the coordination of material, labor and financial assets of the veterinary organization and its activities in general.

Keywords: pharmacotherapy, veterinary medicine, glucocorticosteroids, drug market

Author contribution: Belousov E.A. — processing and structuring of the received information, content analysis of the studied data; Novikova E.O. — search and primary systematization of the studied data; Karasev M.M. — graphical analysis of the studied data; Belousova O.V. — structural analysis of the studied data; Notina E.A. — linguistic design of the received material; Novikov O.O. — general management of scientific work. All authors reviewed the final version of the manuscript and approved it.

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Introduction

Marketing research of the veterinary medicinal products market allows to ensure the awareness of subject matter specialists [1, 2]. There is a systematization of knowledge, expansion of professional horizons, which can contribute to the coordination of labor and financial assets of a veterinary and pharmaceutical organization [2].

At the present stage, the growth of commodity production of agricultural products, including animal products, has a positive impact on the development of pharmaceutical science and the pharmaceutical industry [2]. Together with the growth of the livestock, the need for drugs for veterinary use, including those containing hormones or their synthetic analogues, increases proportionally [3, 4]. With the growing welfare of the country's population, the number of pets has increased, which, like farm animals, require veterinary care [2, 3]. It should be noted that the successful functioning of the veterinary service without the use of hormonal drugs in medical and preventive practice is currently virtually impossible [3–8].

Hormones are highly specialized signaling molecules that control a number of important biochemical processes occurring in peripheral tissues, including those located far from the endocrine glands [7, 9, 10]. The main effects of hormones are metabolic, morphogenic, kinetic, corrective, and permissive. Some hormonal drugs are steroids and have anabolic activity, and even a slight increase in their concentration in the blood can lead to an increase in body weight. In veterinary medicine, hormones are used to stimulate growth and weight gain, accelerate puberty, and increase digestibility of feed [11, 12].

In animal husbandry and veterinary medicine, drugs containing hormones or their synthetic analogues are widely used in gynecological practice to synchronize the reproductive function of the breeding stock. This group of therapeutic drugs (TD) is no less in demand in the treatment of various inflammatory processes, including in the uterus and other organs associated with reproductive function [13, 14]. Often, the use of hormones by veterinarians allows minimizing the duration of the disease, reducing the severity of pathological processes and normalizing the condition of the animal, minimizing the costs of its treatment [14, 15].

The aim of the study is to analyze the range of drugs containing hormones or their synthetic analogues for veterinary use presented on the pharmaceutical market of Russia, by pharmacotherapeutic (PhT) groups, the number of active substances contained in the drug, the state of aggregation, the manufacture's country origin, the manufacturer, the

types of liquid dosage forms, the dispensing from the pharmacy, the years of registration and the objects of veterinary use.

Materials and Methods

Objects of research: Federal Law No. 61-FL (61-ФЗ) "On the Circulation of Medicinal Products", State Register of Medicinal Products for Animals, Vidal Handbook.

Research methods

– content analysis — a scientific method involving the systematic and reliable recording of certain elements of a certain set of documents content with the subsequent quantitative processing of the data obtained;

– structural analysis — based on system analysis, works as a set of geographical maps in the study of the system, starting with a general overview and subsequent detail;

– graphical analysis — an image of numerical values and their ratios using geometric images and graphic aids, i.e. visuals. The study, among other things, used the "Radar chart" tool to build a multi-criteria model and compare quantitative variables. The radar chart shows which variables have similar values, and whether there are outliers among the values of each variable;

– analytical research — a detailed analysis of any data, a way of studying current processes and phenomena, based on which the solution is then applied.

The study used the materials of published marketing research from printed and electronic publicly available sources of information, analytical materials of the studied profile market, as well as data from government organizations published in official documents.

Results and Discussion

Analyzing the State Register of Medicinal Products for Animals, an information array of drugs containing hormones or their synthetic analogues in their structure was formed. It was revealed that the structure of the assortment is determined by 95 trade names (TN) of medicinal products, the manufacturers of which are 38 manufacturing pharmaceutical companies. All drugs are over-the-counter and general sales list medicine.

At the first stage, a study was conducted on pharmacotherapeutic groups. The study of the assortment by pharmacotherapeutic groups makes it possible to systematize (arrange, optimize the groups) of drugs by their use for the treatment of groups of diseases, diseases of certain organs and systems of an animal or specific diseases. According to the results of the study, 11 PhT groups were identified:

– other hormones, their analogues and antagonists — determine 14 TN — 15.0%;

– hormones of the hypothalamus, pituitary gland, gonadotropins and their antagonists — 48 TN — 51.0%;

– glucocorticosteroids — 5TN — 5.0%;

– estrogens, progestogens, their homologues and antagonists — 2 TN — 2.0%;

– insulins in combinations — 1 TN — 1%;
– insulins — 2 TN — 2.0%;
– other hormones, their analogues and antagonists in combinations — 2 TN — 2.0%;
– glucocorticosteroids in combinations — 3TN — 3.0%;
– hormones of the hypothalamus, pituitary gland, gonadotropins and their antagonists in combinations — 2 TN — 2.0%;
– estrogens, progestogens, their homologues and antagonists in combinations — 1 TN — 1.0%;
– other antibacterial and antifungal agents in combinations — 15 TN — 16.0% (Fig. 1).

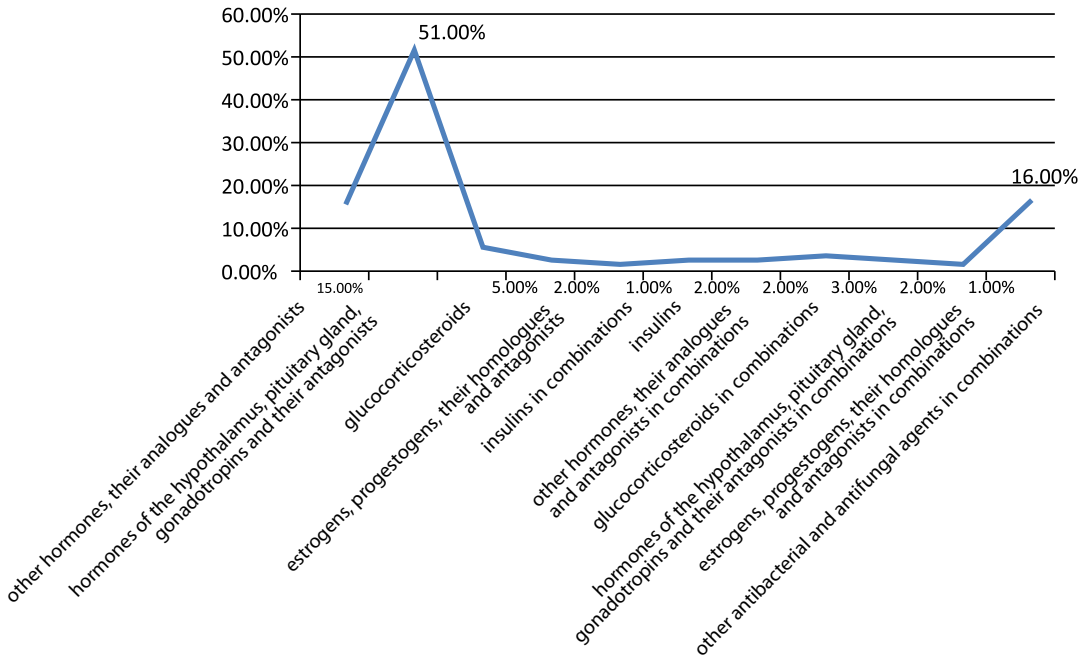

Fig. 1. Ranking of study results depending on pharmacotherapeutic groups, %
Source: compiled by E.A. Belousov, E.O. Novikova, M.M. Karasev, O.V. Belousova, E.A. Notina, O.O. Novikov.

The assortment of drugs by the number of active substances present in the composition was studied. It was determined that monocomponent drugs make up 57 TNs (60.0%), two-component drugs constitutes 19 TNs (20.0%), three or more-component drugs make up 19 TNs (20.0%). It can be concluded that mono-component hormonal drugs dominate the Russian market. All drugs are over-the-counter (Fig. 2).

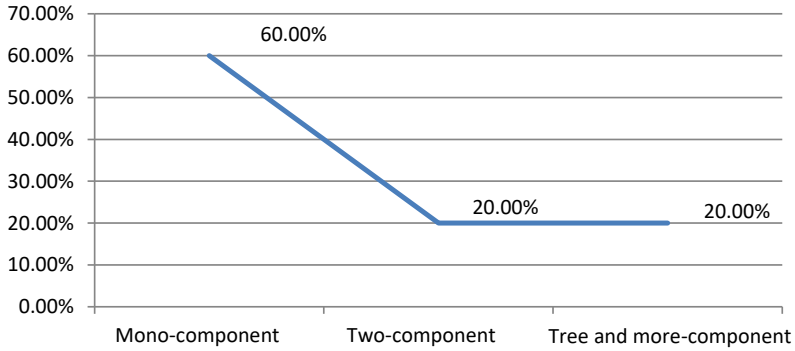

Fig. 2. Ranking of results by the number of active substances, %

Source: compiled by E.A. Belousov, E.O. Novikova, M.M. Karasev, O.V. Belousova, E.A. Notina, O.O. Novikov.

The veterinary medical products market is formed by sixteen countries of manufacturers of drugs containing hormones or their synthetic analogues in their composition. The Russian Federation, having 46 TN, which is 49%, is the leader among the producing countries; Great Britain has 5 TN (5.0%); Spain — 6 TN (6.0%); Germany — 11 TN (12.0%); France — 8 TN (9%); the Netherlands — 3 TN (3.0%); Belgium — 3 TN (3.0%); the Czech Republic — 4 TN (4.0%); Belarus — 2 TN (2%); Korea, Australia, Slovenia, Estonia, New Zealand, Portugal, Ireland have 1 TN each (1.0%). The obtained data allow us to suggest the prevalence of Russian target drugs in the Russian consumer market, which makes up almost 49 % of the hormonal drugs market included in the state register of veterinary drugs, which indicates success in import substitution (Fig. 3).

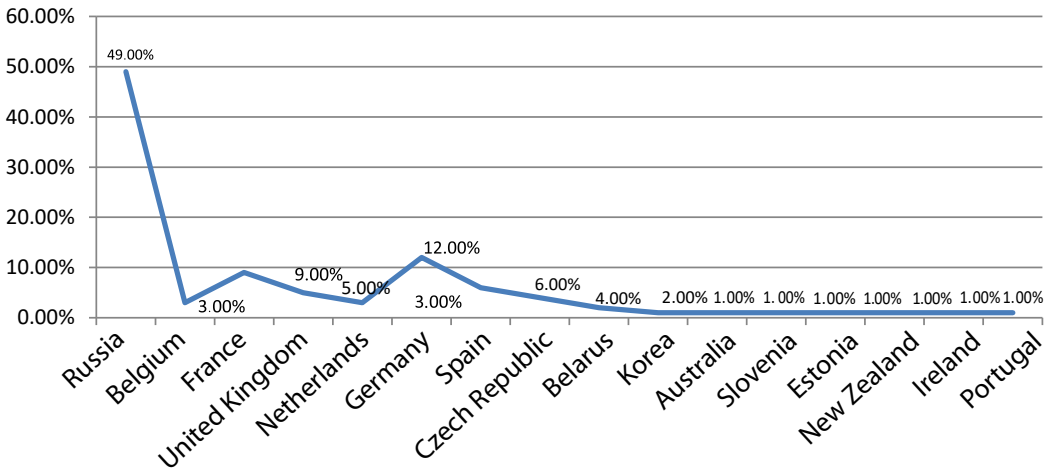

Fig. 3. Ranking of study indicators depending on the country of manufacture, %

Source: compiled by E.A. Belousov, E.O. Novikova, M.M. Karasev, O.V. Belousova, E.A. Notina, O.O. Novikov.

The hormonal veterinary drugs market was studied depending on the manufacturer. It was revealed that the pharmaceutical company LLC ASTRAPHARM is the leader among the companies producing hormonal drugs for veterinary use and accounts for 8 TN (9.0%); the companies JSC MOSAGROGEN, Intervet International GmbH, Ceva Sante Animale — 6 TN each (7.0%); Apicenna LLC — 5 TN (6.0%); Veyx-Pharma GmbH, NITA-FARM LLC, JSC Ecoprom, Bioveta S.A., Norbrook Laboratories Limited — 4 TN each (4.0%); pharmaceutical companies Askont+ LLC, AVZ S-P LLC, Zoetis Belgium S.A., AGROVETZASHCHITA S-P LLC, Laboratorios Hipra, S.A. — 3 TN each (3.0%); Medsintez Plant LLC, Federal State Educational Institution Federal Center for Animal Health Protection, SPAZ-pharm LLC, Intervet International B.V., Agrofarm LLC, Laboratorios SYVA S.A.U. — 2 TN each (2%); pharmaceutical companies KRKA, d.d., Novomesto, DEC International NZ Ltd, Boehringer Ingelheim Animal Health France SCS, VIK — Animal Health, Vet Pharma Frisoyte GmbH, Dales Pharmaceuticals Limited, VIRBAC (AUSTRALIA), Dong Bang Co., Ltd, Virbac, M–L.I.D., Alfasan International B.V., LLC Vector, PUP Gomel Plant of Veterinary Preparations, Bimeda Chemicals Export, Lusomedicamenta, Sociedade Tecnica Farmaceutica, S.A., Industrial Veterinaria, S.A. INVESA, Interchemie Werken De Adelaar Eesti AS, LLC Vetbiokhim — 1 TN each (1.0%) of the studied range of drugs (Fig. 4).

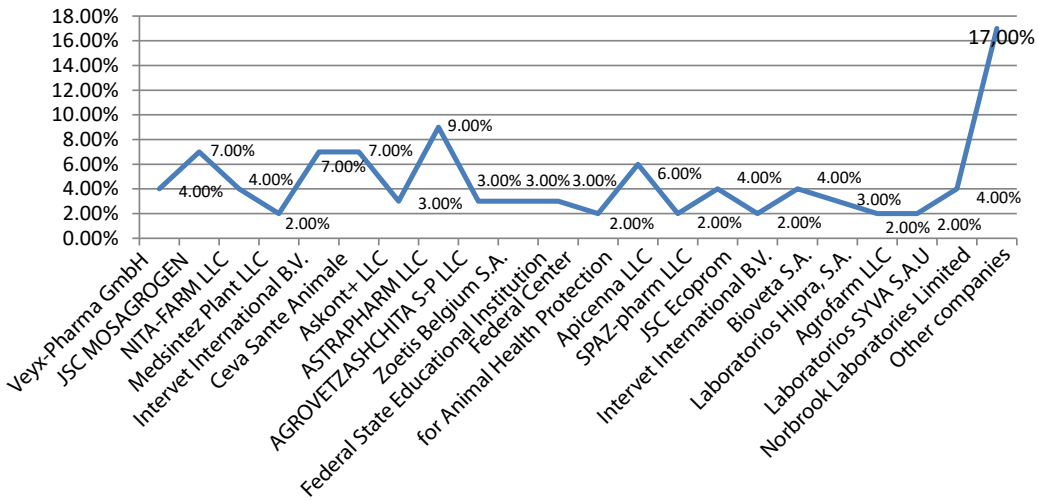

Fig. 4. Ranking of study results depending on the manufacturer, %

Source: compiled by E.A. Belousov, E.O. Novikova, M.M. Karasev, O.V. Belousova, E.A. Notina, O.O. Novikov.

The aggregation state study had the following results. The leading position is occupied by liquid dosage forms — 75 TN (79.0%); the number of solid forms accounts for 14 TN (15.0%); soft and other dosage forms account 3 TN (3%). The predominance of liquid dosage forms is directly related to the possibility to introduce the active substance into the bloodstream, this is especially true in the conditions of stall housing of most animals (Fig. 5).

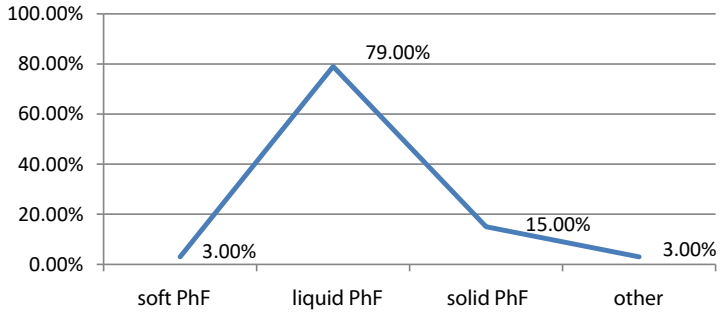

Fig. 5. Ranking of the assortment by aggregation state, %

Source: compiled by E.A. Belousov, E.O. Novikova, M.M. Karasev, O.V. Belousova, E.A. Notina, O.O. Novikov.

The dominant position of liquid dosage forms, due to their undoubted advantages in the convenience of use and the pharmacological effect from their use, which is listed in the accompanying documents of the drug and which the veterinarian expects, as it gives predictable results and a positive effect on the health of the animal, obliges to conduct a study within this target group of drugs. The study showed the prevailing position of injection solutions — 31 TN (42.0%) of the studied cluster of liquid drugs. The minimum amount of TN is represented by oil solutions for oral administration and solutions for external use — 1 TN (1.0%). The second place in terms of the amount of TN in the study is divided by the lyophilisate for the preparation of injection solutions and suspensions for intracisternal use — 10 TN each (13.0%). Drops for oral administration are represented by 5 TN (7.0%). Suspensions are shared by 6 TN (8.0 %) for injection, 4 TN (5.0%) for oral administration and 3 TN (4.0%) for external use. Oral solutions and ear drops account for 2 TN each (3.0%) of the studied range of liquid dosage forms (Fig. 6).

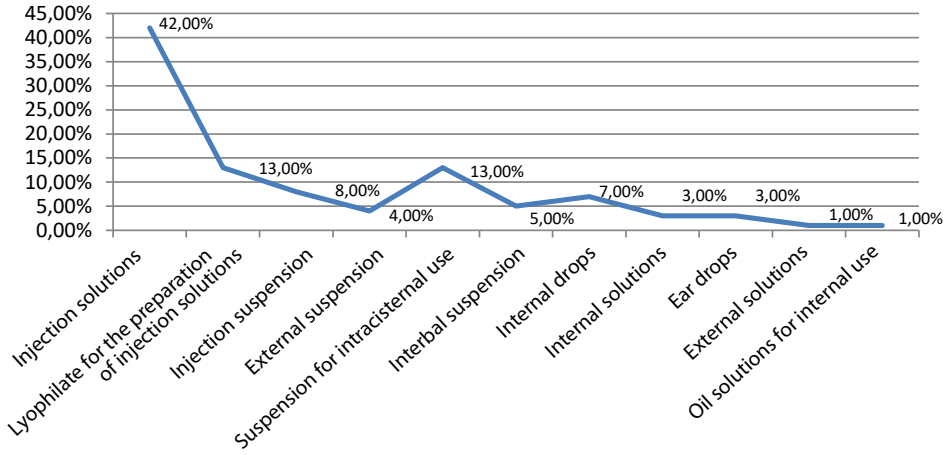

Fig. 6. Ranking of the target drugs market within liquid dosage forms, %

Source: compiled by E.A. Belousov, E.O. Novikova, M.M. Karasev, O.V. Belousova, E.A. Notina, O.O. Novikov.

Data on the registration of drugs containing hormones or their synthetic analogues in their composition from 2013 to 2024 are presented. The maximum amount of TN hormonal drugs (16.0%) was registered in 2019. The steady increase in the number of registered drugs from 2013 to 2019 was replaced by a decrease in registered TN from 2020 to 2024, which may indicate a decrease in dependence on imports, an increase in the activity of national pharmaceutical science and industry to produce Russian analogues in the conditions of import substitution and stabilization of the hormonal drugs market used in veterinary medicine (Fig. 7).

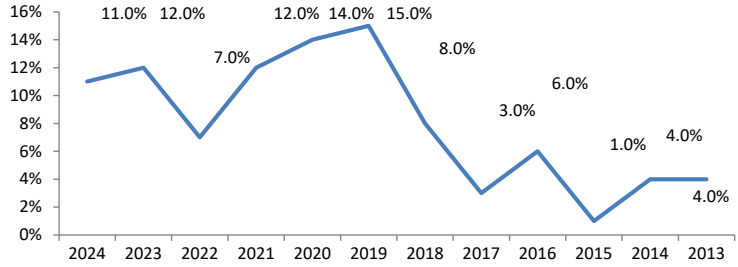

Fig. 7. Ranking of results depending on the date of registration,%

Source: compiled by E.A. Belousov, E.O. Novikova, M.M. Karasev, O.V. Belousova, E.A. Notina, O.O. Novikov.

In turn, a study was conducted on the frequency of the use of drugs containing hormones or their synthetic analogues in the veterinary service of farm, pet and other types of animals. It was revealed that drugs for farm animals account for 43 TN (45.0%); for pet and farm account for 13 TN (14.0%); only for pet account for 36 TN (38.0%); not included in the first three groups account for 3 TN (3.0%) (Fig. 8).

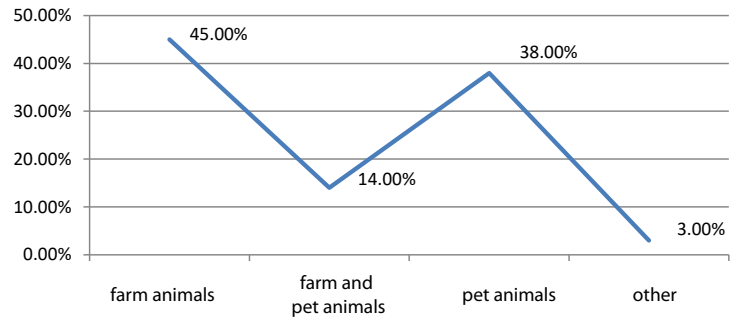

Fig. 8. Ranking of the target drugs market by frequency of use at different veterinary services facilities, %

Source: compiled by E.A. Belousov, E.O. Novikova, M.M. Karasev, O.V. Belousova, E.A. Notina, O.O. Novikov.

The diagram presented for better visualization shows that the indicators "General sales list medicine", "Single-component drugs", "Solutions for injection", "Liquid DF" and "Made in Russia" are stable values of the hormonal drugs market in the Russian Federation (Fig. 9).

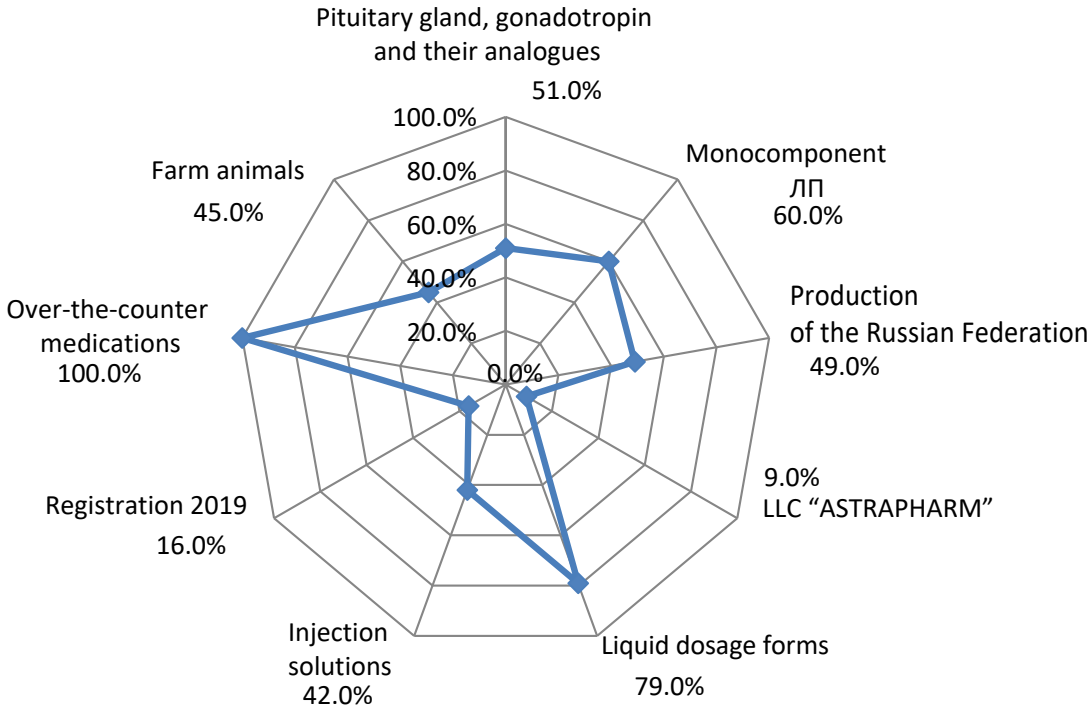

Fig. 9. Grading of maximum study indicators,%

Source: compiled by E.A. Belousov, E.O. Novikova, M.M. Karasev, O.V. Belousova, E.A. Notina, O.O. Novikov.

Conclusion

The assortment of drugs containing hormones or their synthetic analogues for veterinary use, which are registered in the pharmaceutical market of Russia, was studied. The percentage of hormonal drugs as of 15.11.2024 is 4% of the total number of registered drugs.

It was found that the PhT group "Hormones of the hypothalamus, pituitary gland, gonadotropins and their antagonists" is 51.0%; monocomponent drugs comprises 60.0%; 49% of drugs are produced in the Russian Federation; drugs of LLC "ASTRAPHARM" accounts for 9%; liquid drugs accounts for 79%; solutions for injection comprises 42.0% of the studied cluster of liquid dosage forms. The maximum amount of TN hormonal drugs (16.0%) was registered in 2019. Drugs for farm animals comprises 45% of the studied range of hormonal drugs.

The conducted marketing research of the Russian market of drugs containing hormones or their synthetic analogues for veterinary use makes it possible to ensure the awareness of specialists, expand their professional horizons and, as a result, improve the coordination of the material, labor and financial assets of the veterinary organization and its facilities in general.

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Гормональные препараты для ветеринарного применения на фармацевтическом рынке: анализ ассортимента

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Аннотация. Для коррекции физиологических и биохимических процессов в первую очередь с целью интенсификации развития животного организма в сельском хозяйстве успешно используются лекарственные средства. Зарегистрировано 2384 лекарственных препаратов для ветеринарного применения. Современная фармакология обладает широким спектром лекарственных средств, способствующих более быстрому развитию с целью увеличения мышечной массы животного и значительному снижению затрат для получения товарной продукции. Отсюда такое внимание к гормональным препаратам со стороны зоотехнических и ветеринарных служб. Приведены результаты маркетингового исследования ассортимента лекарственных препаратов для ветеринарного применения, имеющих официальную регистрацию на профильном рынке Российской Федерации. Исследование проведено в обеспечение целевого потребительского рынка. Полученные результаты повысят информированность профильных специалистов, расширят их профессиональный кругозор и, как следствие, улучшат координацию материальных, трудовых и финансовых активов ветеринарной организации и ее деятельности в целом.

Ключевые слова: фармакотерапия, ветеринария, глюкокортикостероиды, рынок лекарств

Вклад авторов: Белоусов Е.А. — переработка и структурирование полученной информации, контент-анализ исследуемых данных; Новикова Е.О. — поиск и первичная систематизация исследуемых данных; Карасев М.М. — графический анализ исследуемых данных; Белоусова О.В. — структурный анализ исследуемых данных; Нотина Е.А. — лингвистическое оформление полученного материала; Новиков О.О. — общее руководство научной работой. Все авторы ознакомились с окончательной версией рукописи и одобрили ее.

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