

The influence of drugs containing gluconolactone on the morphological and biochemical parameters of the blood of rabbits

*Angelina Gusarova*¹, *Yulia Lyashchuk*^{2*}, *Alexey Ovchinnikov*², *Gennady Samarin*^{2,3}, and *Konstantin Ivanishchev*¹

¹Federal State Budgetary Educational Institution of Higher Education "State Ryazan Agrotechnological University named after P.A. Kostycheva", 1, st. Kostycheva, Ryazan, 390044, Russian Federation

²Federal State Budgetary Scientific Institution "Federal Scientific Agroengineering Center VIM", 5, 1-st Institutskiy proezd, Moscow, 109428, Russian Federation

³Federal State Budgetary Educational Institution of Higher Education "State Agrarian University of the Northern Trans-Urals", 7, st. Respubliki, Tyumen, 625003, Russian Federation

Abstract. The work discusses the use of antioxidants in the process of feeding rabbits and their effect on the morphological and biochemical parameters of the blood. The drug "Gluconolactone E575 Roquette SG" was chosen as a feed additive. Based on the studies, the authors drew conclusions about the positive effect of gluconolactone on the biochemical parameters of the blood of rabbits, assessed its therapeutic significance and the feasibility of including the drug as an additive in feed rations.

1 Introduction

The relevance of the study lies in the fact that in order to obtain healthy offspring and raise rabbits with high quality indicators of meat productivity, balanced feeding is necessary to maintain the activity of the animals. When there is an imbalance in feed rations, animals get sick more often and gain body weight more slowly [7].

Antioxidants play an important role in the life processes of farm animals. Rabbits, like other animals, can obtain antioxidants from plant foods, but their concentration may not be sufficient to fully protect against oxidative stress [8].

To stabilize feed rations, various biologically active additives are used to increase the efficiency of raising animals and improve productivity indicators [10].

There are a number of studies [4, 11] confirming the effectiveness of gluconolactone as a feed additive. Gluconolactone may affect the absorption of tilianin, as well as the intestinal and biliary excretion of acacetin.

When gluconolactone enters the body of animals with food, it reduces oxidative stress and increases the bioavailability of flavonoids, influencing their recycling processes, which improves health and increases the body's resistance to adverse environmental factors [1, 6].

* Corresponding author: ularzn@mail.ru

Thus, the use of preparations containing gluconolactone as a feed additive to the daily diet of rabbits is a promising area of research.

2 Materials and Methods

The purpose of the study was to evaluate the effect of the drug “Gluconolactone E575 Roquette SG” on the morphological and biochemical parameters of the blood of rabbits.

The effectiveness of the drug was assessed by monitoring hematological blood parameters and the dynamics of live weight of rabbits. The studies were conducted in a private rabbit farm (Ryazan region, Ryazan district, Zubenki village).

For experimental studies, we selected analogue animals (male chinchilla rabbits aged 30 days) in the amount of twenty animals.

After a medical examination and control weighing, the rabbits were divided into two groups of ten heads - control and experimental (experimental).

The experimental period was 3 months: from June 2022 to August 2022.

The rabbits of the experimental and control groups were kept in the same conditions, characteristic of the climatic conditions of the Ryazan region in the summer: two-tier sheds were installed in the fresh air under a canopy opposite each other, each rabbit was allocated an individual cage, which was regularly cleaned and put away. The choice of shed housing for rabbits was due to the fact that a fairly warm climate and fresh air in the summer are conducive to the growth and development of animals.

The basis of the diet of animals in both groups was compiled identically based on the standards and recommendations contained in GOST 34088-2017 “Guide to the maintenance and care of laboratory animals. Rules for keeping and caring for farm animals” [5].

The rabbits' diet was formulated according to their age, weight, health status and physiological needs. The diet was based on complete granulated feed, grain and high-protein grasses (alfalfa and clover).

The only difference in nutrition was that the rabbits of the experimental group were given the biologically active additive “Gluconolactone E575 Roquette SG” as a supplement. The drug is a white powder that easily dissolves in water. Thus, the rabbits of the experimental group received gluconolactone twice a day during morning and evening feeding at a dosage of 250 mg/kg. The rabbits of the control group did not receive any supplements.

The authors studied the dynamics of morphological and biochemical blood parameters. Monitoring the dynamics of indicators was carried out by taking samples weekly into an “IMPROMINI with EDTA K3” tube with a volume of 0.2-0.5 ml and examining the indicators of a general blood test using the “Mindray BC-2800vet” device (manufacturer: “Minrday”, official importer: “Zoomed”) in the conditions of the veterinary laboratory “9 Lives”.

3 Results

The drug “Gluconolactone E575 Roquette SG” contains gluconolactone, which is an antioxidant. Gluconolactone is one of the most common polyhydroxy acids in modern medicine. Its mechanism of action is similar to the activity of alpha hydroxy acids, while polyhydroxy acids have a larger molecular size, which allows for a mild and hypoallergenic effect on the body. Thus, polyhydroxy acids, in particular gluconolactone, are well suited for sensitive animals requiring special care [9].

The dynamics of hematological blood parameters in the control and experimental groups allowed us to conclude that the drug “Gluconolactone E575 Roquette SG” has a positive effect on the immune system and the general resistance of the rabbits’ body, even under the influence of adverse environmental factors on the animal’s body. This is due to the fact that gluconolactone is a natural antioxidant.

The results of experimental studies are presented in Figures 1-4.

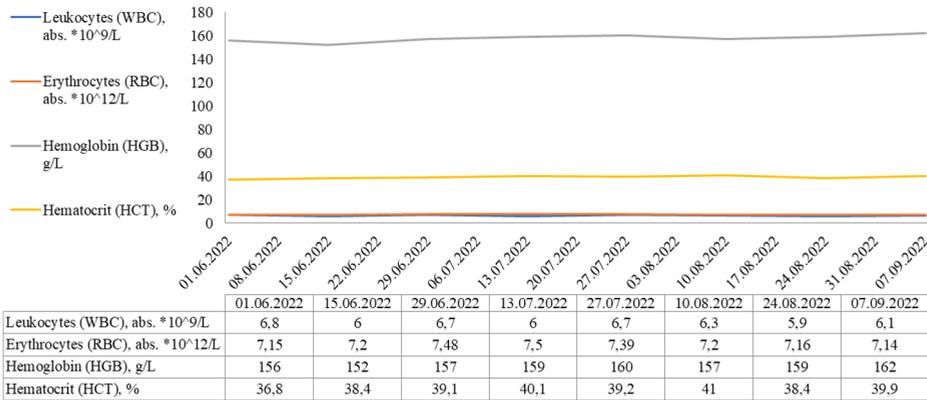


Fig. 1. Dynamics of morphological blood parameters in the experimental group.

Thanks to the use of the “Gluconolactone E575 Roquette SG” additive, the hematological parameters of the rabbits in the experimental group remained within normal limits throughout the entire duration of the experiment under similar feeding and housing conditions for the rabbits of both groups.

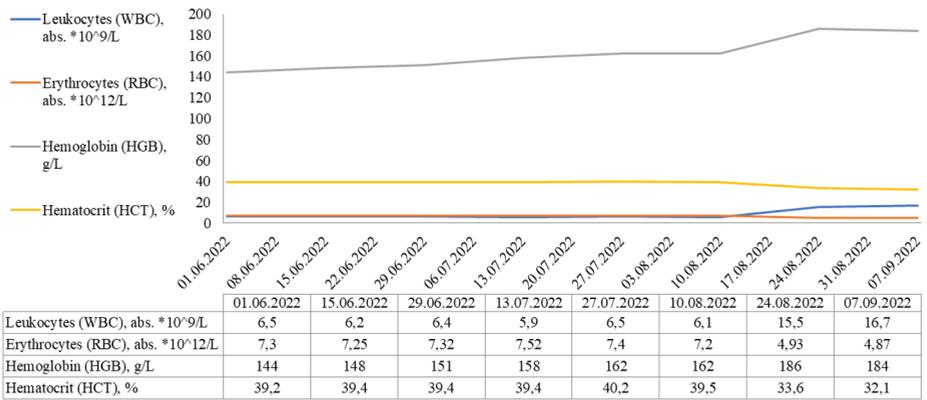


Fig. 2. Dynamics of morphological blood parameters in the control group.

Negative dynamics were observed in the control group. The decrease in erythrocytes in the control group during the period under review was $2,43 \cdot 10^{12}/L$. The hematocrit indicator also decreased and by the end of the experimental period it was 32.1%, while at the beginning of the experiment it was 39.2%. Thus, the loss of hematocrit was 7.1%, which is a significant change.

In the course of biochemical blood tests throughout the experiments, we noted smooth dynamics in the main indicators of biochemical blood analysis in the control and

experimental groups, with the exception of indicators of the dynamics of urea, creatinine and phosphorus content (Figures 3 and 4).

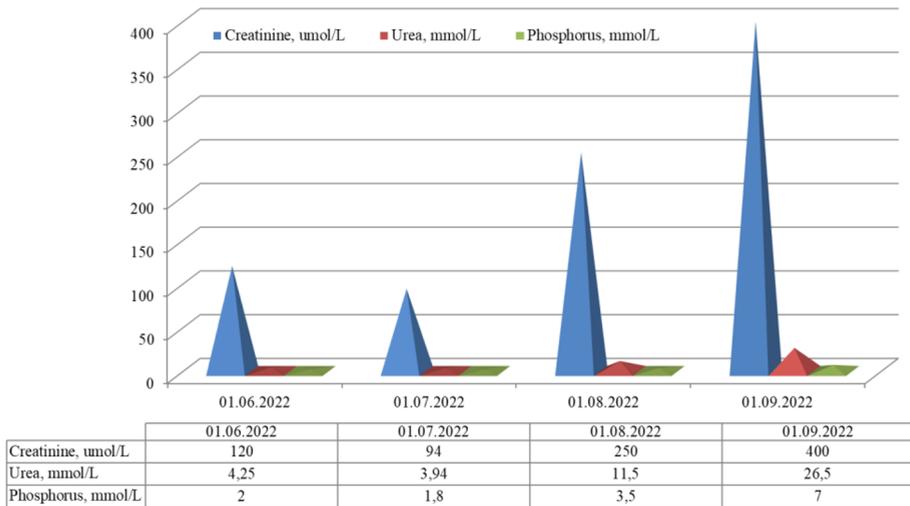


Fig. 3. Dynamics of biochemical blood parameters in the experimental group.

Analysis of the results obtained showed that by the end of the first experimental period, compared to the beginning, no indicators of the biochemical blood test had changed in the experimental group.

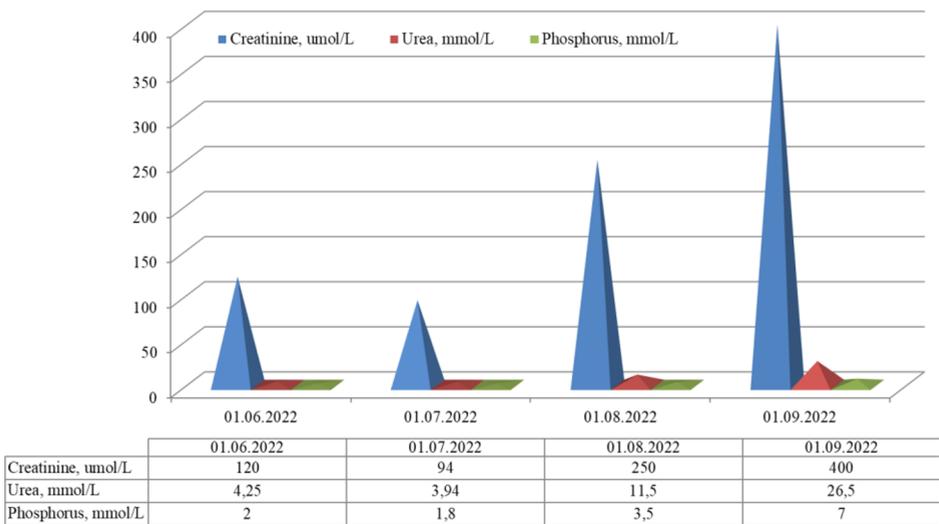


Fig. 4. Dynamics of biochemical blood parameters in the control group.

In the rabbits of the control group, in the analyzes taken on 08.01.2022 and 09.01.2022, the dynamics of the content of urea, creatinine and phosphorus significantly increased.

Thus, the inclusion of the dietary supplement “Gluconolactone E575 Roquette SG” in the diet of rabbits contributed to an increase in growth intensity and an increase in live weight of animals, which is most likely due to an improvement in metabolic processes due to the increased activity of the body’s antioxidant system.

Also, “Gluconolactone E575 Roquette SG” had a positive effect on the slaughter yield of carcasses. Post-mortem diagnostic data allowed us to conclude that the highest live weight of rabbits and the weight of a fresh carcass was observed in rabbits of the experimental group. The slaughter yield of this sample of animals was 55.18%, which is 3.88% higher than the control group. Accordingly, the slaughter yield of the control group was 51.3%. The drug does not have a negative effect on the quality of rabbit skins and fur.

The skins of all rabbits selected for slaughter were of high quality, with densely padded fur and no defects.

Thus, we can conclude that enriching the diet of rabbits with the drug “Gluconolactone E575 Roquette SG” is advisable, and the drug itself can be recommended for use in rabbit breeding enterprises.

4 Discussion

Issues related to the effectiveness of the use of gluconolactone were considered in the works of such authors as: V. V. Kulakov, E. O. Saikhanov, A. V. Koyudenko [8]. The mechanism of the antioxidant effect of gluconolactone on the body was discussed in the works of Dai P, Zhu L, Luo F [4], Xia B, Zhou Q, Zheng Z, Ye L, Hu M, Liu Z. [11] et al.

5 Conclusion

The results obtained led to the conclusion that during the period of application of Gluconolactone E575 Roquette SG supplementary feeding, the blood parameters in the animals of the experimental group at the final stage of the experiment remained almost at the same level as the indicators at the initial stage, while in the rabbits of the control group there was a negative dynamic of some blood parameters.

By the end of the experimental period, an increased content of leukocytes was observed in the blood of animals in the control group, which may be a marker of inflammatory processes. Negative changes also affected the content of erythrocytes and platelets, which may indicate a weakened state of the animal's body.

As a result of the research, we recorded a positive effect of the use of the drug “Gluconolactone E575 Roquette SG” on the immune system and the general resistance of the body of rabbits in the experimental group and the absence of pronounced side effects.

Also, “Gluconolactone E575 Roquette SG”, introduced into feed rations, at a fairly low cost, gives a positive economic effect when raising and fattening rabbits.

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