Productivity of rabbits when using the drug "KED+LBA" in their diets

N T Rasskazova, Z V Tsoy and A K Pulinets

Department of zootechnology and recycling of animals products, Primorsky State agricultural academy, 44 Blukhera Street, Ussuriisk, 592522, Russian Federation

E-mail: rasskazova55.55@mail.ru, zoyatsoy84@mail.ru, aspirantura_pgsa@mail.ru

Abstract. The rabbit is an important agricultural species, due to its high productivity, precocity, relative unpretentiousness in care, the possibility of use in the fur industry and the production of high-value dietary meat. Public and private organizations are concerned about the lack of industrial production of rabbit meat in Russia, as the demand for this product is growing. The quantity and quality of meat is more dependent on a full-fledged, balanced diet for nutrients and metabolic energy. In the conditions of the Primorsky territory, vegetable raw materials of the far Eastern flora are increasingly used in the practice of animal husbandry. It is used to balance the rations of the missing elements to improving the palatability of the basic feed, improvement of digestibility, purposeful change of the metabolism and the prophylaxis of stress conditions of animals. The article discusses the effect of the drug "KED+LBA" on the productivity of young rabbits in the conditions of Primorye.

1. Introduction

The rabbit is an important agricultural species, due to its high productivity, precocity, relative unpretentiousness in care, the possibility of use in the fur industry and the production of high-value dietary meat. Public and private organizations are concerned about the lack of industrial production of rabbit meat in Russia, as the demand for this product is growing. High fecundity and precocity of rabbits makes it possible to get meat from them in a short time with a high protein content, low cholesterol and good digestibility. The quantity and quality of meat depend to a greater extent on a full-fledged diet that is balanced in terms of nutrients and metabolic energy [1-3]. It is known that the search for local sources of feed and biologically active additives that can improve production efficiency has always been of great importance for the development of rabbit breeding [4-9].

Currently, there are new preparations from plants that are better absorbed by the animal body than vitamins, hormones, macro - and microelements obtained synthetically [6]. Such biologically active substances include preparations obtained from Amur velvet bast, Chinese lemongrass, and vitamin concentrate from aspen bark [10-12]. This can be attributed to herbal products, Sneakers and FOREHEAD (FOREHEAD-the inner bark of Amur velvet). The drug Ked is obtained from the husk of pine cones. Biologically active substances were isolated from waste pine cones of the Ussuri taiga after separating nuts from them. These biologically active substances are conventionally called Ked (patent RUS 2138160 08.06.1998). The drug KED is a brown powder with the smell of pine cones. The taste is salty-sour with a slight bitterness. The Ked preparation contains a wide range of biologically active substances: protein – 16.5%, fat – 25.81%, fiber – 0.66%, calcium – 7.48%; phosphorus – 0.28%; lipids...
– 33.9%; including phospholipids – 24.2%, cholesterol (free) – 0.4%, NFA (unsaturated fatty acids) – 5.7; triglycerides – 3.6% [13]. Our research in 1998 showed that the inclusion of the drug Ked in the diets of Minks had a positive effect on increasing their live weight, body length, increasing the yield of young animals, and improving the quality of skin products.

The introduction of the drug Ked in the diet of rabbits allowed to increase the absolute growth by 12%, the safety of livestock by 13.3%, the yield of slaughter weight by 1.9% and the level of profitability by 20.9% [14].

The inner bark of Amur velvet is a powder of a bright lemon-yellow colour and bitter taste. 100 g of dry matter contains nutrients (%): protein - 5.6; fiber - 20.0; ash - 7.9; micro and macronutrients: calcium - 6.1%; phosphorus - 0.1%; copper -3.4 mg/kg; zinc -7.9 mg/kg.

The use of the inner bark of the Amur cork in the feeding of young mink as a biologically active additive to the basic diet, in the conditions of Primorsky Krai has allowed to increase the relative weight gain of experimental animals males 0.7% females 0.3% (P>0.001), increase the level of hemoglobin and number of red blood cells, to improve the fur quality.

Commodity evaluation of skins showed a positive trend in favor of the introduction of mink FOREHEAD in the diet, the score for the quality of skins was 6.1% higher than the control. The level of profitability in the experimental group was 10.6% against 4.5% in the control group [15].

In the literature available to us, we did not find data on the use of biologically active substances isolated from the husk of cedar cones (Korean pine) and Amur velvet bast in feeding rabbits, so we decided to conduct research on the joint effect of Ked and LBA preparations on the productivity of rabbits and identify the optimal dose.

2. Methods and materials

Scientific and economic experience was carried out in the Primorsky territory on fattening young rabbits of the California breed from 45 to 120 days of age.

For the research, three groups of rabbits were formed by the method of pairs of analogs, taking into account the origin, live weight, age, and gender of 15 heads each.

The animals were kept in the same conditions. The first group was a control group, the second – an experimental group.

During the entire experiment, the drug "Ked + LBA" was set in periods of 10 days with the same interval. Intact rabbits did not receive the drug " Ked + LBA".

In the control group, rabbits were given a basic diet (RR), in the second group, the drug "Ked + LBA" was added to the main diet at the rate of 5 mg per 1 kg of live weight, and in the third group -10 mg per 1 kg of live weight.

The young animals of the experimental groups were fed to their heart's content (taking into account the palatability). The structure of granulated feed was as follows (%): barley – 29.0; wheat – 13.0; wheat bran – 10.5; soybean meal – 20.0; grass flour – 25.2; premix P 90-2 – 1.0%; lime flour – 1.3%. Watering was performed manually. [12-16]

The criteria for evaluating the growth of young animals were live weight indicators, estimated by individual weighing of rabbits at 45-, 60-, 90-day age. Based on the results of weighing, the average daily increase was calculated.

Throughout the experiment, the safety of young rabbits was taken into account. A pathoanatomic autopsy was performed on fallen rabbits and the cause of death was determined.

After the rabbits reached the age of 120 days, a control slaughter was carried out, 3 rabbits were selected from each group. The slaughter yield was determined by calculation, the ratio of the mass of the carcass together with the internal fat to the pre-slaughter mass expressed as a percentage. When determining meat qualities, the mass of a carcass with kidneys and internal fat without a head, skin and internal organs was weighed. After the rabbits were slaughtered, the internal organs were examined and weighed. In carcasses, the appearance and color of the surface, integumentary and internal adipose tissue, and abdominal serous membrane were determined by examination. After maturation of meat, varietal cutting of carcasses was carried out. When carrying out varietal cutting, carcasses were divided
into 4 anatomical parts: shoulder, cervical-thoracic, lumbosacral, and hip. To determine the amount of muscle, fat, and bones in the carcasses, they were boned. Then the meat ratio was calculated. The quality of rabbit meat was evaluated according to GOST 20235.0-74. At the same time, the appearance and color, the condition of the muscles on the incision, consistency, and smell were determined, according to the method developed by A. T. Mysik (1986).

Based on the research results, the economic efficiency of using the drug "KED + LBA" was calculated.

Purpose of research is to study the effectiveness of different doses of the drug "KED+LBA" in feeding young rabbits.

In accordance with this goal, the following tasks were defined:

- to study the effect of the drug "KED + LBA" on changes in body weight;
- analyze the effect of the drug on the "KED + LBA" safety of young animals and conduct pathoanatomical studies;
- determine the effect of the drug "KED + LBA" on the meat quality of rabbits;
- establish economic efficiency.

### 3. Results
The studied drug had a positive effect on the growth of live weight of rabbits. Throughout the experiment, high rates were observed in animals of the 2nd experimental group, which received mixed feed with the addition of the drug "KED+LBA" in the amount of 5 mg/kg of live weight. Rabbits of the 2nd experimental group at the end of the study had a greater absolute increase in live weight compared to the control by 6.1%.

We have identified a positive effect of the drug "KED+LBA" on the safety of rabbits. The safety of livestock in the control group was 80%, in the 2nd and 3rd experimental groups 93.3 and 86.6%, respectively. At autopsy, the fallen rabbits of the control group were found to have a lesion of the small intestine. The mucous membrane of the small intestines is reddened, sometimes with peeling, the contents of the intestines are liquid, sometimes with gas bubbles. In the 2nd experimental group, 1 goal had to be scored due to a traumatic injury. In the 3rd experimental group, rabbits died from sunstroke.

Changes in the live weight of rabbits are shown in Table 1.

| Index                                          | I control          | II experimental | III experimental |
|------------------------------------------------|--------------------|-----------------|------------------|
| Live weight at the begging of the research (45 days), g | 1020.6±7.1 (n=15)  | 1022.2±5.1 (n=15) | 1028.8±6.4 (n=15) |
| Live weight at 60 days age, g                   | 1518.3±6.8 (n=14)  | 1721.5±6.9 (n=15) | 1615.4±6.3 (n=15) |
| Live weight at 90 days age, g                   | 2551.4±11.9 (n=13) | 2715.6±13.8 (n=14) | 2654.3±6 (n=14)     |
| Live weight at 120 days age, g                  | 3051.9±10.2 (n=12) | 3177.6±10.4 (n=14) | 3086.8±9.8 (n=13)   |
| Absolute increase of gain, g                    | 2031.3 (n=12)      | 2155.4 (n=14)    | 2058.0 (n=13)      |
| In % of the control group                       | 100                | 106.1           | 101.3             |
| Daily gain, g                                   | 27.1±1.2           | 28.7±0.5 \(^a\) | 27.4±0.4 \(^a\)   |
| In % of the control group                       | 100                | 105.9           | 101.1             |

\(^a\) P \leq 0.001.
In order to determine the specificity of the action of the vegetable Supplement "KED+LBA" on the 
meat productivity of rabbits at the end of the studies at 120 days of age, a control slaughter of rabbits 
was carried out, the results of which are presented in table 2.

**Table 2. Indicators of rabbit slaughter.**

| Index                          | Group       |
|-------------------------------|-------------|
|                               | I control   | II experimental | III experimental |
| Pre-slaughter weight, g       | 3051.9±10.2 | 3177.6±10.4     | 3086.8±9.8       |
| Weight of a paired carcass, g | 1702.9±0.3  | 1881.1±0.4 b    | 1750.2±0.38 a    |
| In % of the control group     | 100         | 110.5           | 102.8            |
| Killer output, %              | 55.8±0.48   | 59.2±0.45 a     | 56.7±0.58        |
| In % of the control group     | 100         | 106.1           | 101.6            |

*a*-p≤0.05; *b*-p≤0.01.

Slaughter yield, % feeding rabbits with rations with the addition of the drug "KED+LB" contributed 
to an increase in the mass of the carcass in the experimental groups. The largest carcass weight was in 
rabbits of the second experimental group-1881.1 g, which is significantly higher by 10.5% (p ≤ 0.001) 
than in the control group.

According to the results of examination of rabbit carcasses in the control and experimental groups, 
there were no differences in organoleptic parameters. All the carcasses were identical in appearance, 
color, serous membrane of the abdominal cavity, muscles on the incision, consistency, smell, 
transparency and aroma of the broth.

The ratio of edible parts of the rabbit carcass is shown in table 3.

**Table 3. Ratio of edible parts of rabbit carcass.**

| Index     | Group   |                          |
|-----------|---------|--------------------------|
|           | I control | II experimental | III experimental |
| Weight of a paired carcass | 1702.9±0.3 | 1881.1±0.4 | 1750.2±0.38 |
| Types of fabrics: muscle | 1326.5±0.21 | 1486.1±0.34 | 1368.7±0.26 |
| fat       | 122.6±0.38 | 148.6±0.45 | 129.5±0.32 |
| bone      | 253.8±0.27 | 246.4±0.44 | 252.0±0.36 |
| Meat ratio| 100  | 114.7 | 103.2 |

The research results showed that the highest content of muscle tissue was found in the 2nd 
experimental group-79%, i.e. 1.1% higher than the results in the control group. The meat content 
coefficient in the 2nd and 3rd experimental groups was higher by 14.7% and 3.2% than in the control group.

Feeding rabbits the drug "KED+LBA" did not have a negative effect on the meat quality of rabbit meat.

Studies have shown that the use of the drug "KED+LBA" in feeding young rabbits is economically 
profitable. Thus, the level of profitability for the period of scientific and economic experience in the 
second and third experimental groups was higher than in the control group by 18.6% and 10.2% respectively.
4. Conclusion
The drug "KED+LBA" at a dose of 5 mg/kg of live weight in the diets of young rabbits has a positive effect on the absolute increase in live weight by 6.1%, ensures the safety of livestock by 13.3%, increases the slaughter yield by 6.1% with a high degree of confidence (p≤ 0.001), the meat yield coefficient by 14.7%, the profitability level by 18.6%.

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