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ORIGINAL ARTICLE

Effects of Short-Term Low-Intensity Laser Radiation on Muscle Reactions in Young Lambs

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The article is based on the results of a study of the effect of short-term, low-intensity laser radiation on the meat yield of young lambs in the farm "Gulandom ona" of the Kushrabot district of the Samarkand region. Analysis of the change in body weight by age in absolute and daily growth rates showed that the lambs of the experimental group differed from the control lambs in significantly higher body weight and daily growth rates. In this case, it was shown that, according to the studied indicators, the lambs in the experimental group were significantly superior to those in the control group. It was established that the night gain obtained in the lambs of the II and III experimental groups was 3.6-4.4% higher than that in the lambs of the control group.

Key words: laser beams, experiment, control, lambs, meat, bone, morphological composition, meatiness, chemical composition.

In the era of a market economy, all areas of animal husbandry are focused on animal productivity and improving the quality of the resulting product. The live weight of animals is considered an indicator of their productivity, and the fact that the indicator of live weight depends on feeding and feeding conditions, as well as the use of new technologies to direct these methods to a specific goal, has been proven by a number of studies. foreign scientific researchers (Abdramanov *et al.*, 2017).

Often, the development of technological methods to increase productivity (the creation of new breeds) takes many years or has a negative impact on product quality (the introduction of feed, biological additives, hormones, and antibiotics), which is dangerous for consumers. With the development of natural sciences and the progress of technology and instrumentation, it has become possible to study the mechanisms of physical effects on living tissues, particularly the type of electromagnetic radiation, organisms, systems, organs, tissues, cells, and molecules (Abilov, 2018).

They believed that the visible part of the white-light spectrum occupies a special place among the influencing factors. Light plays an important role in the growth and development of animals. Despite the fact that the phenomenon of laser radiation is widely used in photobiological processes, it has not received sufficient theoretical justification. Laser radiation increases the functional activity of living organisms owing to its high statistical ordering (harmonization) (Aboneev *et al.*, 2015).

Efficient methods for increasing livestock agricultural production are used to feed nutritious diets that contain all nutrients. The most important aspect of the complex effect of laser radiation on the body is its deep penetration into body tissues. Laser radiation is used to treat animals, prevent diseases, and increase productivity (Aboneev *et al.*, 2015).

The effects of laser radiation on animal bodies have not been fully studied in veterinary medicine. In recent years, researchers have begun to use some properties of laser radiation in animal husbandry.

The most important aspects of laser radiation are as follows: coherence-radiation occurs simultaneously with atoms in one phase; monochromatic radiation has the same oscillation frequency; the fact that it has a high energy density, it has a clear direction, it is possible to create a beam of thin rays, and it is possible to control radiation, which is widely used in all areas, including science and medicine (Alekseev *et al.*, 2018).

Low-intensity lasers are most often used in veterinary medicine for therapeutic purposes. Their strength is chosen so that even if the thermal effect is not felt, it does not damage the skin tissues of the body, but has an amazing effect, penetrating into the tissues to a depth of 5-7 cm. Only low-intensity lasers perform this function. An acceptable (optimal) laser device allows the body to “choose” its own (optimal) frequency range, that is, when electromagnetic waves propagate in a “floating” order, the body “chooses” the necessary range for itself (Omonov, Aripov, 2019).

According to several researchers, low-intensity laser radiation causes sensitizing effects, stabilization of blood movement and absorption, and extensive photophysical and photochemical changes (Afanasiev, 2021).

Quick and easy rearing of young animals is of great economic importance. We studied the effects of biophysical methods on live weight and average daily and relative growth rates determined on its basis (Bogatyreva, 2006).

The use of laser technologies is very effective for the implementation of methods that genetically create opportunities for high-quality productivity at various stages of the life of cattle bred on an industrial basis in developed livestock countries around the world. The priority of biophysical methods over other biological methods lies in the fact that the manifested effect, especially of low-intensity laser radiation, is used mainly for therapeutic purposes. Laser radiation has a multifaceted positive effect on the body of animals, including increasing their ability to fight diseases and productivity.

Under the conditions of Uzbekistan, studies on the influence of biophysical methods on processes such as the consumption of pasture food by lambs and the digestion and assimilation of substances contained in it, as a result of stress caused by unfavorable alimentary and climatic factors in the body of lambs, have not been

carried out. Therefore, solving the problem of increasing the productivity of lambs left for breeding while maintaining their health and vitality and enriching the market with environmentally friendly, high-quality competitive lamb meat has become one of the current areas of our research in the current market economy.

The use of laser technologies is very effective for the implementation of methods that create opportunities for high-quality productivity genetically at various stages of the life of cattle bred on an industrial basis in the developed livestock countries of the world. The priority of biophysical methods in comparison with other biological methods lies in the fact that the manifested effect, especially of low-intensity laser radiation, is used mainly for therapeutic purposes. Laser radiation has a multifaceted positive effect on the body of animals, including increasing the ability to fight diseases and productivity.

Under the conditions of Uzbekistan, studies of the influence of biophysical methods on such processes as the consumption of pasture food by lambs, the digestion and assimilation of substances contained in it, as a result of stress caused by unfavorable alimentary and climatic factors in the body of lambs, have not been carried out. Therefore, solving the problem of increasing the productivity of lambs left for breeding, while maintaining their health and vitality, enriching the market with environmentally friendly, high-quality competitive lamb meat has become one of the current areas of our research in the current market economy. So, the purpose of the article is to study the age dynamics of live weight, absolute and daily growth of newborn lambs.

MATERIALS AND METHODS

The results obtained were carried out in the laboratory of the Veterinary and Livestock Department of the Samarkand region based on a special regulation.

Karakul sheep and their offspring were used as objects (Rajamurodov, Akhrorov, 2022).

We isolated 21 lambs from control group I, groups II, and III. Lambs in the control group I were not subjected to laser irradiation.

The lambs in experimental group II were exposed to laser radiation only after birth.

Lambs in the third experimental group were exposed to laser radiation from the 3rd month of pregnancy.

Regarding the nutritional status of the farm, the lambs in the trial and the lambs derived from them were fed and kept the same until weaning.

They mainly fed him wormwood, chitir, black hazel, ephemerals, yantok, carracks, and ephemeroids.

After weaning the lambs, in addition to grazing, they fed 300 g of 25% concentrate of barley, corn, oat, and cotton bran per 1 head of lambs.

In addition to experimental lambs on the farm, they are under constant control, the feed given to them and the conditions for their maintenance, at the same time, animals in captivity are under constant supervision of specialists from the farm and the region, and they provided practical assistance at the level of demand.

In addition, after the developing embryos were practically formed in the body of the sheep, the mother sheep of the experimental group were irradiated with low-intensity laser light between the last lumbar spine and the tail.

The lambs were exposed to low-intensity laser radiation at the nerve center located in the first thoracic spine, which is responsible for innervation of the pituitary gland. Experimental lambs were irradiated with a laser machine MSL-FN-639-50 mWBI90389, and the results were studied in the infrared spectrum. In this case, a helium-neon laser with a power of E=1 mW and λ=632.8 Nm was used.

RESULTS AND DISCUSSION

Based on the results of weighing the live weight of the lambs in the experiment, it was clear that the live weight of the lambs in all compared groups was almost the same. However, in the 1st month of life of lambs, their live weight increased significantly:12 kg for lambs in group I, 12.2 and 12.5 kg for lambs in groups II and III, respectively. The high rate of change in the live weight of the lambs in the comparison group remained until weaning of the lambs:25.6 kg in the lambs of the control group, 26.4 and 27 kg in the lambs of the experimental group. Changes in the live weights of weaned lambs were observed in the control and experimental groups (Table 1).

However, it should be noted that, despite the growth and development indicators of the lambs studied, the lambs in experimental groups II and III achieved higher rates than the rest of the lambs in terms of signs and characteristics that reflect the increase in live weight. At weaning, the lambs of experimental groups II and III were 3.2 and 5.5% higher, respectively, than that of the control group (R<0.001). The same situation was observed after the separation of the lambs from the mother, that is, while caring for them. During the observation period, i.e. at 5 months of age, the live weight of lambs of II and III experimental groups increased by 4.4 and 8.0%, and at 7 months of age by 4.6 and 9.5% (R <0.04; R<0.002) turned out to be more.

For the development of weaned lambs, night growth and absolute indicators are important for assessing their productivity and selecting the best individuals in terms of growth and developmental energy. In the first month of postnatal ontogenesis after embryonic development, lambs in the experimental groups were characterized by fairly high rates.

When calculating the absolute value of the daily gain, it was noted that the lambs in all experimental groups had a high intensity of growth and development from birth to weaning. This is a general characteristic of this species. Over the past period, the absolute increase in the lambs of the control group was 20.9 kg, and II experimental group - 21.6 and III experimental group - 22 kg.

Table 1. Dynamics of changes in the live weight of experimental lambs, kg

Age	groups of lambs					
	I	***N***	II	***n***	III	***n***
At the time of birth	4,7±0,17	21	4,8±0,21	21	5,0±0,4	21
1 month	12±0,6	19	12,2±0,8	21	12,5±0,7	21
2 month	18,0±0,8	19	18,5±0,6	21	18,9±0,7	21
3 month	22,4±0,21	17	23,0±0,8	21	23,5±0,20	21
4 month	25,6±0,9	17	26,4±0,23	21	27±0,22	21
5 month	27,4±0,8	17	28,6±0,21	19	29,6±0,24	20
7 month	32,7±0,33	16	34,2±0,38	18	35,8±0,38	20

Table 2. Daily live weight gain of experimental lambs, g

Age periods	groups of lambs		
	I	II	III
From birth to 1 month	236,6±9,51	243,2±10,30	246,5±9,65
1 to 2 months	173,4±5,27	176,6±5,36	180,2±5,20
2 to 3 months	176,5±4,60	180,1±4,5	183,0±5,08
3 to 4 months	96,2±3,38	103,5±3,75	106,5±3,75
From birth to 4 months	171,0±2,60	175,5±4,9	179,5±4,53
From birth to 7 months	132,5±2,40	137,3±3,70	138,3±3,86

In the month after weaning, the lamb growth unit decreased significantly in all groups of lambs, which, in our opinion, was probably due to the cessation of milk from the breastfed mother in addition to the supplemental nutrition provided. In separated lambs, separation from their mother and milk for almost 1.0-1.5 months creates a certain level of stress. Even when considering the general parameters of changes in relation to the age of the animals, significant differences between the compared groups were manifested in the

change in the live weight of the lambs of the control and experimental groups at a later age. According to the data presented above, in the lactation period (from birth to 4 months), lambs of groups II and III exceeded the lambs of the control group in absolute daily growth rates by 2.6-5%, and in the period of the general maintenance period (from birth to 7 months) -3.6 was equal to -4.4%.

Notably, the observed changes in the night growth of lambs were not uniform across the rearing periods in the compared groups. It was noted that the daily weight gain of lambs from birth to 1 month of age ranged up to 236.6 g in control group I, 243.2 g in experimental group II and 246.5 g in group III. At the same time, rapid growth of the lambs in all three groups was observed during this period. However, it was found that the daily gain of lambs irradiated with low-intensity laser light (experiments II and III) exceeded that of lambs from the control group. In general, the lactation period of lambs, that is, from birth to weaning, is the optimal period for the growth and development of lambs nursing their mothers. However, during the same period, the foals of experimental groups II and III, irradiated with low-intensity laser light, also showed an average increase in tanning of 175.5 and 179.5 g per night, respectively. When comparing the growth of lambs from different groups, it was found that, during the lactation period, the daily gain of lambs in group III was higher than that of the other groups, and this difference was higher than that of lambs by 8.5 g or 5.0%. years in the control group (2 table).

It should be noted that in the first months of the life of lambs (from birth to separation from the mother), their growth rate is high, which corresponds to the general patterns of ontogenesis.

Since the lambs were weaned from their mothers and started to be fed on natural pastures, their growth rate decreased significantly, which could have caused a number of stress conditions to appear in the body. Even under such conditions, the lambs of the experimental groups retained the superiority of the studied sizes over lambs of other groups (Rajamurodov *et al.*, 2021).

CONCLUSION

The night gain obtained in the lambs of experimental groups II and III was 3.6-4.4% higher than that in the lambs of the control group. The lambs in experimental group III also retained their growth superiority.

Analysis of the change in body weight by age in terms of absolute and daily growth rates showed that the lambs in the experimental group differed from the control lambs in significantly higher body weight and daily growth rates. At the same time, it was shown that, according to the studied indicators, the lambs in the experimental group were significantly superior to those in the control group.

According to the analysis of the data obtained, the use of biophysical methods in the intensive rearing of young growing lambs increased metabolism in the body of these lambs and had an effective effect on their growth and development.

CONFLICTS OF INTEREST

The authors declare that they have no potential conflicts of interest.

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