

USE OF AMINO ACIDS THAT PROMOTE LIVE WEIGHT GAIN, BODY CONDITION AND HEMATOLOGICAL PARAMETERS IN DORPER LAMBS

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Abstract: The objective was to evaluate the use of amino acids that promote live weight gain, body condition (BC) and hematological parameters of Dorper lambs. The study was carried out during the months of May - August 2023 in northern Mexico (25° LN). 40 lambs with an average age of 3 months, homogeneous in terms of live weight (LW; 16.02 ± 2.44 kg) and body condition (BC; 1.7 ± 0.2) were used and were divided into two groups (n=20 each). A first group (Treated) was administered 10 mg of promoter amino acids. While a second group (Control) was given 0.5 of physiological saline solution as a placebo effect. The treatment was applied in a single dose. The PV and WC were recorded, and the levels of white blood cells (WBC) and red blood cells (RBC) were determined at the beginning and end of the study period. The general average of final PV (26.0 ± 6.0) and WC (2.4 ± 0.1) showed no difference ($P > 0.05$), as did GB (113.8 ± 22.0) and GR (3.53 ± 1.0). The results show that there was no effect on weight gain, body condition, and white and red blood cell levels. In conclusion, administration of a single dose of 10 mg of amino acids did not promote weight gain, body condition, and white and red blood cell levels in Dorper lambs.

Keywords: Promoting amino acids, hematological parameters.

INTRODUCTION

The presence of sheep in the semi-arid region provides a protein option for the inhabitants of the area, small ruminants are a livestock option for small producers and intensive systems that seek to make the most of the plant resources available due to the environmental conditions of the area. region; Aimed at this, supplementation with efficient products will offer the possibility of improving the economy of producers. However, although the incorporation of amino acids in the diet of

sheep under conditions of intensive systems is essential to improve weight gain with a view to increasing meat production, it is not carried out frequently, because in general protein foods and amino acid additives are often expensive (Liu and Masters, 2003).

Currently there are few economically viable options that can be incorporated by small producers, despite the few options, in farm animals in the region studied, one of the main purposes of comprehensive livestock management must be based on the nutrition of amino acids and focus on matching the profile of essential amino acids required by livestock with the amino acid profile of commercial products available on the market (Cao et al., 2021).

Therefore, the relevance of the interest of this study is imperative to evaluate and identify possible amino acid nutrition options due to the paucity of research on growing lambs and kids compared to monogastric animals. It could be that growth rate is less of an economic factor for ruminants under grazing conditions than for monogastric animals in intensive indoor systems (Liao et al., 2015).

The administration of amino acid promoters can contribute to a better use of the nutrients present in the diet with the purpose of increasing live weight gain, body condition and strengthening of the immune system and also present an accessible and easily applied supplementation option. to lambs through the exhibition of results aimed at producers to increase sheep productivity.

MATERIALS AND METHODS

All methods and management of the experimental units used in this study were in strict accordance with the guidelines for the ethical use, care and welfare of animals in research at the international level (FASS, 2010) and national level (NAM, 2002).

LOCATION OF AREA OF STUDY

The experiment was carried out in the Ejido Granada, Coahuila (northern Mexico) during the months May to August 2023. The study area is located at an altitude of 1120 meters above sea level, with an average annual precipitation of 230 mm and an average temperature of 24 °C, maximum of 41 °C in May and June, and a minimum of -1 °C in December and January. The relative humidity varies between 26.1% and 60.6%, and the length of the day is 13h 41min during the summer solstice (June) and 10h 19min during the winter (December); (CONAGUA, 2015).

ANIMAL MANAGEMENT

During the experimental period, which lasted from May 13 to August 5 (84 days), the rams were fed food waste from a unit of Holstein dairy cows. Their ration consisted primarily of alfalfa hay, corn silage, and corn grain. The rams were fed twice a day (1200 and 1800 h) and had free access to clean water and mineral salts.

TREATMENT OF LAMBS

40 Dorper lambs with an average age of 3 months were used, which were randomly distributed into 2 groups (n=20 each): with an average initial weight of 16.02 ± 2.44 kg. A first group (Treated) was administered 10 mg of promoter amino acids. While a second group (Control) was given 0.5 mL of physiological saline solution as a placebo effect. The treatment was applied in a single dose.

VARIABLES EVALUATED

Weight and body condition

Throughout the study, live weight and body condition (BC) were measured. Live body weight was determined in the morning (8:00 to 10:00 am) before males consumed food. A Torrey brand digital scale with a capacity of 400 kg (EQM-400/800) was used. WC was evaluated by estimating the muscle and fat mass of the lumbar region using the technique described by (Walkden-Brown et al., 1997); this activity was evaluated by the same technician throughout the experimental period. Weighing and evaluation of WC was carried out every 14 days during the 84-day period.

ANALYSIS OF BLOOD METABOLITES

Blood samples were evaluated to determine the levels of white blood cells (WBC) and red blood cells (RBC) at the beginning and at the end of the study period. For the hematological analysis, a HEMALIZER (2000) hematological analyzer was used to evaluate the quantities of white and red blood cells. Blood samples were collected in the mornings, before feeding; every 14 days for 84 days.

STATISTIC ANALYSIS

The standard deviation of the means of live weight, body condition, serum protein and the number of white and red blood cells was calculated in the Excel program, in order to detect differences between the groups by obtaining the percentages of increase rates. The estimation of the p-value to determine statistically significant differences between the groups was developed in the Rstudio statistical package, through the application of the qqnorm functions the normality of the parameters was determined, while the t.test function was applied with a confidence level of 95%. The differences were considered significant at a value of $P \leq 0.05$.

RESULTS AND DISCUSSION

Table 1 shows the results for live weight, body condition and number of white and red

blood cells. No difference was found for PV and CC. ($P>0.05$). The percentage of white blood cells.

Variables	Start		Final	
	Treaty (n=20)	Control (n=20)	Treaty (n=20)	Control (n=20)
Peso vivo (kg)	16.0 ± 2.4	16.0 ± 2.4	27.3 ± 6.6	26 ± 5.8
CC (1-5)	1.7 ± 0.2	1.7 ± 0.2	2.5 ± 0	2.4 ± 0.2
GB ($\times 10^9/L$)	86.0 ± 21.5	92.7 ± 28.2	107.4 ± 19	120.2 ± 26.7
GR ($\times 10^{12}/L$)	2.7 ± 0.9	2.7 ± 1.1	2.9 ± 0.9	3.2 ± 0.9

Table 1: Mean (\pm DSM) for live weight, body condition and hematological parameters of Dorper lambs treated with a single dose of 10 mg of amino acid promoters (Treated) or untreated lambs (Control).

WBC: white blood cells and RBC: red blood cells.

Sudent's T was used in the analysis of comparison of means, because the distribution of the parameters has a clear trend towards normality. Student's T has represented a solution to the problem that arises when the parameters of the distributions are typically unknown. The test was carried out in the Rstudio statistical package, and the estimation yielded a value of $p = 0.492$ with a significance level of 95%. Therefore, the null hypothesis was accepted, because there is no significant difference in the application of the treatment.

CONCLUSION

The results found under the conditions of this study demonstrate that a single dose of 10 mg of amino acids did not promote weight gain, body condition, as well as red white blood cell levels in Dorper lambs. Therefore, it is recommended that future studies analyze the effect of multiple doses and frequency of application.

REFERENCES

- Cao, Y., Yao, J., Sun, X., Liu, S., Martin, GB (2021). Aminoácidos en la Nutrición y Producción de Ovinos y Caprinos. En: Wu, G. (eds) Amino Acids in Nutrition and Health. Avances en Medicina Experimental y Biología, vol 1285. Springer, Cham. https://doi.org/10.1007/978030-54462-1_5
- FASS. 2010. Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching, 3rd ed. Federation Animal Science Society, Savoy, IL, USA. ISBN: 978- 956-14-2161-5.
- Liao SF, Wang T, Regmi N (2015) Lysine nutrition in swine and the related monogastric animals: muscle protein biosynthesis and beyond. Springerplus 4:147
- Liu, SM y Masters, DG (2003) 'Utilización de aminoácidos para la producción de lana', CABI Books. CABI Internacional. doi: 10.1079/9780851996547.0309.
- NAM. 2002. Guide for the Care and Use of Laboratory Animals. Co-produced by the National Academy of Medicine-Mexico and the Association for Assessment and Accreditation of Laboratory Animal Care International, 1st ed. Harlan Mexico, DF, Mexico. ISBN: 978-0-309-15400-0.
- Walkden-Brown, S.W, Restall, B.J, Scaramuzzi, R.J., Martin, G.B., Blackberry, M.A. 1997. Seasonality in male Australian cashmere goats: Long term effects of castration and testosterone or oestradiol treatment on changes in LH, FSH and prolactin concentrations, and body growth. Small Ruminant Research. 26:239-252.