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SHORT NOTE

Effects of the injection of organic modifier on the weight gain of cattle from the Nellore breed in the dry season

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Additional keywords

Multivitamin supplementation.
Growth promotor.
Food additive.

SUMMARY

This article's objective was to evaluate the effects of the application of organic modifier on the weight gain of Nellore calves in the dry season, in the range grazing system of *Urochloa decumbens*. Sixty uncastrated Nellore (*Bos indicus*) calves were used, which were 11 to 12 months of age and were divided randomly into five lots (12 calves/lot): control lot (Lc) did not receive the organic modifier, and the lots L_{10} and L_{12} were administered with 10 and 12 mL subcutaneous injections, respectively, on day 0. The lots L_{10+10} and L_{12+12} were administered with 10 and 12 mL subcutaneous injections, respectively, on both day 0 and day 30 of the experiment. The animals were weighed on days 0 and 60. The animals from the lots L_{10}, L_{12}, and L_{10+10} experienced a weight gain of 28.3%, 18.5%, and 28.3%, respectively. However, there was no significant difference (P>0.05) between these lots and the control allotment, Lc. The L_{12+12} allotment experienced a weight gain that was 10.6% lower than the Lc, although there was not a significant difference between the allotments (p>0.05). We conclude that the administration of organic modifier does not increase the weight gain of cattle significantly and that the administration of excessive doses of organic modifier may be detrimental to the animal's weight gain.

Palavras chave adicionais

Suplementação polivitamínico.
Promotor de crescimento.
Aditivo alimentar.

Efeito da injeção de modificador orgânico sobre o ganho de peso de bovinos nelore na estação da seca

RESUMO

Objetivou-se avaliar o efeito da aplicação de modificador orgânico no ganho de peso de bovinos da raça Nelore no período da seca em sistema de pastejo extensivo de *Urochloa decumbens*. Utilizaram-se 60 bovinos, machos inteiros, da raça Nelore (*Bos indicus*), com idade entre 11 e 12 meses que foram divididos ao acaso em 5 lotes (12 bovinos/lote), o lote controle (Lc) não recebeu o modificador orgânico, nos lotes denominados, L_{10} e L_{12}, foram administrados uma injeção de 10 e 12 mL de modificador orgânico, respectivamente, de no dia zero e nos lotes, L_{10+10} e L_{12+12}, foram administrados uma injeção de 10 e 12 mL de modificador orgânico, respectivamente, no dia zero e outra após 30 dias (dia 30). Os animais foram pesados nos dias 0 e 60. Os animais dos lotes tratados com o modificador orgânico, L_{10}; L_{12} e L_{10+10}, tiveram aumento no ganho de peso na ordem de 28,3%; 18,5% e 28,3%, respectivamente, no entanto, não houve diferença significativa (p>0,05) entre esses lotes e o lote controle (Lc). O L_{12+12} teve um ganho de peso 10,6% menor do que o Lc, mesmo assim, não houve diferença significativa entre os lotes (P>0,05). Conclui-se que a aplicação de modificador orgânico não eleva o ganho de peso dos bovinos significativamente e a aplicação de doses excessivas de modificador orgânico pode ser prejudicial para o ganho de peso dos bovinos.

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INTRODUCTION

The Brazilian cattle production system, for the most part, is extensive due to the great extension of pasture (Peripolli et al. 2016, p.146). However, these pastures are deficient in minerals, and it is necessary to supplement cattle. The organic modifier, which has often been used by farmers for the purpose of supplementing their animals with minerals and vitamins, to mitigate and/or prevent their nutritional deficiencies and thus optimize use of food for bovines raised under range conditions, hoping to increase the production of these animals (Abba et al. 2010, p. 290). However, the experiments that evaluated the effects of organic modifier in animal production are scarce, the results are contradictory, and the economic benefit of using organic modifier is still unclear. Therefore, this study aimed to evaluate the effect of organic modifier application on weight gain of Nellore cattle in the dry season in an extensive grazing system.

MATERIAL AND METHODS

The study was conducted during the period of June 2014 through August 2014, with a trial period of 60 days, in Lutécia, SP, Brazil. Sixty uncastrated male calves of the Nellore (*Bos indicus*) were used, ranging from 11 to 12 months of age, kept on pasture fed by Urochloa decumbens, supplemented with protein-enriched mineral mixture ad libitum, and randomly divided into five lots (12 calves/lot): the control lot (Lc), had a live average weight of 224.7 ± 13.2 kg and these animals did not receive of organic modifier. The lots L_{10} (223.4 ± 13.7 kg) and L_{12} (228.5 ± 17.1 kg), the calves were received a 10 and 12 mL subcutaneous injection of organic modifier, respectively, on day 0 of the experiment. The lots L_{10+10} (230.5 ± 13.7 kg) and L_{12+12} (232.2 ± 24.21 kg) the calves were received a 10 and 12 mL subcutaneous injection of organic modifier, respectively, on both day 0 and day 30 of the experiment.

The calves were individually weighed on days 0 and 60 in the morning, without fasting and before drinking water. On day 0, pasture forage samples were taken, cut to grazing height (30 cm), preserved at -5 ºC, and submitted for chemical analysis.

The organic modifier used was composed of the following: 420 mg of monosodium glutamate, 1000 mg of L-lysine hydrochloride, 420 mg of glycine, 210 mg of DL-methionine, 210 mg of L-histidine hydrochloride, 50 mg of L-tryptophan, 200 mg of L-valine, 200 mg of L-arginine hydrochloride, 13 mg of cobalt chloride, 2 mg of copper sulfate, 15 mg of potassium iodide, 10 mg of zinc chloride, 42 mg of chloride sodium, 1.500 mg of calcium hypophosphite, 210 mg of magnesium chloride, 5.000 µg of vitamin B12, 2.000.000 IU of vitamin D2, and 100 IU of vitamin E.

The variables considered for the economic return calculation were the current value of the cattle metric arroba (R$150.00), carcass yield of 52%, the weight gain difference between the experimental groups, and the cost of organic modifier (R$1.26/10 mL dose and R$1.51/12 mL dose). The experiment followed an entirely causal method, and the results of the calves' weight gain measurements in all experimental lots displayed a normal distribution on the Shapiro–Wilk test, and compared them using the one-way Variance Analysis (Banzatto and Kronka 2006, p.17). The percentage weight gain of the cattle treated with organic modifier (L_{10}, L_{12}, L_{10+10}, and L_{12+12}) was calculated on the weight gain in comparison to the control lot (Lc).

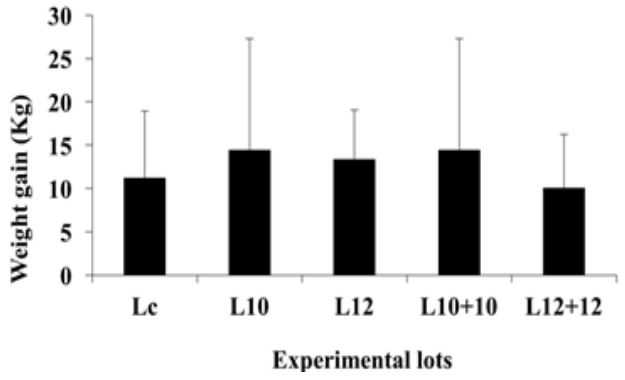

Figure 1. Live weight gain of Nellore calves supplemented with organic modifier. There was no significant difference (P>0.05) in body weight gain of the calves from the experimental groups (Ganho de peso de bovinos da raça Nelore suplementados com modificador orgânico. Não houve diferença significativa (P>0,05) no ganho de peso dos bezerros dos grupos experimentais).

RESULTS AND DISCUSSION

The chemical composition of *Urochloa decumbens* on day 0 of the experiment was as follows: 42.4% dry matter, 5.4% gross protein, 59.2% total digestible nutrients, 76.2% neutral detergent fiber, 43.5% acid detergent fiber, 1.4% ethereal extract, and 6.7% mineral matter. On day 60, the composition was 78.0% dry matter, 4.4% gross protein, 60.7% total digestible nutrients, 80.7% neutral detergent fibers, 49.1% acid detergent fibers, 11.16% ethereal extract, and 5.9% mineral matter.

The calves from the L_{10}, L_{12}, and L_{10+10} experimental lots had a weight gain of 28.3%, 18.5%, and 28.3%, respectively. However, there was no significant difference ($p>0.05$) between these lots and the control lot (**Figure 1**). Abba et al. (2010, p. 291) observed a similar result. They reported no observation of a significant increase ($p<0.05$) in the weight gain of half-breed heifers, ¼ Simental and ¾ Nellore, which received the treatment with the organic modifier. These results corroborate with Soutello et al. (2002, p. 19) who also reported there was no significant increase in weight gain of steers Nellore. Oliveira and Nogueira (2005, p. 17) also reported that the organic modifier injection did not increase weight gain in calves and heifers Girolando. Freitas et al. (2011) also observed no effect of supplementation use with ADE vitamins and organic modifier in the development of yearling heifer crosses Aberdeen Angus and Braford in pasture *Avena strigosa* and *Lolium multiflorum*.

However, Junqueira and Marjoram (1996, p. 30) observed an increase in feedlot cattle weight gain and growth phase and termination, respectively. However, these experiments did not clear the physiological mechanisms that were involved in the promotion of growth and weight gain in cattle that received the injection of the organic modifier.

From an economic standpoint, the L_{10} allotment had the most gains in profitability, with R$14.74 more profit per animal, followed by the L_{10+10} allotment, with an increase of R$13.48 in profit per animal. The L_{12} allotment had an increase of R$8.73 in profit per animal.

The allotment that received two 12 mL injections of organic modifier (L_{12+12}), one on day 0 and the other on day 30, had a weight gain 10.6% lower than the control allotment. However, this result was not significant ($p>0.05$) (Figure 1). That probably occurred due to the dosage of organic modifier being excessive, and thus, might have caused a subclinical intoxication of the mineral and vitamin elements or of the amino acids, which led to the poor results in these animals.

Under the experimental conditions and according to the results, we concluded that the organic modifier

application does not increase the cattle's weight gain significantly and the application of organic modifier in excessive doses may be detrimental to the cattle's weight gain.

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