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The Effect of Using the Product of Aliplus on the Components of the Diet on Growth and Some Characteristics of Calves Carcasses

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Abstract

This research was conducted to study the effect of using the product (ALiplus) on the components of the diet on growth and some characteristics of calves carcasses. Thirty local calves, close in age, with an average live weight (206.51) kg, were randomly divided into two nutritional groups, close in ratio of crude protein and metabolic energy. The first treatment included feeding the calves on a standard diet consisting of (soybean meal, yellow corn, wheat bran, wheat flour, barley, molasses of cane, limestone, and salt), while the second treatment included feeding the calves on a ration treated with (ALiplus) as a non-protein nitrogen source, replaces soybean meal in the first ratio. For a fattening period that lasted (6) months, during which the quantities of consumed fodder, the rates of live weight gain, and some characteristics of carcasses were calculated. The results showed that there were no significant differences between the experimental treatments in the rates of daily and total weight gain and the final weight of calves. Although the statistical analysis of the consumed feed was not conducted because the feeding was collective, no arithmetical difference was observed between the transactions in the daily consumed quantities of feed, which in the first treatment amounted to (5.836) kg of concentrated feed/day/calf and in the second treatment (5.768) kg. Concentrate feed /day/calf , and feed conversion rates did not differ among the experimental treatments. The statistical analysis also showed that there were no significant differences between the experimental treatments in the weight of the carcass and the dressing percentage.
Keywords: *Calf Fattening Diets, Aliplus, Urea, Non-protein Nitrogen*

Introduction:

Attempts to reduce the costs of producing animal units of all kinds remain desirable, and the high cost of feed grains and high-protein meal makes the use of alternatives as a source of protein very important in reducing the costs of feeding beef cattle. In this regard, the traditional way to increase the proportion of protein in the diet is to add meal that (the high-priced and limited quantities), in addition to its competition of animals with simple stomachs, including poultry (Al-Hafiz, 1992). Urea is used as a non-protein nitrogen source as a supplement protein that can be easily broken down in the rumen of ruminants (Saeed and Abdel Latif, 2009), although its content of carbohydrates, minerals, and vitamins is low. Urea is represented inside the animal's rumen by decomposing it to produce ammonia and carbon dioxide during the fermentation processes. Thus taking advantage of this ammonia microorganisms to build their microbial protein, and the ability of microorganisms to benefit from urea depends on the existence of a balance between the energy and nitrogen content in the ration (Stanton and Whitller, 2006; Misra, et al. 2006 and INRA, 2002). Consequently, these microbes, after their destruction, are a source of protein of high nutritional value that is adding to the protein of the diet to meet the needs of the animal (Smith, 2002 and Abd AL-Rhman, 2010). Studies have shown that there are many precautions to be taken into considerations when using urea as a source of nitrogen, if what is prepared from protein through urea should not exceed one-third of the animal's protein needs and should be added carefully and accuracy, in addition to providing the animal with minerals and vitamins to ensure a good balance in the diet (Gonzalez et al., 1987; Espinnasse, 1994; Yazdi, et al. 1997).

Therefore, the use of industrial products that include, in their content, urea as a non-protein nitrogen source (NPN), and the rest of the other nutrients in the correct proportions, ensures the safety of feed manufacturing and the balance of nutrients in it in a way that provides all nutritional needs and animal safety. The product ALiplus is one of these safe and effective industrial products in the use of urea in the feed, where this substance is added to the concentrated and rough feed, to improve the nutritional value of the feed and reduce the costs of producing meat livestock, in a way that guarantees all the needs of urea use of energy, vitamins, and minerals and according to the animal's need.

Therefore, this study aims at the possibility of using the product ALiplus in the components of rations in growth and some characteristics of calves carcasses.

Materials and working methods:

The fattening experiment for this study was carried out in one of the private fields belonging to livestock breeders, in which (30) local calves of close age and average live weight (206.51 kg) were used. The calves were placed under veterinary care and an integrated preventive program was allocated to them under the supervision of the veterinarian to ensure their safety throughout the experiment period. After weighing the calves, they were randomly distributed into two nutritional groups, with (15) calves for each group. The statistical analysis of their initial weights showed that there were no significant differences between them.

The calves were fed on two diets close in the percentage of crude protein and metabolic energy if the calves of the first group were fed a standard ration (control treatment), while the calves of the second group were fed on the treatment ration to which (Aliplus) was added as a non-protein nitrogen source (NPN) consisting of urea , soybean meal, sodium bicarbonate, sulfur, vegetable mixture, fermentation stimulants, mineral elements and forage anti-caking agents) containing crude protein 96% (non-protein nitrogen 225.3%), crude fiber 0.1%, crude ash 4.6% and crude fat 3% . The calves groups were fed the experimental diets gradually for 14 days as an introductory period before the start of data collection. and free feeding was adopted *ad libtum* on experiment diets, two meals a day (morning and evening), with clean water and mineral salts cubes provided in front of the calves throughout the experiment period The fattening period lasted for 6 months, during which the daily consumed quantities of feed were calculated based on the weight of the provided feed minus the remaining feed. The calves were also weighed monthly every 30 days periodically and before feeding in the morning until the end of the experiment period. At the end of the fattening period, five calves were slaughtered from each treatment, after the calves fasted for 12 hours and were weighed and their live weight was recorded to represent the final weight.

The experiment transactions were prepared in the form of pellets, and the proportions of their components are shown in table (1). As for the treatment ration (the second ration), it was prepared in two steps. The first step included adding (Aliplus) by 22 kg/ton to the primary feed materials constituting the ration, then adding water by 120 liters/ton according to the recommendations of the manufacturer, then mixing the mixture well and leaving For (15) days for the reaction to occur. Temperature readings and pH measurements of the mixture were taken during this period. The second step included compressing the feed in the form of pellets. The chemical analysis of the experimental diets was carried out in the laboratory, where the percentage of dry matter, crude

protein, ether extract, crude fiber, and ash was calculated, according to what was stated in the A.O.A.C (2002).

The statistical analysis of the experimental data was carried out using the ready-made statistical program SAS (2000), using a Complete Randomized Design (CRD), and using the following mathematical model:

Yij = μ + ti + eij Whereas:

Yij = Observed value j that is affected by transaction i

μ = General means of observation.

ti = Efect of treatment i, since i = 1, 2.

eij= Random error accompanying each observation, which was assumed to be distributed randomly, naturally, and independently (NID).

The significance of the differences between the mean of the coefficients was tested using Duncan's polynomial test (Duncan, 1955) at the level of significance (0.05).

Table 1.The proportions of the components and the chemical composition of the experimental parameters

	The Components	First Treatment (Standard)	Second Treatment (Aliplus)
	Soybean meal %	13	----
	Corn %	21	24
	Wheat %	----	8
	Wheat Bran %	18	15
	Wheat Flour %	23	22
	Barley %	20	26
	Molasses Of Cane %	2	2
	Calcium Carbonate %	2	2
	Salt %	1	1
	Aliplus (Kg)	----	22
	Water (liter)	----	120
	Quantity produced (kg/ton)	1000	1100
Chemical Analysis			
	Dry Matter %	88.83	86.39
	Crude Protein %	16.02	15.85
	Ether Extract %	1.96	2.08
	Crude Fiber %	6.88	6.42
	Crude Ash %	5.96	5.22
	Metabolisable Energy (Kcal/kg) *	2805	2830
	ADF (Acid-detergent fibre) % **	6.63	5.91
	NDF (Neutral-detergent fibre) % **	19.49	18.99

* Calculated from the tables of chemical analysis and according to what is stated in (Al-Khawaja et al., 1978) and based on the dry matter.
** Calculated from chemical analysis tables and according to (McDonald et al., 2010).

Results and discussion:

Table (2) indicates the insignificant differences between the experimental treatments in the average daily weight gain (1.021 and 0.993 kg) and the total weight gain (183.91 and 178.75 kg) for calves of the two treatments, respectively.

The results show that the calves whose diet contained Aliplus in the second treatment as a non-protein nitrogen source (NPN) achieved very close weight increases for the calves of the first treatment that took the normal diet, and the reason for this may be attributed to the fact that the microorganisms inside the rumen have taken Its sufficiency of nitrogen through the urea found in the substance (Aliplus) with the rest of the other nutrients and enabled it to produce its microbial protein in a way that covers the needs of the animal in addition to the protein of real food transiting from the rumen (undegradable protein) to give a good opportunity for the animal to grow and maintenance .

Since the final weight rates are the outcome of the daily weight gains, which is also expressed in total gains, the results of this trait came in the same sequence that appeared in the previous two traits, as the final weights of calves in the two experimental treatments reached (391.24 and 384.43 kg), respectively.

The results of this study were in agreement with the results of Porsch et al. (2018), who showed that there were no significant differences in the final weights between the calves of the experimental treatments when fed with different nitrogen sources (soybean meal, urea, yellow corn, and yellow corn husks), where the final weights rates reached For calves 421.50, 413.72, 421.48 and 410.19 kg/calf respectively. Also, the results of this study agreed with the results of Nassar et al. (2014) who indicated that there were no significant differences in the daily weight gains when feeding calves on different nitrogen sources (soybean meal, black seed meal, and urea), where the daily weight gains amounted to 434.52, 415.79 and 443.57 kg/day/calf at 30 weeks of age. It also agreed with the results of Wolfwinkel (2009), which indicated that there were no significant differences in the daily weight gains and final weight of Friesian calves fed on rations containing different nitrogen sources (soybean meal or soybean meal and yeast).

Table 2. Live weight increments and final weight of calves of the experimental parameters

Adjectives	First Treatment (Standard)	Second Treatment (Aliplus)
Initial weight (kg)	207.33 ± 11.46	205.68 ± 10.79
Final Weight (kg)	391.24 ± 13.87	384.43 ± 14.55
Total Weight Gain (kg)	183.91 ± 15.12	178.75 ± 16.50
Daily Weight Gain (kg)	1.021 ± 0.08	0.993 ± 0.10

Feed consumption rates and feed conversion rates for calves of the experimental treatments were not statistically tested because the feeding was collective and according to what the experiment was designed. From throe table (3) it is clear that the daily and total consumed feed were close, as the daily consumption of concentrated feed by calves reached (5.83 and 5.76) kg concentrated feed/day/calf for the experiment treatments, respectively. This indicates that Aliplus containing urea as a non-protein nitrogen source (NPN) did not affect the free intake of feed in the second treatment, as the product (Aliplus) eliminated the negative effect of urea on feed consumption and therefore the palatability of calves to the ration was not affected by urea. On the contrary, we note that Aliplus has increased the rate of nitrogen utilization by microorganisms in the rumen with the rest of the other elements available in this article and it was reflected on the feed conversion rates for calves in this (second) treatment if the feed conversion rates did not differ The nutritional efficiency of the calves of the two treatments differed from each other by a significant difference, despite no of statistical analysis was conicated for this trait because the feeding was collective, and the feed conversion rates for the calves of the first and second treatments were 5.71 and 5.80 kg of concentrated feed/kg of live weight gain, respectively. The results of the feed consumed trait and the efficiency of its feed conversion in this study agree with the results obtained by Banjade et al. (2017) that there were no significant differences in the amount of total feed consumed and the feed conversion efficiency of buffalo calves fed on a standard ration and a ration containing urea. Also, these results were identical to what was obtained by Nassar et al. (2014), as they noticed that daily feed consumption (2.98, 3.07, and 2.89 kg/day/calf) and feed conversion rates(6.86, 7.38, and 6.54 kg feed/kg weight gain) did not differ significantly. Between calves fed on different nitrogen sources (soybean meal, black seed meal, and urea), respectively. It also agreed with the results of Duff et al. (2003), who showed that the increase in the percentage of urea in the rations from zero to 0.5, 1.00, and 1.50% of the components of the ration did not negatively affect the consumption of feed and the efficiency of its nutritional conversion for groups of calves feeding on these different percentages.

Table (3).The quantities of feed consumed and the efficiency of its food conversion for calves of the experiment treatments

Adjectives	First Treatment (Standard)	Second Treatment (Aliplus)
Amount of daily consumed concentrated feed (kg)	5.83	5.79
Total consumed concentrate feed quantity (kg)	1050.60	1038.28
Daily consumption of hay (kg)	1.45	1.35
feed conversion rates kg concentrate feed / kg live weight	5.71	5.80

Table (4) indicates the average weights of carcasses for calves of the experimental treatments, which reached in the first treatment (234.78 kg) and in the second treatment (229.31 kg),The statistical analysis showed that there were no significant differences between the standard treatment and the second treatment. The reason for this may be due to the calves receiving the same amount of nutrients in both treatments and in the form that replaces them by giving similar muscle growth rates throughout the carcass. The statistical analysis, the results of which are shown in table (4) , showed that there were no significant differences in the dressing ratio of the calves of the first and second treatments that contained Aliplus, and the dressing ratio rates were 60.00 and 59.64%, respectively.

These results were identical to what Steiner et al. (2019) found when they used two sources of nitrogen in the rations of beef cattle, where the comparison treatment did not differ with the treatment that contained urea as a non-protein nitrogen source in the characteristics of carcass weight (297.93 and 299.27 kg) and the dressing percentage (56.68 and 56.52%), respectively. The results of this study also agreed with the results of Burque et al. (2008) that there were no significant differences in the dressing percentage of buffalo calf carcasses fed on three levels of urea (0, 0.5, and 1.00%) of the diet components. Also, the results of Duff et al. (2003) agreed that there were no significant differences in the weight of calves' carcasses and their netting ratios when they used different levels of urea in fattening rations.

Table (4) the weights of the carcasses and the dressing ratios for the carcasses of calves of the experiment coefficients

Adjectives	First Treatment (Standard)	Second Treatment (Aliplus)
carcass weight (kg)	234.78 ± 7.43	229.31 ± 6.98
dressing percentage (%)	60.00 ± 0.9	59.64 ± 0.75

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