

UTILIZATION OF PROBIOTICS "STARBIO" IN THE DIETS FOR BEEF CATTLE THE EFFECTS ON WEIGHT GAIN AND CARCASS QUALITY

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ABSTRACT

An experiment has been carried out to investigate the effects of probiotic supplementation in the diets of beef cattle on the weight gain and the carcass quality. Fifty six Ongole grades of approximately 2 years old with an average weight of 249 kg were divided into 4 groups and allocated to flocked pens in which there were 14 individuals in each pen. Two levels of probiotic supplementation into two different-fiber-level concentrates were fed in a gradual increase quantity depending on the duration of fattening period. Napier grass (*Pennisetum purpureum*) was fed *ad libitum* after being chopped in approximately 5 cm length. Drinking water was available at any time. Weight changes were recorded every month. The animals were slaughtered after 120-day period of fattening. Carcass weight, backfat thickness, trimmed fat and area of rib-eye was measured. Results indicated a range of average daily gain (ADG) from 0.9 to 1.08 kg ($P>.05$) with a mean of dry matter intake of 2.8% of the body weight. The efficiency of feed dry matter utilization for weight gain was slightly better when the ration with 42% neutral detergent fiber content and supplemented with 0.5% probiotic was fed. Carcass weight, percentage and trimmed fat were not significantly different among treatment means. It was concluded that the utilization of probiotics at 0.5% of the diets seemed to be adequate since supplementation of probiotics at 1.0% level did not improve the weight gain nor the carcass quality.

Key words: Beef cattle, probiotics, weight gain, carcass.

INTRODUCTION

The increased meat demand should be supported by improving the productivity of meat producing livestock, includes sheep, goats and cattle. An improved productivity may be defined as a greater production when similar inputs were given, meaning that an increase in the efficiency of input conversion to livestock production should be obtained. Among the most important livestock production determinants is feed; therefore diet formulation would be of prime importance in increasing the efficiency of feed utilization. The quantity, quality and balanced of nutrients in the diets would be the key factors for diet formulation. The utilization of feed organic matter by ruminants is dependent on the ruminal microbial activity; therefore, rumen microbial growth and the microbial fermentative products in the form of volatile fatty acids become the important factors in

affecting the host animal productivity (Wallace, 1994; McAllister *et al.*, 1994). The use of yeast culture, enzyme preparation or a combination of microbes capable of degrading organic matter as part of the diets has recently been widely reported (Yoon and Stern, 1995). However, the positive response to production was approximately equal to the negative or no responsive results, indicating that further works still have to be carried out. In the present experiment, the probiotics starbio was included in the concentrate diets of beef cattle (Ongole grades) with the objective of improving the efficiency of feed utilization which should be reflected in a better weight gain and carcass quality.

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MATERIALS AND METHODS

Fifty-six Ongole grades of approximately 2 years old with an average live-weight of 249 kg were divided into 4 groups and allocated to flocced pens each consisted of 14 animals. Antibiotics and enteroparasite treatments were given at the beginning of the experiment. The animals were weighed at the start and at 10 days after adjustment to the respective dietary treatments followed by every 30 days interval to estimate the average daily gain (ADG). The dietary treatments consisted of two concentrates containing different levels of neutral detergent fiber (42 versus 45%). The concentrate was formulated using wheat pollard, soybean meal, corn, oilpalm kernel cake, cacao skin meal, beer waste, minerals, salts and probiotics. To each concentrate, the probiotics starbio was supplemented at a rate of 0.5% or 1.0% of the dry matter. The concentrate was fed at a gradually increased quantity that was adjusted along with the duration of fattening period, at a rate of approximately 3% of the body weight. *Pennisetum purpureum* (Napier grass) was fed *ad libitum* after being chopped into approximately 5 cm length. Drinking water was available at any time. Feed offered and orts were recorded everyday. After 120-day fattening period the animals were slaughtered. Only 7 animals from each treatment group, however, were used for the carcass evaluation. Carcass length, chest depth, carcass weight,

backfat thickness, abdominal fat and trimmed fat were recorded. The area of musculus Longissimus dorsi (ribeye) at 13th rib was calculated and samples of these muscles were taken for the analysis of protein, ash and water contents. The fat content was estimated by subtracting the water, protein and ash content from 100. Data were analyzed statistically in a completely randomized design with a factorial arrangement for the ADG with initial weight as a covariate, while for the carcass measurements the slaughter weight as a covariate (Steel and Torrie, 1980) using the General Linear Model (SAS, 1987).

RESULTS AND DISCUSSION

Table 1 summarizes the data of initial and final weight, calculated average daily gain, dry matter intake, and feed to gain ratio, while table 2 indicates the carcass characteristics. The average total dry matter intake were similar for all treatment groups with an overall mean of 8.69 kg/head/day which was approximately equal to 2.8% of the body weight, indicating that the dry matter intake fell within the suggested quantity (2.5 to 3.0% of body weight; Tillman *et al.*, 1986).

The supplementation of probiotic Starbio was expected to improve the ruminal fermentation of fibrous material in the diet; however, the data of dry matter intake alone did not clearly show the difference between the

Table 1. Performance of cattle as affected by feeding rations containing different level of fiber and probiotic

	Treatments				Mean
	A	B	C	D	
No. of animal	14	14	14	14	
Liveweight, kg	241	248	254	253	249
Feed Dry Matter Intake, kg/d	8.78	8.77	8.61	8.61	8.69
Final weight, kg	372.0	372.4	371.8	372.6	372.2
Weight Gain, kg	129.5	124.6	117.3	119.0	122.6
FGR	8.1	8.4	8.8	8.7	8.5

A: Ration containing 42% NDF with probiotic supplement at 0.5%; B: Ration containing 42% NDF with probiotic supplement at 1.0%; C: Ration containing 45% NDF with probiotic supplement at 0.5%; D: Ration containing 45% NDF with probiotic supplement at 1.0%; FGR: feed to gain ratio

level of supplementation. The efficiency of microbial fermentation may have increased the ruminal microbial protein synthesis, which was reflected in the production response of the animal in terms of weight gain or carcass quality. The response of weight gain to the dietary treatments ranged from 117.3 to 129.5 kg which were equal to a rate of daily gain ranged from 0.9 to 1.08 kg ($P>.05$). The non-significantly different in weight do not gain nor average daily gain presumably due to the relatively wide variability in individual feed intake as a result of the differences in initial liveweight. Unfortunately individual feed intake was not measured in the present experiment. The calculated dry matter intake range from 8.61 to 8.78 kg/head/day resulting in feed to gain ratio range from 8.1 to 8.8. The data of carcass percentage tend to be greater when 1.0% probiotic was supplemented to the ration (treatment B and D versus treatment A and C). However the effect was greater when probiotic was supplemented to the 42% NDF ration. This was an indication of the beneficial effect of probiotic on the use of fibrous component was more obvious when higher probiotic supplement was given to 42% NDF content as compared to the 45% NDF ration.

From the weight gain data, it seemed that 0.5% supplementation of probiotic to the 42% NDF ration was better than the other treatments; however, when the carcass yield was considered then the 1.0% probiotic supplement would be more advantageous.

The carcass length and chest depths were similar for all treatment groups ($P>.05$). Percentage of abdominal fat was lower for treatment B (1.0% probiotic supplement to 42% NDF ration) as compared to the 0.5% probiotic supplement (Treatment A) with a larger area of ribeye (76.3 cm²) as compared to 69.5 cm². The backfat thickness was relatively similar for all treatments with a slight tendency of thinner fat when higher probiotic supplementation was given. As expected the moisture content of the meat samples were on the ball mark of 75% ranging from 74.2 to 75.3%. The protein content of the meat samples taken from the musculus longissimus dorsi was practically the same (21.8%); however, when the NDF content of ration was higher, the protein content of the meat was slightly greater (22.1% for treatment C and 22.7% for treatment D) as compared to treatment A or B. The total trimmed fat was considered as wastage in fattening process due

Table 2. Carcass characteristics as affected by feeding rations containing different level of fiber and probiotic

	Treatments				Mean
	A	B	C	D	
No. of samples	7	7	7	7	
Slaughter weight, kg	392.3	388.1	383.9	392.0	389.1
Carcass weight, kg	183.7	188.4	178.7	184.9	183.9
Carcass percentage	46.89	48.53	46.59	47.18	47.30
Length, cm	125.7	125.4	124.9	125.5	125.4
Chest depth, cm	61.4	63.1	61.4	60.8	61.7
Backfat thickness, cm	0.55	0.38	0.59	0.52	0.51
Abdominal fat, %	4.3	3.9	3.8	3.9	4.0
Ribeye area, cm ²	69.5	76.3	65.1	75.7	71.7
Meat Composition:					
Moisture, %	75.3	74.2	74.5	74.9	74.7
Protein, %	21.8	21.8	22.1	22.7	22.1
Ash, %	1.05	1.04	1.04	1.05	1.04

A: Ration containing 42% NDF with probiotic supplement at 0.5%; B: Ration containing 42% NDF with probiotic supplement at 1.0%; C: Ration containing 45% NDF with probiotic supplement at 0.5%; D: Ration containing 45% NDF with probiotic supplement at 1.0%;

to the fact that the trimmed fat was considered as a lost; therefore it is usually expected that the final product of carcass should be low in the fat content.

CONCLUSION

The probiotic Starbio supplement tend to be adequate at 0.5% of the ration since supplementation at 1.0% did not improve the average daily gain. However, higher probiotic supplement may be given to the 42% NDF ration to improve the carcass yield and quality.

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