Short Communications

Evaluation of Two Methods of Feeding for the Fattening of Dhofari Calves

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Abstract. The objective of this experiment was to evaluate two different trials for fattening Dhofari calves and find out which one was more economically profitable. A total of 12 local Dhofari calves were used and divided into two equal groups. Each group consisted of 6 calves of 12 months of age, with an average live body weight (LBW) of 206.7 ± 7.48 kg. They were fed for 154 days with two different methods of fattening. In the first method calves were fed 3.25% of their live body weight, 77.5% of it as a commercial concentrate and 22.5% as Rhodes grass hay. In the second method calves were fed starting with 4.00 Kg commercial concentrate with increasing of 0.5 kg for every 25 kg live body weight increase while Rhodes grass hay was fixed by 3 kg. Daily feed consumption (DFC), total weight gain (TWG), daily weight gain (DWG), feed conversion ratio (FCR), and cost of production per one kilogram gain (CPG) were measured. The experiment started from April to September. Effect of season on FCR, DFC, and CPG was also investigated. Results showed significance (p < 0.05) between the two trials in terms of DFC, FCR, and CPG in favor for the second trial. Results showed there was significant (P<0.05) effect of season on DFC, FCR, and CPG in both trials in favor for the summer season. It was concluded that fattening Dhofari growing calves breed on the second trial would be the economically profitable choice.

Keywords: Dhofari calves, Fattening methods, Feed Consumption, Production cost, Weight gain

1. INTRODUCTION

There are 208 thousand cows in Oman with almost 60% of them located in the south region of Dhofar governorate (MAF, 2012) and most of them are indigenous Dhofari cattle breed. Dhofari cattle breed is a subtropical Bos indicus small sized breed with a small cervical-thoracic hump, short horns, a narrow body and a tendency towards dark skin colors (Mahgoub et al., 2013). There is almost no research done on this breed, or its ability for fattening and meat production. This local breed was domesticated and used by Omanis for the production of both meat and milk for centuries. With proper management and control of diseases Dhofari cattle have enhanced their performance in terms of growth rates (Bahashwan, et al., 2015). The main objective of fattening calves is to make full use of their ability to produce meat with the least cost possible. Dhofari cattle respond well to improved management by way of higher growth rates (Bahashwan, et al., 2015). Dhofari calves recorded a post weaning daily gain of 222.76 gm/day and pre-weaning daily gain of 675.52 gm/day (MAF, 2010).

Omani farmers and animal keepers at the south region of Sultanate of Oman depend on this breed mainly for red meat. Early studies of the Dhofari calf breed found variation in their growth rate and weights which strongly suggested a research proposal for improvement and later on fattening programs (Bahashwan, et al., 2015). There has not been any published research about this breed ability for fattening such as other indigenous breeds in the Middle East. This research aims to find out the ability and potential of Dhofari calves for fattening with the least costly way by applying two different proposed trials of fattening. This would open new window for more research to come for this particular breed which will surely depend on the results of this trial as a reference.

2. MATERIALS AND METHODS

A total of 12 healthy Dhofari calves having the average age of 12 months and body weight 206.67±7.48 kg were randomly distributed into two groups of 6 each. They were housed in 2 separate pens with their own separate feeders and water supply. The pens had one part shaded and the other part is not for free movement, direct sun exposure and ventilation. The two experimental groups were fed with two different ways. The experiment started on April till September for 154 days. Live body weights were
measured using 500kg weighing scale clock, every 2 weeks for 22 weeks. Daily feed consumption and feed conversion ratios were also measured. The cost of producing of one kilogram weight gain was also measured based on the local prices of concentrates which was around 5 Omani Rial per 50kg of concentrates and Rhodes grass hay (Chloris gayana) which cost about 1 Omani Rial per 8 kg.

2.1. Diet content of calves feed

Calves were fed a commercial concentrate and Rhodes grass hay (Chloris gayana) from day one of the trial till day 154 (Table 1). Mineral blocks and water were provided as ad libitum. Concentrate ration provided ME of 11MJ/kg which met the nutritional requirements of growing calves weighing 150-200kg (NRC, 1984).

2.2. Trials of Fattening

Feed was weighed and distributed among the two groups of calves and they were fed twice (morning and evening) daily.

Trial I: Calves started with an average initial live body weight of 208.83±10.53kg. They were fed 3.25% of their live body weight, 77.5% of it as a commercial concentrate and 22.5% as Rhodes grass hay through the experimental period of 154 days.

Trial II: Calves started with an average initial live body weight of 204.50±11.55kg. They were fed starting with 4.00 Kg commercial concentrate with increasing of 0.5 Kg for every 25 Kg live body weight increase while Rhodes grass hay was fixed by 3 kg.

2.3. Statistical Analysis

Data collected were statistically analyzed using SPSS (SPSS 2010) with GLM procedure. Means were compared with t-test for significance at P<0.05. Methods effects as independent factors on the changes of average final weights, average total weight gain, average daily weight gain, average daily feed consumption, average feed conversion ratio and average cost of production of one kg weight gain as dependent factors were examined. Seasonal effect as independent factor on the average daily feed consumption of the first and second group of calves was also statistically analyzed using the same software and procedure.

3. RESULTS AND DISCUSSIONS

Statistical analysis showed significance (p<0.05) for DFC, FCR, and CPG (Table 2) between the two trials of fattening.

The average daily feed consumed (Table 2) by the first and second groups was not significant (P>0.05). This is mainly because of the amount of concentrate allowance given to the two groups. In the first group the calves were allowed to consume 2.25% concentrate of their live body weight and as their weight was increasing, therefore the concentrates in terms of quantity which was higher than the second

Table 1: Ingredients and composition of feeds (%) on dry matter basis

| Ingredients            | (%)  |
|------------------------|------|
| Corn                   | 15   |
| Barley                 | 23   |
| Soybean meal           | 6    |
| Oil seed extracts      | 21   |
| Cereal by-products     | 33   |
| Limestone              | 1.3  |
| Salt(NaCl)             | 0.7  |

| Chemical Composition   | (%)  |
|------------------------|------|
| Dry matter             | 89.17|
| Crude protein          | 14   |
| Crude fibre            | 10   |
| Crude fat              | 2    |
| Ash                    | 6.91 |
| ME(MJ/kg)              | 11   |

Table 2: Least squares means and standard errors of Dhofari calves production performance affected by trial of fattening

| Studied Traits          | Trial I         | Trial II        |
|-------------------------|-----------------|-----------------|
| Average initial weight(Kg) | 208.8 ±11.1 a   | 204.5 ±11.2 a   |
| Average final weight(Kg)   | 312.8 ±11.6 b   | 300.8 ±11.7 b   |
| Average weight gain(Kg)     | 104.0 ±4.05 c   | 96.3 ±4.05 c    |
| Average daily weight gain(Kg) | 0.68 ±0.03 d   | 0.63 ±0.02 d    |
| Average daily feed consumption(Kg) | 8.86 ±0.24 e | 5.17 ±0.22 f    |
| Average feed conversion ratio(Kg) | 13.2 ±0.50 f   | 8.32 ±0.49 h    |
| Average cost of production per gain(Omani Rial) | 3.31 ±0.13 i | 2.08 ±0.12 h |

Mean values in rows followed by different subscripts are significantly different (p<0.05)
The second group of calves was found by other researchers (Manni et al., 2013, Cross M et al., 2015) and (Manni et al., 2016) to be significant in terms of decreasing the wasted or lost feed intake and higher feed utilization efficiency. The FCR of the second trial was significantly (p<0.05) higher by almost 3 kg than the first trial (Table 2) which was also found in Sharabi breed calves (Abdullah et al 2010) fed on 4% concentrates of their body weight. The second group (Trial II) of calves ability to make use of the feed regime, translated into the average daily gain of 1kg was significantly (p<0.05) better by almost 5 kg than the first group (Trial I) (Table 2). Calves subjected to the second trial (Trial II) cost of producing per 1kg of live body weight gain was significant (P<0.05) better than to the first (Table 2). The calves of the first trial who consumed more feed than the ones in the second trial used that extra feed to convert it into fat deposit in their body whereas the second trial calves were making use of it to build their tissue and growth which was also found by others (Blakely et al., 2016). As a result, the second trial calves used less feed quantity to convert to weight gain than the first trial calves which was also found in Sharabi breed calves (Abdullah et al 2010). Results showed significant (p<0.05) effect of summer and autumn seasons on calves DFC, FCR, and CPG (Table 3) in both feeding trials.

### Table 3: Least squares means and standard errors of Dhofari calves DFC, FCR and CPG affected by summer and autumn seasons

|                | Trial I           | Trial II          |
|----------------|-------------------|-------------------|
| **DFC (kg)**   | SUMMER            | 8.06 ±0.34        | 5.20 ±0.05        |
|                | AUTUMN            | 9.98 ±0.34        | 5.14 ±0.06        |
| **FCR (kg)**   | SUMMER            | 8.63 ±0.22        | 7.30 ±0.45        |
|                | AUTUMN            | 15.97 ±0.23       | 12.30 ±0.46       |
| **CPG (Rial)** | SUMMER            | 2.16 ±0.02        | 1.82 ±0.38        |
|                | AUTUMN            | 12.90 ±0.30       | 3.07 ±0.37        |

Mean values in columns followed by different subscripts are significantly different (p<0.05)

DFC = daily feed consumption.; FCR= feed conversion ratio.; CPG= cost of production per gain.

DFC of the first group calves were significantly (P<0.05) lower by almost 24% (Table 3) during summer season than autumn as also found by others (Bernabucci et al., 2015) in Holstein steers. This difference might be due to the influence of season on the feed intake (Bernabucci et al., 2015). The FCR for both trials (Trial I, and Trial II) calves was significantly (p<0.05) affected by season (Table 3). In summer season calves converted one kilogram weight gain from using up about 45% less feed in comparison to autumn season for Trial I and 40% less for Trial II (Table 3). This might be related to feed consumption quantity in both trials during summer and autumn which was also found in Brahman calf breed (Asres et al., 2014). During the summer season calves significantly cost 10 Omani Rila (OMR) less for production gain than during autumn season in trial I and significantly 1.5 Omani Rial (OMR) less in trial II (Table 3). This might be related to the significant lesser FCR during the summer season in comparison to autumn.

### 4. CONCLUSION

This study showed that Dhofari calves responded well to fattening. Trial II proved to be better than Trial I in terms of DFC, FCR, and CPG. Summer season was superior compared to autumn in terms of DFC, FCR, and CPG.

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