The Pharma Innovation Journal 2022; 11(12): 2398-2401

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(12): 2398-2401

www.thepharmajournal.com
Received: 15-09-2022
Accepted: 18-10-2022

SB Gajmal
M.Sc. (Argi), Department of Animal Husbandry and Dairy Science, College of Agriculture, V.N.M.K.V., Parbhani, Maharashtra, India

Dr. DS Chauhan
Professor, Animal Husbandry and Dairy Science, College of Agriculture, V.N.M.K.V., Parbhani, Maharashtra, India

PR Chavan
M.Sc. (Argi), Department of Animal Husbandry and Dairy Science, College of Agriculture, V.N.M.K.V., Parbhani, Maharashtra, India

NS Chavan
M.Sc. (Argi), Department of Animal Husbandry and Dairy Science, College of Agriculture, V.N.M.K.V., Parbhani, Maharashtra, India

Corresponding Author:
SB Gajmal
M.Sc. (Argi), Department of Animal Husbandry and Dairy Science, College of Agriculture, V.N.M.K.V., Parbhani, Maharashtra, India

Effect of feeding different concentrate mixture on growth performance of Deoni male calves

SB Gajmal, DS Chauhan, PR Chavan and NS Chavan

Abstract
An experiment with Random Block Design for analysing the growth performance in Deoni male calves under different concentrate feeds was conducted in Parbhani over a period of 90 days while taking concentrate feed as main factor. Twenty-four Deoni male calves selected with nearness of their ages in four treatments as he T_1 treatment dry fodder (Jowar kadbi) with green fodder (Jowar multicut) and readymade concentrate mixture-I (Sugras) as per requirement for feeding of calves. For treatment T_2 dry fodder (Jowar kadbi) with green fodder (Jowar multicut) and concentrate mixture-II (Maize) as per requirement used. Treatment T_3 dry fodder (Jowar kadbi) with green fodder (Jowar multicut) and concentrate mixture-III (sorghum) as per requirement used. Treatment T_4 Dry fodder (Jowar kadbi) with green fodder (Jowar multicut) and concentrate mixture-IV (Wheat) are used. Growth performance is measured in case of their feed intake, daily dry matter intake, body weight, body chest girth, body length, body height. In this experiment cost structure also studied with efficient concentrate feed mixture. From the experimental findings it was observed that concentrate feed has effect on growth performance of Deoni male calves and higher body weight gain observed under the different concentrate feed.

Keywords: Concentrate feed, growth performance, body weight, body chest girth, body length, body height

Introduction
India possesses largest livestock population of 535.78 million and ranking first in cattle (194.49 million) and buffalo (109.85 million) population major input to maintenance of this large amount of livestock population is feeds and fodder. Currently the total feed consumption is approximately 757 metric tons of green fodder, 460 metric tons of dry fodder and 47.3 metric tons of concentrate. Currently, there is a shortage of 62.7 percent green fodder, 23 percent dry fodder and 44 percent concentrate. In terms of ruminants, there will be 26 percent deficit for DCP and 23 percent TDN. Reliable estimates of food demand and supply are not available, although some attempts have been made in the past to estimate the availability of different types of feed at the national level. Under nutrition is perhaps the greatest single factor responsible for the degeneration of livestock. Nutrition is one of the important aspects, which influences livestock production. The most important nutrient required by the animal are protein, carbohydrate, fat, water, minerals and vitamins (Drackley, 2008) [5]. Each class of these nutrient perform one or more function in the body protein are essential for growth, for repairing of bones wear and tear of the tissues and are responsible for formation of muscular tissues, skin and blood cells (KO, 2010) [16]. Carbohydrate is the chief source of energy in the animal body and maintained body temperature. Water is essential for physiological function such as digestion, absorption of nutrients and elimination of undigested nutrient, it also regulates body temperature. Minerals form approximate 4 to 5 percent of the weight of matured cattle. They are essential for promoting cell activity in the tissues and aids in digestion. Vitamins are essential for the life and health of the animals. In their absence, animal suffer from disease such as poor growth, rickets, deformed bones and teeth. Therefore, a balance ration must be given to the animals to full fill the requirement of the nutrient for maintenance and production (Mertens, 1987) [11]. Balanced feeding is another necessity, it has been observed that animal in certain region is suffering from various minerals disease (Kertz 2017) [8]. These are instances, where animal do not grow and perform well even after feeding the adequately due to nutritional imbalance. Therefore, it is beneficial to analyze available feed and fodder and prepare a feed schedule, balancing the entire beneficial nutrient; effort in planned feeding of the animals will not only enhance the production and profit but also reduce feed shortage.

Material and Methods

The experiment entitled "Effect of feeding different concentrate mixture on growth performance of Deoni male calves" was undertaken at Cattle Cross Breeding Project, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani during the year 2021-2022, for a period of 90 days (26 January to 27 April). The present experiment was conducted by Randomized block design by Amble (1975) with four treatments as detailed number of treatments 04, number of male calves per treatment 06, total number of male calves 24. Ingredient for concentrate used in each treatment as Concentrate mixture-I (T_1) sugras 100 percent, concentrate mixture-II (T_2) Maize 35, cotton seed cake 20, soybean 12, Tur chuni 30, Mineral mixture 02, salt 01 percent, concentrate mixture-III (T_3) sorghum 34, cotton seed cake 20, soybean 13, tur chuni 30, mineral mixture 02, salt 01, Concentrate mixture-IV (T_4) wheat 42, cotton seed cake 33, soybean 05, tur chuni 17, mineral mixture 02, salt 01 percent.

Experimental calves were selected in each treatment with average body weight as T_1-131 kg, T_2-132.8 kg, T_3-129 kg and T4-132.6 kg. Recorded observations are chemical composition of feed, daily dry matter intake, body weight, body chest girth, body length and body height with proper instrument like weighing balance and metallic tape. Analysis of feed was for dry matter, crude protein, crude fiber, ether extract, total ash and nitrogen free extract.

Results

It was observed (Table 1.) that, the average dry matter content in concentrate mixtures - I, concentrate mixtures - II, concentrate mixtures - III and concentrate mixtures - IV Jowar kadbi and Jowar multicut were 90.21, 90.20, 90.16, 90.12, 89.30 and 24.70 percent respectively. The concentrate mixture-II containing 19.26, 10.68, 4.16, 5.20 and 60.70 percent CP, CF, EE, total ash and NFE, respectively. The concentrate mixture - I containing 18.10, 10.48, 4.18, 4.44 and 62.80 percent, CP, CF, EE, total ash and NFE, respectively. The concentrate mixture-IV containing 17.68, 11.79, 4.69, 5.35 and 60.49 percent CP, CF, EE, total ash and NFE, respectively. The concentrate mixture-III containing 17.80, 12.38, 4.12, 5.46, 60.24 percent, CP, CF, EE, total ash and NFE, respectively.

Table 1: Chemical composition of feed stuff

Particulars	Con. mix-I (Sugars 100%)	Con. mix-II (Maize 35%)	Con mix-III (Sorghum 34%)	Con mix-IV (Wheat 42%)	Jowar Dry Kadbi	Jowar multicut
DM	90.21	90.20	90.16	90.12	89.30	24.70
CP	18.10	19.26	17.80	17.68	3.45	8.12
CF	10.48	10.68	12.38	11.79	35.48	35.48
EE	4.18	4.16	4.12	4.69	2.89	2.37
Total ash	4.44	5.20	5.46	5.35	8.40	10.75
NFE	62.80	60.70	60.24	60.49	50.25	43.28

The data of table 2. indicate body weight of calves, weight increase after various treatments varied significantly. The average final weight gain was highest in T_2 followed by T_1, T_4 and T_3 groups. Lowest weight gain was recorded in T_3 (27.11) treatment group i.e., various concentrate mixture feedings had a substantial impact on the calves' body weight gain. The average initial body weight was 131.00, 132.80, 129.00 and 132.60 kg in T_1, T_2, T_3, and T_4 groups respectively and average final observations of body weight were 163.39, 167.56, 156.11, 161.81 kg in respective T_1, T_2, T_3, T_4 treatments. The total gain in body weight was higher in treatment T_2 (34.76 kg) followed by T_1 (32.39 kg) and T_4 (29.21 kg) and T_3 (27.11 kg) treatment. Average daily gain in body weight was higher in T_2 (0.382 kg) followed by T_1 (0.356 kg), T_4 (0.321 kg) and T_3 (0.298 kg)

Table 2: Effect of different feeding treatment on body weight of calves (kg)

Treatments	Average Initial weight (kg)	Weight gain kg/day/ calves	Weight gain kg/week/ calves	Period total weight gain (kg)	Average Final Weight (kg)
T_1	131.00	0.356	2.49	32.39	163.39^{ab}
T_2	132.80	0.382	2.67	34.76	167.56^{a}
T_3	129.00	0.298	2.08	27.11	156.11^{c}
T_4	132.60	0.321	2.24	29.21	161.81^{b}
F test	NS	Sig	Sig	Sig	Sig
SE (M) ±	-	0.01	0.08	0.37	1.58
C.D at 5%	-	0.03	0.24	1.13	4.816

Table 3. showed that the average initial chest girth was 113.50, 114.20, 111.30, and 112.40 cm in T_1, T_2, T_3, and T_4 groups respectively and average final observations of chest girth were 125.30, 126.19, 119.50, 121.10 cm in respective treatments. The total average gain in chest girth was higher in treatment T_2 (12.80 cm) followed by T_1 (10.50 cm) and T_3 (9.7 cm) and T_4 (5.40 cm) treatment, respectively. Results showed that nutritive gain is near about same means treatments were at par with each other.

Table 3: Effect of different feeding treatment on chest girth (cm)

Treatments	Average initial chest girth (cm)	Average final chest girth (cm)	Average gain chest girth (cm)
T_1	113.50	125.30	11.80[a]
T_2	114.20	126.19	12.00[a]
T_3	111.30	119.50	9.80[c]
T_4	112.40	121.10	10.70[b]
F test	NS	Sig	Sig
SE (M) ±	-	1.19	0.11
C.D at 5%	-	3.63	0.33

Table 4. shown that in treatments T_1, T_2, T_3, T_4, the gains in body length were 9.30, 11.69, 6.20 and 7.40 cm, respectively. This showed that the T_2 (11.69 cm) treatment had the statistically biggest growth in length while the T_1 (9.30 cm), T_4 (7.40 cm) and T_3 (6.20 cm) treatment had the lowest gain in length. Initial body lengths in the treatment groups T_1, T_2, T_3 and T_4 were 103.20, 102.80, and 101.70, 102.10 cm, respectively, while final body lengths in each T_1, T_2, T_3, T_4 group were 112.50, 114.50, 107.90 and 109.50 cm. Table 9. shows that growing calves in the T_2 group had higher body length gain than those in the T_1, T_4 and T_3 groups.

Table 4: Effect of different feeding treatment on body length (cm)

Treatments	Average initial body length (cm)	Average final body length (cm)	Average gain body length (cm)
T_1	103.20	112.50	9.30[b]
T_2	102.80	114.50	11.69[a]
T_3	101.70	107.90	6.20[d]
T_4	102.10	109.50	7.40[c]
F test	NS	Sig	Sig
SE (M) ±	-	1.08	0.09
C.D at 5%	-	3.29	0.29

The table 5 clearly showed that growing calves in the T_2 (14.30cm) group had higher body heights than those in the other treatments, with the lowest body heights in the T_3 (10.20cm) treatment. The feeding concentrate mixture had an impact on the growing calves various body measurements, with the growth in length being statistically significant. Initial body heights in the T_1, T_2, T_3 and T_4 groups were 106.20, 107.80, 103.10 and 104.50 cm, respectively, whereas final height measurements in each T_1, T_2, T_3, T_4 treatment were 118.80, 122.10, 113.10, and 115.70 cm. The T_2 (14.30cm) treatment group total gain in height (cm) was largest, followed by T_1 (12.60cm) and T_4 (11.20cm), and was lower in T_3 (10.20cm).

Table 5: Effect of different feeding treatment on body height (cm)

Treatments	Average initial body height (cm)	Average final body height (cm)	Average gain body height (cm)
T_1	106.20	118.80	12.60[b]
T_2	107.80	122.10	14.30[a]
T_3	103.10	113.10	10.20[d]
T_4	104.50	115.70	11.20[c]
F test	NS	Sig	Sig
SE (M) ±	-	1.15	0.13
C.D at 5%	-	3.50	0.38

Discussions

Chemical composition of feed stuff similar findings observed by Doke (1991) [4] and Naser (2011) [13] Average body weight gain has similar observations by Mawal (2015) [10] and Madavi *et al.* (2020) [9] and Mishra *et al.* (2017) [12] and Dahiwale (2018) [3] Average body chest girth findings are best observed in Talokar (1993) [15], Kahate *et al.* (2017) [7] and shelar (2004) [14] Similar results of average gain in body length observed by Hosmani and Srivastava (1989) [6] for average body height similar findings are observed by Belsare (2004) [2].

Conclusion

The study of present investigation concluded that the T_2 ingredient (Maize, CSC, soybean, Tur chuni, Mineral mixture, salt) used as feed for experimental calves were found best to fulfill the nutritional and appetite requirement as compared with T_1, T_3 and T_4 treatments. Feeding of concentrate mixture has positive effect on maintenance and growth performance on calves. In experimental period the feed intake recorded was sufficient to fulfill the daily dietary activities and nutritional demand of calves. The highest growth rate (weight gain) in experimental period was observed by feeding jowar kadbi, with jowar multi-cut as a green fodder and concentrate mixture-II. According to dry matter intake, T_2 has significant values followed by T_1, T_4, T_3 respectively. Hence shown that by giving jowar kadbi with green fodder as jowar multi-cut and concentrate mixture-II for experimental calves. The body growth performance with respect to chest girth, body length, body height of calves statistically significant in T_2 treatment. Cost structure for rearing of calves is best in T_2 treatment because cost of feeding per day per calves is less than other treatments. From the body weight point of view the cost per kg body weight gain is lowest in concentrate mixture-II than other concentrates mixture used.

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