EFFECT OF FEEDING SHEA NUT CAKE BASED DIETS ON GROWTH AND CARCASS CHARACTERISTICS OF GRADED MURRAH MALE BUFFALOE CALVES

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ABSTRACT

A trial was conducted to analyze the growth performance and carcass characteristics of eighteen graded Murrah male buffalo calves and distributed randomly into 3 equal groups in complete randomized design and fed three different rations for a period of 120 days. The control diet (T1) contained 0% SNC and 0% probiotic. T2 contained 20% SNC and 0.1% probiotic (yeast culture). T3 contained 40% SNC and 0.1% probiotic. As the SNC content increased in the diets the dry matter intake was also increased significantly from T1 to T3 rations. The total body weight gain (kg) of buffalo calves in the experimental diets T_2 and T_3 were significantly ($P < 0.01$) higher than control (T_1) diet. The average daily gains

(g) were significantly (P<0.01) in T2 and T3 rations than control ration. The feed conversion efficiency was significantly (P <0.01) higher in control diet T_1 against T_2 and T_3 diet clearly indicating the inclusion of SNC in the diets reduces the cost of production of meat in buffalo calves. The average dressing percentage expressed as percentage of slaughter weights and empty body weights were 52.29^{a}±0.08, 53.51^{b}±0.42 and 54.27^{b}±0.34, and 64.20±0.23, 65.72±1.00 and 66.82±0.84 respectively in T1, T2 and T3 diets fed buffalo calf groups respectively. The dressing percentage in T2 and T3 experimental groups were comparable but significantly higher (P<0.01) than control group (T1). There was no significant difference observed among the experimental treatments in yield of various edible and non edible organs individually. However the total edible offal's percent on slaughter weight was significantly higher in T3 group when compared to T1 and T2. These results indicate that the addition of SNC in diets of buffalo calves did not affect the yield of individual edible offals but significantly (P<0.01) increased the total yield of edible offal's in SNC fed experimental animals.

Keywords: **Average Daily Gain, Carcass characteristics, Murrah buffalo bull calves, Probiotics and Sheanut cake.**

Introduction

The green fruit of Shea (*Butryospermum parkii*) tree has a pulp that covers the seed or nut. The harvest follows 3 to 5 years cycle and yields 80 kg of nuts and from these nuts, oil will be extracted and leaving the residue Abidemi *et al*., (2009); Kumar *et al*., (2010). Sheanut meal is now receiving increased attention as a potential feed ingredient due to the increased amounts that are available as a result of high demand for shea fat for cosmetics and as a cocoa butter substitute in chocolate Lipp and Anklam (1998). Shea nut cake is the residue that remains after the extraction of shea butter from the nut. It is estimated that about 500,000 tons of shea nut cake is produced annually by the shea industry in the savanna zones of Ghana Okai *et al*., (1989). It is estimated that for every metric tonne nuts processed, 450–600 kg of shea nut cake is produced and about 60,000 metric tonnes of shea kernels are consumed locally in a year Ofusu *et al.,* (2009). Thus, about 30,300,000 kg shea nut cake is generated locally in a year in Ghana. Meanwhile the industry has been projected to equalize the cocoa industry in future as shea butter gradually becomes the best substitute for the cocoa butter industries Moore S (2008) and De Muelenaere (1997). Shea nut fruits are a source of energy during the dry season. The production of Shea nut cake is approximately 18,000 tons per year from M/s. Foods, Fats and Fertilizers Pvt. Ltd which is Multi National Company located in West Godavari District A.P. It is the only industry that is importing Sheanut cake in Andhra Pradesh.

Materials and Methods

Eighteen graded Murrah buffalo calves of initial body weights 106.25 ± 2.67 Kg were selected and divided in to three equal groups T1, T2 and T3 (Table 1). Three experimental rations were tried namely T1, T2 and T3 in growing buffalo calves to study the effect of inclusion of Shea nut cake at 20% and 40% levels with inclusion of probiotic (0.1 per cent yeast culture) was compared with the control diet. Along with concentrates all the animals were fed with chaffed APBN1 fodder crop every day. The experimental animals were maintained in individual housing system with feeding and watering arrangements throughout the experimental period. The experiment was conducted for 120days at Livestock Research Institute, Rajendranagar, Sri Venkateswara Veterinary University. The feed ingredients were purchased from the local market and the shea nut cake is procured from M/s. Foods, Fats and Fertilizers Pvt. Ltd which is Multi National Company located in West Godavari District A.P. The experimental rations were processed into mash by grinding through 8 mm sieve in a hammer mill.

Three representative animals from each group were slaughtered at the end of growth trial to study the carcass characteristics like dressing percentage, hot carcass weight, weight of edible and non-edible organs etc. All the observations were recorded for the parameters indicated in the experiment.

The animals were slaughtered by "Halal" method after overnight starving. The live weights of animals were recorded before slaughter. The stripping, legging, dressing and evisceration were performed by adopting the standard procedure described by Gerrard (1964). The weights of hot carcass, edible (liver, heart, testes, diaphragm, kidney and spleen) and non-edible organs (lungs, trachea, stomach and intestines) were recorded. The carcass was then divided into 5 cuts viz., leg, loin, rack, shoulder and neck and fore shank and brisket as suggested by the National Livestock and Meat Board of United States of America (Brandly *et al.*, 1968).

Statistical Analysis

The experimental data were subjected to least square analysis of variance (Snedecor and Cochran 1968) and the treatment means were tested for significance by Duncan's multiple range test (1955).

Results and Discussion

Growth and Performance

The average daily dry matter intake of $4.23^{a} \pm 0.02$, $4.44^{b} \pm 0.02$, and $4.75^{c} \pm 0.02$kg were recorded by buffalo calves fed experimental diets T_1, T_2, and T_3 respectively (Table 2). As the sheanut content increased in the diets the dry matter intake was also increased significantly from T1 to T3 rations. The initial and final body weights (kg) of the experimental sheep in intensive system are shown in Table 2. The mean initial and final body weights were $75.10^{a} \pm 1.02$, $81.13^{b} \pm 0.54$ and $90.48^{c} \pm 0.31$ for T_1, T_2, and T_3 diets respectively. The total body weight gain (kg) of buffalo calves in the experimental diets T_2 and T_3 were significantly ($P < 0.01$) higher than control (T_1) diet. The average daily weight gain (g) were $0.42^{a} \pm 0.006$, $0.45^{b} \pm 0.003$ and $0.50^{c} \pm 0.001$ respectively for T1, T2 and T3 rations respectively in the growing buffalo calves, presented in the table . The average daily gains (g) were significantly ($P<0.01$) in T2 and T3 rations than control ration. The feed conversion ratios (FCR) of experimental diets in experimental buffalo calves are presented in Table 2. The feed conversion efficiency was significantly ($P <0.01$) higher ($10.15^{a} \pm 0.11$) in control diet T_1 group against $9.84^{b} \pm 0.07$, and $9.45^{c} \pm 0.060$ f T_2, T_3 diets respectively. Inclusion of sheanut cake in the diet of buffalo calves is decreasing the FCR, which is cost effective. The cost of control T_1 diet (Rs. $73.04^{c} \pm 0.75$) per kg body weight gain was significantly ($P<0.01$) higher than T_2 (Rs. $68.10^{b} \pm 0.48$) and T_3 (Rs. $62.28^{a} \pm 0.41$). This clearly indicates the inclusion of Sheanut cake in the diets reduces the cost of production of meat in buffalo calves.

Carcass Characteristics

Carcass characteristics and yield of wholesale cuts and various visceral organs are discussed in this chapter and values are presented in Table 4. The average dressing percentage expressed as percentage of slaughter weights and empty body weights were $52.29^{a} \pm 0.08$, $53.51^{b} \pm 0.42$ and $54.27^{b} \pm 0.34$, and 64.20 ± 0.23, 65.72 ± 1.00 and 66.82 ± 0.84 respectively in T1, T2 and T3 diets fed buffalo calf groups respectively. The dressing percentage in T2 and T3 experimental groups were comparable but significantly higher ($P<0.01$) than control group (T1). There was no significant difference observed among the experimental treatments in yield of various edible and non edible organs individually (Table 5). However the total edible offal's percent on slaughter weight was significantly higher in T3 group when compared to T1 and T2. These results indicate that the addition of sheanut cake in diets of buffalo calves did not affect the yield of individual edible offals but significantly ($P<0.01$) increased the total yield of edible offal's in Sheanut cake fed experimental animals.

Table 1: Ingredient composition of experimental rations.

Feed ingredients	Experimental diet T 1	Experimental diet T 2	Experimental diet T3
	kg	kg	kg
Maize	48.5	37	25.5
Groundnut cake	29	27	25
Sheanut cake	0	20	40
Deoilded rice bran	13.5	7	0.5
Urea	1	1	1
Molases	5	5	5
Salt	1	1	1
Min mix	2	2	2
Total quantity	100	100	100
Probiotic	0	0.1	0.1

Table 2: Average daily weight gain and dry matter intake.

Treatment	Initial weight Kgs	Final weight Kgs	Weight gain Kgs	Average daily weight gain Kgs	Dry matter intake /DAY Kgs	FCR
T1	106.21	180.00	73.79	0.41	4.23	10.32
	108.20	182.60	74.40	0.41	4.20	10.16
	110.00	186.20	76.20	0.42	4.27	10.09
	101.30	178.90	77.60	0.43	4.32	10.02
	102.80	180.30	77.50	0.43	4.21	9.78
	108.80	179.90	71.10	0.40	4.16	10.53
	106.22± 1.42	181.32^{a} ± 1.09	75.10^{a} 1.02	0.42^{a}± 0.006	4.23^{a}± 0.02	10.15^{a}± 0.11
T2	108.00	189.00	81.00	0.45	4.48	9.96
	109.40	192.10	82.70	0.46	4.38	9.53
	107.90	190.30	82.40	0.46	4.49	9.81
	108.80	188.60	79.80	0.44	4.39	9.90
	110.20	189.60	79.40	0.44	4.42	10.02
	107.10	188.60	81.50	0.45	4.46	9.85
	108.57± 0.46	189.70^{b} ±0.54	81.13^{b}± 0.54	0.45^{b}± 0.003	4.44^{b}± 0.02	9.84^{b}± 0.07
T3	104.00	194.30	90.30	0.50	4.79	9.55
	106.20	195.20	89.00	0.49	4.77	9.65
	103.80	194.60	90.80	0.50	4.82	9.56
	105.10	195.80	90.70	0.50	4.74	9.41
	103.30	194.30	91.00	0.51	4.68	9.26
	104.30	195.40	91.10	0.51	4.71	9.31
	104.45± 0.42	194.93± 0.25	90.48^{c}± 0.31	0.50^{c}± 0.001	4.75^{c}± 0.02	9.45^{c}± 0.06

Table 3: Cost economics of buffalo calves rations

Group	Conc. (Wt)	Grass (Wt)	Conc. Cost (Rs)	Grass Cost (Rs)	Tot Cost (Rs)	Conce. Cost/Kg Wt gain (Rs)	GCST /KG	TCST /KG
T1	223.94	2196.35	3282.98	2196.35	5479.32	44.49	29.76	74.26
	222.35	2180.77	3259.69	2180.77	5440.46	43.81	29.31	73.12
	226.06	2217.12	3314.02	2217.12	5531.14	43.49	29.10	72.59
	228.71	2243.08	3352.83	2243.08	5595.91	43.21	28.91	72.11
	222.88	2185.96	3267.46	2185.96	5453.42	42.16	28.21	70.37
	220.24	2160.00	3228.65	2160.00	5388.65	45.41	30.38	75.79
Mean	**224.03^{a} ±1.21**	**2197.21^{a} ±11.94**	**3284.27^{c} ±17.85**	**2197.21^{a} ±11.94**	**5481.48^{a} ±29.81**	**43.76^{c}± 0.45**	**29.28^{c} ±0.30**	**73.04^{c} ±0.75**
T2	237.18	2326.15	3251.69	2326.15	5577.84	40.14	28.72	68.86
	231.88	2274.23	3179.11	2274.23	5453.34	38.44	27.50	65.94
	237.71	2331.35	3258.95	2331.35	5590.29	39.55	28.29	67.84
	232.41	2279.42	3186.37	2279.42	5465.79	39.93	28.56	68.49
	234.00	2295.00	3208.14	2295.00	5503.14	40.40	28.90	69.31
	236.12	2315.77	3237.17	2315.77	5552.94	39.72	28.41	68.13
Mean	**234.88^{b} ±1.01**	**2303.65^{b} ±9.91**	**3220.24^{b} ±13.85**	**2303.65^{b} ±9.91**	**5523.89^{a} ±23.77**	**39.70^{b} ±0.28**	**28.40^{b} ±0.20**	**68.10^{b} ±0.48**
T3	253.59	2487.12	3192.68	2487.12	5679.79	35.36	27.54	62.90
	252.53	2476.73	3179.35	2476.73	5656.08	35.72	27.83	63.55
	255.18	2502.69	3212.67	2502.69	5715.36	35.38	27.56	62.94
	250.94	2461.15	3159.35	2461.15	5620.50	34.83	27.14	61.97
	247.76	2430.00	3119.36	2430.00	5549.36	34.28	26.70	60.98
	249.35	2445.58	3139.35	2445.58	5584.93	34.46	26.84	61.31

Mean	**251.56** [c] ±1.12	**2467.21**[c] ±11.01	**3167.13** [a] ±14.130	**2467.21** [c] ±11.01	**5634.34** [b] ±25.14	**35.01**[a] ±0.23	**27.27**[a] ±0.18	**62.28** [a] ±0.41

Means with different superscripts in a column wise differ significantly (P<0.01)

Table 4: Dressing percentage and Carcass characteristics.

Parameter	T1	T2	T3
Av. Slaughter weight	180.92±1.58	189.42±0.55	194.92±0.80
Carcass Wt (Kgs)	94.71	101.53	105.67
	95.11	100.11	107.00
	94.60	102.88	104.66
Mean	94.81[a]±0.15	101.51[b]±0.79	105.78[c]±0.67
Empty Wt Kgs)	147.71	154.93	158.15
	149.00	156.22	156.68
	146.35	152.32	160.13
Mean	147.69[a]±1.62	154.49[b]±0.76	158.32[c]±1.14
% Of Carcass On Slaughter Wt (Dressing Percentage)	52.24	53.52	54.22
	52.46	52.77	54.90
	52.18	54.23	53.70
Mean	52.29[a]±0.08	53.51[b]±0.42	54.27[b]±0.34
% Of Carcass On Empty Wt	64.12	65.53	66.82
	63.83	64.08	68.29
	64.64	67.54	65.36
Mean	64.20±0.23	65.72±1.00	66.82±0.84
Wt of GIT Kgs)	33.59	34.77	36.75
	32.30	33.48	38.22
	34.95	37.38	34.77
Mean	33.61±0.76	35.21±1.14	36.58±0.99

Means with different superscripts in a column wise differ significantly (P<0.01)

Table 5: Yield of different edible and non edible organs of buffalo calves.

TREATMENT	T1	T2	T3
SLAUGHTER WT	180.92±1.58	189.42±0.55	194.92±0.80
HEAD	8.34±0.39	8.50±0.19	8.54±0.29
HIDE	9.55±0.15	10.52±0.66	11.00±0.64
TROTTER	3.10±0.01	3.44±0.12	3.66±0.11
FULL STOMACH	33.61±0.21	34.41±0.47	36.69±0.26
EMPT STOMACH	22.67±0.40	23.74±0.18	24.88±0.14
GI TRACT	10.94±0.19	10.67±0.40	11.81±0.24
LIVER	2.36±0.06	2.42±0.10	2.54±0.05
SPLEEN	0.35±0.01	0.36±0.04	0.38±0.01
HEART	0.52±0.01	0.54±0.01	0.54±0.01
KIDNEYS	0.35±0.01	0.39±0.01	0.40±0.01
LUNGS	1.75±0.03	1.85±0.03	1.92±0.01
TOTAL	37.25±0.50	38.69±0.99	40.79±1.20
EDIBLE OFFALS	5.32^{a}±0.09	5.56^{ab}±0.08	5.78^{b}±0.02
EDIBLE OFFALS %SW	2.94±0.08	2.94±0.06	2.97±0.03

Means with different superscripts in a column wise differ significantly (P<0.01)

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