

*Original Research***Effect of Supplementation of *Leucaena leucocephala* (Lam.) de Wit (*Leucaena*) Leaves on Growth Performance and Metabolic Profile of Crossbred Calves****Ravi Kant*, Rohit Bishist and Manoj Kumar**

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Abstract

A four month feeding experiment was conducted to assess the effect of feeding fresh *Leucaena leucocephala* leaves, replacing 10 % of total daily dry matter of the control diet, feeding on growth performance and metabolic profile of the crossbred male calves of 6-12 months of age. The weight gain, average daily gain, mean Hb concentration, mean blood glucose, blood total protein and mean blood urea were recorded significantly ($p < 0.05$) higher in treatment group. While mean blood creatinine level was higher in control group as compared to the treatment group. It was concluded that *Leucaena leucocephala* leaves can be incorporated in the diet of crossbred calves @ 10% of dry matter intake/animal/day without any adverse effect on growth performance and metabolism of crossbred calves.

Key words: Blood Biochemical, Crossbred Calves, Growth, *Leucaena leucocephala***How to cite:** Kant, R., Bishist, R., & Kumar, M. (2019). Effect of Supplementation of *Leucaena leucocephala* (Lam.) de Wit (*Leucaena*) Leaves on Growth Profile of Crossbred Calves. International Journal of Livestock Research, 9(5), 154-159. doi: 10.5455/ijlr.20181212024424**Introduction**

Poor green fodder availability is major challenge to improve productivity of Indian livestock's. As against the requirement of 222 million ton green fodder availability is only 143 million ton (Anonymous, 2015). In this situation fodder trees are indispensable resources for animal feeding, especially in hilly state like Himachal Pradesh and particularly in lean summer and winter season (Vashist and Pathania, 2001). However, the present level of fodder tree production is meeting only partial need of the animals but fodder tree leaves contain higher protein and calcium compared to grasses and straws and a wide range of fodder trees have been used for ruminants as the major source of feeding materials (Osti *et al.*, 2006).

Leucaena leucocephala belongs to family Leguminosae and is widely grown in the sub-tropical zones of Himachal Pradesh. It is valued as an excellent protein source for cattle fodder, consumed browsed or

harvested, mature or immature, green or dry. All parts of *L. leucocephala* are edible to animals, including leaves, young stem, flowers, young and mature pods, and seeds. *Leucaena leucocephala* is evergreen forage rich in protein, minerals and β carotene and is widely used species as a valuable fodder shrub in the tropics. However, consumption of this legume at high densities may be limited because of anti-nutritional factor like mimosine which leading to nutritional imbalance (Calsamiglia *et al.*, 2010). So keeping in view importance and constraints of *Leucaena leucocephala* feeding, study was conducted to find out the effect of incorporation of *Leucaena* leaves@ 10% dry matter intake/animal/day on growth performance and biochemical profile of the crossbred calves.

Materials and Methods

Location and Climate

The present study was conducted during October 2015 to January 2016 at livestock research farm of YSP University of Horticulture and Forestry, Nauni, Himachal Pradesh located at an elevation of 1250 m above mean sea level in the Mid-Himalayan zone (30°51' N latitude and 76°11' E longitude). Climatically, the location lies in the sub-tropical belt but is slightly skewed towards the temperate climate and receives an annual rainfall of 110-115cm.

Animals and Feeding

A total of 12 cross bred male calves of 6 months to 12 months, with an average body weight of 85.17 kg were divided into two equal groups having 6 animals in each group. These calves were subjected to a feeding trail of 4 months duration. All the animals of both the groups were fed as per normal feeding schedule of dairy farm the ingredients of the feed were as follows-

S. No	Particulars	Parts
1	Maize	30%
2	Wheat Bran	32%
3	G. N. C	20%
4	Mustard cakes	10%
5	Molasses	5%
6	Mineral mixture	2%
6	Salt	1%

Each animal in treatment group was fed with fresh *Leucaena* leaves @ 10% DM intake/animal/day. All the experimental animals were weighed in the beginning of feeding trial and subsequently on fortnightly interval to assess the live weight changes. The animals were weighed before feeding and watering in the morning. The average daily weight gain of animals was estimated by calculating the difference between final weight and initial weight and dividing it with the number of feeding days.

Blood Analysis of Animal

A total of 108 blood samples were collected from all the animals of both the groups before starting the feeding trial and fortnightly interval. During sampling 10 ml. blood was collected into labelled sterile tubes containing ethylene diamine tetra acetic acid (Sodium EDTA) as anticoagulant for the determination of haematobiochemical parameters. These vials or sterile tubes were then placed in auto analyser to get the reading for haemoglobin, blood glucose, total protein, creatinine and blood urea were estimated by the using the GOD-POD kit (Span Diagnostics Ltd., India).

Statistical Analysis

Data generated from the study was analysed by using student's test at 5 per cent level of significant (Snedecor and Cochran, 1994).

Results and Discussion

Growth Performance of the Crossbred Calves

The data of growth performance has been presented in Table 1. The average initial body weight 85.17 kg in control and 86.17 kg did not differ significantly, indicating uniformity in the groups at the beginning of feeding trial. At the end of 4 months feeding trial, the final weight of animals in control group was recorded as 115.08 kg and that of animals in treatment group was 119.14 kg.

Table 1: Effect of *L. leucocephala* leaves feeding on growth performance of crossbred calves

Parameter	Control Group (C)	Treatment Group (T)
Initial weight (kg)	85.17	86.17
Final weight (kg)	115.08	119.14
Total weight gain (kg)	29.91	32.97
ADG (gm/day)	249.49 ^a	274.76 ^b

Average daily gain* $t_{cal}=6.29$

Total weight gain at the end of feeding trial was higher in the crossbred calves of treatment group was 32.97 kg as compared to the crossbred calves of the control group (29.91 kg). Overall average daily gain was significantly higher in the crossbred calves of treatment group (274.76 gm/day) as compared to the crossbred calves of control group (249.49 gm/day) at 5 per cent level of significance. There was a positive effect of *L. leucocephala* leaves feeding on the growth performance (average daily gain) of crossbred calves. Higher average daily gain (gm/day) and total weight gain in the animals of the treatment group represents higher growth rate as compared to the animals of the control group (Rodriguez *et al.*, 2012).

Haematological Profile of the Crossbred Calves

The mean haemoglobin concentration 10.25 g/dl in treatment group did not differ significantly ($p>0.05$) from 10.25 g/dl in control. However, mean Hb concentration in the animals of both the groups was within

the normal range (Radostits *et al.*, 2006) of the species. There was no negative effect of *L. leucocephala* leaves feeding on the Hb concentration of the crossbred calves. The mean blood glucose level in treatment group was significantly ($p < 0.05$) higher than the control group (45.08 and 43.69 mg/dl). However, interaction between feeding type and feeding intervals had non-significant ($p > 0.05$) effect on blood glucose level of crossbred calves of both the groups. The results in the present study are in agreement with the previous studies of Sarap and Chavan (2014) who, reported higher glucose level in the crossbred heifers supplemented with the Anjan tree leaves when compared with the green maize and concentrates. On the similar lines Kholif *et al.* (2016) also reported an increase in blood glucose levels in Anglo-Nubian goats on feeding of Moringa silage which may be due to the fact that feeding of Moringa forage helps in bypassing some soluble carbohydrates to be absorbed as glucose, which helps in increasing the metabolizable energy intake.

Table 2: Biochemical profile of the crossbred calves

Feeding Type Feeding Interval	C	T	C	T	C	T	C	T
	Blood Glucose (mg/dl)		Total Protein (g/litre)		Creatinine(μ mol/l)		Blood Urea (mmol/litre)	
I(0 day)	43.55	43.55	74.14	75.62	117.21	116.55	5	4.87
II(15 days)	43.62	43.64	74.23	77.86	117.95	117.13	4.96	4.88
III(30 days)	43.62	43.66	74.39	76.41	118.24	117.2	4.92	4.91
IV(45 days)	43.68	43.69	74.5	76.03	118.98	117.39	4.94	4.91
V(60 days)	43.69	44.21	73.37	76.03	119.19	117.66	4.94	4.9
VI(75 days)	43.71	45.26	73.77	75.67	119.34	118.06	4.92	4.93
VII(90 days)	43.75	46.48	73.53	75.23	119.43	118.48	4.87	4.85
VIII(105 days)	43.79	47	73.03	75.11	119.61	118.98	4.89	4.87
IX(120 days)	43.81	48.2	73.8	75.22	120.04	119.17	4.93	4.91
Over all Mean	43.69^a	45.08^b	73.86^a	75.91^b	118.89^a	117.85^a	4.93^a	4.89^a

Blood glucose- $CD_{0.05} = 0.98$; Total protein- $CD_{0.05} = 0.90$

Mean blood total protein concentration was significantly ($p < 0.05$) higher in treatment group (75.91g/litre) as compared to the control group (73.86g/litre). Significant increase in blood total protein levels could be due to the tannins content in the *Leucaena leucocephala* leaves which facilitates bypass of proteins from the rumen of calves and absorption from intestine. Present findings are in agreement with Khalel *et al.* (2014) who reported that feeding of Moringa leaves (40% inclusion) in the ration resulted in higher total blood protein concentration (8.78 g/dl vs. 7.53 g/dl) in lactating cows as compared to the animals fed on 40% Berseem in ration. The feeding of *L. leucocephala* leaves during the entire experiment period had non-significant ($p > 0.05$) effect on creatinine level in blood of crossbred calves in both the groups which may be due to the fact that feeding of *Leucaena leucocephala* to the cross bred calves has not resulted in any protein deficiency in the treatment group of animals. Olafadehan *et al.* (2014) also reported that increasing the level

of *Ficus polita* fodder up to 700 g/kg in the total mixed rations did not have deleterious effect on the lean mass tissue of the growing goats.

The mean value of urea level in the animals of both the groups was found within the normal range of the species. The effect of feeding types, feeding intervals as well as interactions between feeding types and feeding intervals exercised a non-significant ($p>0.05$) effect on presence of blood urea in the crossbred calves of both the group. The mean blood urea level was higher in control group (4.93) than in treatment group (4.89). There was no particular pattern was followed in blood urea level of crossbred calves in feeding trial in both control groups and treatment group. The studies shows that lower blood urea level was observed in the crossbred calves fed on *Leucaena leucocephala* leaves and that might be due to better dietary protein utilization. Khalel *et al.* (2014) reported lower blood urea level (38.44 mg/dl) and higher dietary N utilization in lactating cow on feeding *Moringa oleifera* forage than Berseem containing diet (46.45 mg/dl).

Conclusion

Feeding of *L. leucocephala* leaves @ 10% of dry matter intake/animal/day did not have any adverse effect on the growth performance and metabolic profile of the crossbred calves and can be safely fed crossbred calves as a green fodder.

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