

Effect of Detoxified Neem Seed Cake on Carcass Characteristics in Growing Bannur Lambs

P. Krishnamoorthy¹, S.B.N. Rao^{2,*}, D. Dinesh Kumar², S. Jash², H. Rahman¹

¹ICAR-National Institute for Veterinary Epidemiology and Disease Informatics (NIVEDI), Ramagondanahalli, Yelahanka, Bengaluru, Karnataka, India

²ICAR-National Institute of Animal Nutrition and Physiology (NIANP), Adugodi, Bengaluru, Karnataka, India

Abstract

The present study was conducted to know the effect of two levels of detoxified neem (*Azadirachta indica*) seed cake (DNC) on the carcass characteristics of male lambs. Eighteen male lambs were randomly divided in three groups of six each with group I control concentrate containing soyabean meal (SBM) and group II and III fed with concentrate mixtures containing defatted and DNC at two levels DNC25 and DNC50 for five months. At the end of feeding trial, the sheep were slaughtered humanely and slaughter weight, carcass weight, dressing percentages, and percentage weight of various organs were calculated and analysed statistically. The mean±SE slaughter weight (kg) and carcass weight (kg) of sheep were 18.33±1.27 and 13.65±0.95 in group I, 17.68±1.28 and 13.15±1.03 in group II, 18.00±0.99 and 13.71±0.79 in group III, respectively. The dressing percentages on slaughter weight basis were 49.74±1.26, 49.69±1.04 and 51.94±0.55, respectively. No significant difference in the slaughter weight, carcass weight and dressing percentages between the three groups was observed. The percentage of slaughter weight of various organs like skin, head, feet, heart, lungs, spleen, testicles, kidney and liver showed no significant difference between the treatment and control groups. Thus, the detoxified neem seed cake can be fed to sheep as protein replacement without affecting the carcass characteristics, which will reduce the feed cost and improve the profitability of the sheep farmers in India.

Keywords: Detoxified neem seed cake, bannur sheep, carcass characteristics

*Author for Correspondence E-mail: sbnrao@gmail.com

INTRODUCTION

Soybean meal (SBM) is a costly protein source and is used in the feed of animals because of its high protein content. Sheep and goats, small ruminants may be fed with alternate protein supplements such as neem (*Azadirachta indica*), which is a fast growing tree and belongs to the family of Meliaceae. It is native to India, but it also spread across Africa, Bangladesh, Central and South America, Indonesia, Malaysia, Pakistan, Sri Lanka and Thailand. Neem tree has several uses and can be grown under reforestation and social forestry programmes [1]. Neem oil and other products were mainly used for traditional medicines, making cosmetics, antimicrobial and antifungal agents in bio-manure and plant production [2, 3]. Raw neem seed cake (RNC) was available after oil extraction as byproduct which has high crude protein (36–38%) contents and available in about 0.9 million

tons per annum in India [4]. It contains toxic bitter triterpenoids like azadirachtin, salannin, nimbin, nimbidiol, etc.; because of this, toxic principles the palatability of neem seed cake was reduced [5]. Washing of neem seed cake with water may result in obtaining wholesome protein substitute but there was loss of 22% dry matter due to washing [6].

To avoid such loss, processing the cake in alkaline medium without water washing either by soaking it in water (1:5 w/v) or containing either sodium hydroxide (2% w/w) for 24 h or by ensiling with 2.5% urea (w/w) for 5–6 days as per earlier reports [7, 8]. The sundried, ground alkali treated and urea ammoniated neem seed kernel cake was found suitable in the feeding of growing lambs without affecting their growth and nutrient utilization [9]. However, there was lack of literature on the effect of new patented process of

detoxification of neem seed cake on carcass characteristics of growing bannur lambs. Hence, the present study was to investigate the effects of replacing the protein source in the feed with detoxified neem seed cake on the carcass characteristics in bannur lambs.

MATERIALS AND METHODS

Animals

The study was carried out at experimental livestock unit, ICAR-National Institute of Animal Nutrition and Physiology (ICAR-NIANP), Karnataka, India. Eighteen male lambs of bannur breed, native of Mandya district in Karnataka was procured with the body weight ranging from 9 to 12 kg and aged 5 to 6 months. The sheep lambs were randomly divided into three groups and were reared individually under similar managemental conditions throughout the experiment. At the beginning of the experiment, lambs were dewormed using broad spectrum anthelmintic (Albendazole @ 10 mg per kg body weight).

Diets and Management

The detoxified neem cake (DNC) used for the experiment was procured from M/s Ayurved Research Foundation, New Delhi, India. The procedure for detoxification of neem seed cake was described in the previous report [10]. Lambs were divided randomly into three groups of six each viz., Group I: Control replaced SBM at 0%; Group II: concentrate mixtures containing defatted and DNC at 5.4% of concentrate mixtures, replacing SBM at 25% (DNC 25) and Group III: concentrate mixtures containing defatted and DNC at 10.8% of concentrate mixtures, replacing SBM at 50% (DNC50).

The concentrate mixtures prepared were fed to respective groups along with finger millet (*Eleusine coracana*) straw to lambs for a period of five months. The three iso-nitrogenous and iso-caloric concentrate mixtures were prepared and fed to the lambs. The ingredients and chemical composition of concentrate mixtures was as per previously reported [10]. The lambs were housed individual pens and fed with the respective concentrate mixtures daily in the morning hours as per the nutritional requirements guidelines [11]. Ram lambs had free access to

clean water during the whole experimental period.

Carcass Characteristics

The lambs were slaughtered humanely after five months of feeding trial. The slaughter weight, empty body weight, carcass weight (kg) and dressing percentages were calculated by weighing the body parts and visceral organs. The dressing percentages on slaughter weight basis and empty body weight basis were calculated. The yield of edibles and visceral organs were calculated on percentage of slaughter weight basis. The pluck weight was calculated by summing the weight of lung, heart and liver of the each sheep. The weight of skin, head, feet, heart, lungs, spleen, testicles, kidney and liver were weighed and calculated the percentage of slaughter weight and expressed as percentages.

Statistical Analysis

The data on each parameters was subjected to one way ANOVA to find out the significant difference among the three groups by using SAS Enterprise Guide software version 5.1 (SAS India Limited, Mumbai). The results were expressed as mean±standard error of the parameter calculated with standard error mean and P values.

RESULTS

The effect of feeding graded levels of DNC on carcass characteristics of bannur lambs is given in Table 1. The slaughter weight, empty body weight, carcass body weight showed no significant difference between the treatment groups and the control group. The yields of edibles were 12.19±0.48, 12.28±0.24 and 12.51±0.29% in groups I, II and III, respectively. The yield of visceral organs in groups I, II and III were 6.03±0.93, 4.50±0.13 and 4.84±0.10%, respectively. There was no significant difference observed in the yield of edibles and visceral organs of lambs between different treatment groups.

The percentage of pluck weight were 0.65±0.05, 0.63±0.05 and 0.64±0.03 in groups I, II and III, respectively. No significant difference was observed between the different groups. The dressing percentage on slaughter weight basis were 49.74±1.26, 49.69±1.04 and 51.94±0.55% in control, DNC-25 and DNC-50

Table 1: Effect of Feeding Graded Levels of Detoxified Neem Seed Cake on Carcass Characteristics of Bannur Lambs.

Parameters	Treatments			SEM	P value
	Group I (Control)	Group II (DNC-25%)	Group III (DNC-50%)		
Slaughter Weight (kg)	18.33±1.27	17.68±1.28	18.00±0.99	0.65	0.93
Empty body weight (kg)	13.65±0.95	13.15±1.03	13.71±0.79	0.51	0.90
Carcass weight (kg)	9.15±0.73	8.81±0.71	9.37±0.58	0.37	0.84
Dressing on slaughter weight basis (%)	49.74±1.26	49.69±1.04	51.94±0.55	0.60	0.22
Dressing on empty body weight basis (%)	66.75±1.18	66.96±0.73	68.15±0.38	0.48	0.40
Pluck (kg)	0.65±0.05	0.63±0.05	0.64±0.03	0.01	0.95
Yield of edibles (%)	12.19±0.48	12.28±0.24	12.51±0.29	0.73	0.82
Yield of visceral organs (%)	6.03±0.93	4.50±0.13	4.84±0.10	0.89	0.17
Non-Carcass Components (% of Slaughter Weight)					
Skin	13.34±0.65	12.82±0.45	12.36±0.09	0.27	0.35
Head	7.21±0.25	7.53±0.18	7.58±0.18	0.12	0.41
Feet	2.49±0.13	2.45±0.04	2.53±0.11	0.05	0.83
Heart	0.49±0.03	0.46±0.01	0.46±0.01	0.01	0.54
Lungs	1.37±0.16	1.53±0.05	1.48±0.09	0.05	0.47
Spleen	0.32±0.04	0.28±0.01	0.30±0.01	0.01	0.63
Testicles	0.54±0.10	0.53±0.09	0.59±0.12	0.06	0.92
Kidney	0.32±0.04	0.28±0.01	0.28±0.01	0.01	0.47
Liver	1.68±0.10	1.56±0.07	1.31±0.24	0.09	0.25
Gastro-intestinal tract	25.52±0.74	25.82±0.92	23.72±0.63	0.58	0.19

groups, respectively. There was no significant difference in dressing percentage observed and indicated that the body weight gain and dressing percentage was not affected by feeding detoxified neem seed cake. The percentage weight of various organs also showed no significant difference between control and treatment groups given detoxified neem seed cake.

DISCUSSION

Earlier studies involved with feeding of neem seed cake indicated that palatability of neem seed cake was a major issue in calves [12], buffalo bulls [13], crossbred bulls [14] and sheep [15]. However, few farm level detoxification strategies helped to overcome the palatability problems in buffalo calves [16] and goat kids [17]. In the present study, the two levels of detoxified neem cake in concentrate mixtures fed to lambs resulted in no change in the slaughter weight, empty body weight and carcass weights when compared to control group. The earlier report indicated that

there was no body weight changes between the different treatment groups fed with detoxified neem seed cake compared with control group [10]. The nutrient conversion efficiency in terms of slaughter weight, empty body weight and carcass weight was not affected in this study and indicated that the process of detoxification of neem seed cake was effective. The results from the present study were concurred with the previous reports in buffalo calves fed alkali treated and urea ammoniated neem seed kernel cake (NSKC) as compared with those on rations containing conventional protein supplements (GNC) [16] and also in goats fed urea ammoniated NSKC [17]. The dressing percentage of sheep was not affected by feeding the detoxified neem cake and concurred with the previous reports of feeding detoxified neem cake on the performance of broilers [7, 8]. There was no change in the various organ weights between the different treatment groups and concurred with previous report for testis weight in lambs fed with detoxified karanj seed cake [18]. The

pluck weight, percentage yield of visceral organs and edibles revealed no difference between different treatment groups and concurred with previous reports [8, 17]. The neem seed cake may also act as parasiticide and helps in removing the intestinal parasites. There are many beneficial effects by feeding the detoxified neem seed cake as a non-conventional protein source and better utilization of the agricultural byproducts.

Thus, the present detoxification methodology is very effective in removing the toxic principles and increasing the palatability of neem seed cake, which was evident from this study. It can be used to replace the costlier protein supplements such as soybean meal and groundnut cakes in the feed of sheep and goats. Further, by feeding the non-conventional and agricultural byproducts to animals, the feed cost can be reduced and increase the profitability of sheep farmers in India.

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