

Brief Report

Effect of Supplementing Different Levels of Mustard Seed Cake on Milk Yield and Milk Composition of Achai Cattle

Muhammad Sohail¹, Muhammad Nauman-ul-Islam¹, Hayazuddin^{2*}, Imtiaz Ali Shah¹, Abdur Raziq¹, Subhan Ullah³ and Arsalan Ali Shah¹

¹Livestock Research and Development Station, Surezai; ²Directorate of Livestock Research and Development, University of Peshawar, Peshawar, ; ³Department of Animal Health, University of Peshawar, Peshawar, Khyber Pakhtunkhwa, Pakistan.

Abstract | This study was conducted at Livestock Research and Development Station (LR and DS) Peshawar. Objectives of the study were to evaluate different feeding levels of Mustard Seed Cake (MSC) on milk yield and milk composition of Achai cattle. A total 24 lactating Achai cows of first parity were selected and randomly divided into 3 groups viz. A, B and C on the basis of physiological and productive status (n=08). Experimental animals were allocated to diet containing zero (control), 12 and 18 percent MSC. All the three rations were iso-caloric and iso-nitrogeniuos. Each cow was given a daily feed ration according to NARC standards. Milk yield of each experimental animals were recorded twice daily while its composition were checked through milk analyzer twice a week. Mean daily production of milk among three groups was significantly ($p < 0.05$) different, however highest milk production (4.8 ± 0.74 liter/day) was recorded for group B, followed by Control (3.6 ± 0.51) and group C (2.4 ± 0.71). Cows in group B produced higher ($p < 0.05$) milk fat percent (5.83 ± 0.107) while control and group C produced 4.98 ± 0.78 and 4.51 ± 0.81 ($p > 0.05$) fat percent respectively. Feeding of different levels of MSC have no significant ($p > 0.05$) effect on protein, SNF and Lactose contents of the milk. These results concluded that milk yield and milk fat were increased by supplementation of MSC in the dairy cattle ration. The proportion of MSC up to 12% in the ration has shown the best efficiency of production as compare to other rations.

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***Correspondence** | Hayazuddin, ²Directorate of Livestock Research and Development, Peshawar, Khyber Pakhtunkhwa, Pakistan; **Email:** drhayaz13@yahoo.com

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Keywords | Achai cattle, Milk yield, Milk composition, Mustard seed cake

Introduction

Livestock sector is an important sub-sector of the Agriculture in Pakistan. Its contribution to the GDP is 11.4% and 53.2% to agriculture value added. The main product of livestock farming is milk, which placing our country at third number in global ranking (IDF, 2008). Due to improper management and poor quality nutrients in the diet of indigenous breeds, the average milk production is very low. Quality of milk and composition are important characteristics which

determine consumer acceptability and nutritive value. In Pakistan, a lot of research and development is required in milk production; processing and marketing for satisfaction of consumer demand. Milk is available from different dairy animals with varying nutritional plans and in different state of physiology (Bath et al., 1985). One of the major constraints in the development of dairy industry in Pakistan is inadequate availability and utilization of nutrients (Sarwar et al., 2002). The most important and third edible oilseed is mustard seed crops of the world after soybean and oil

palm. Mustard seed is crushed by extraction process to obtain Mustard oil. During the process some amount of distilled oil are kept with pressed cakes and used as oil cakes. Oil cakes are served as animal feeds. Mustard seed cake (MSC) is used in the ration of cattle and buffaloes in Pakistan. Due to higher production of mustard seed, it is necessary to exploit its availability in shortage times of other plant protein sources. Keeping in view, the present study was conducted to find out the effect of MSC on Milk yield and milk composition of indigenous breed of cattle.

Materials and Methods

This study was conducted to find out the effect of different level of MSC on milk yield and its composition of Achai cattle at LR and DS Surezai, Peshawar. LR and DS Surezai, is located in semi-arid zone and the normal range of temperature recorded during summer season is 40–48°C. The main source of water for irrigation is tube well but due to excessive load shedding of electricity at the station, there is scarcity of water which results in green fodder deficiency particularly in hot summer season.

Experimental animals

The 24 lactating Achai cows of 210–225 kg live body weight and almost same physiological and productive status were selected. The lactating cows were randomly divided into 3 groups A, B and C each having 08 animals and were offered three different experimental rations having zero, 12 and 18% level of MSC. Each experimental animal was treated for ecto- and endoparasite through the use of endectin (Ivermectine) injection as routine measure of dairy farm. All the three rations were iso-nitrogenous and iso-caloric with 16–18% protein and 70–72% total digestible nutrients (TDN).

Feeding

Adaptation period of 15 day was given which was followed by 45 day experimental period. At the start experimental feed was gradually increased and the usual feed was decreased until the cattle were shifted to complete experimental rations. The effectiveness of each experimental ration was tested in terms of milk yield and composition. The rations were fed to the lactating cows twice daily before milking to fulfill their nutritional requirements for maintenance and production. Clean and fresh drinking water were available ad libitum to experimental cows (Table 1).

Table 1: Composition of experimental rations.

Ingredients	Ration-I. (0% MSC)	Ration-II (12% MSC)	Ration-III (18% MSC)
Cotton Seed Cake	30 %	24%	20%
Maize Gluten	20%	20%	20%
Mustard Seed Cake*	0%	12%	18%
Wheat Bran	30%	24%	22%
Mineral Mixture	0.5%	0.5%	0.5%
Molasses	17%	17%	17%
DCP	1%	1%	1%
Salt	1%	1%	1%
Toxin Binder	0.5%	0.5%	0.5%
Total	100%	100%	100%

Data of daily milk production was recorded on pre designed sheet twice daily, while for milk composition (Fat, Protein, Lactose and SNF%) the samples were collected twice a week in sterilized container and checked through lactoscane milk analyzer machine at Dairy Technology Laboratory.

Statistical analyses

The design of the study was completely randomized and the data was arranged in Microsoft Excel 2007. Proc-mixed analytic technique was utilized to determine effect of MSC on milk yield and milk composition (SAS-2000 ANOVA) (Littell et. al., 2006).

Table 2: Effect of mustard seed cake on milk production of achai cattle.

Ration type	Mean ± S.E	p-value
0% MSC	3.6±0.51	<0.05)
12% MSC	4.8 ± 0.74	
18% MSC	3.00±0.71	

Results and Discussions

Milk Yield (Table 2) shows the effect of feeding different levels of Mustard Seed Cake on Milk Yield in Achai cattle. The analyses of the data revealed that mean daily production of milk among three groups was significantly (p<0.05) different, however highest average milk production 4.8±0.74 liters/day was recorded in group B, followed by group A (3.6±0.51liters/day) and group C (3.00±0.71liters/day) respectively. It's also evident from the results that higher level of mustard seed cake decreased milk production, as the presence of tannin an anti-nutritional factor in MSC affect palatability, feed intake, subsequent di-

gestibility and resultant decreased milk yield. The results is in line with the finding of Frutos et al, (2004), that high level of tannin lowers feed intake in mustard seed cake incorporated diets. The present finding, that higher level of MSC incorporation negatively affect feed intake supports the results of Bell (1993), who reported lower feed intake of ration supplemented with Mustard seed cake due to the presence of high levels of Anti-nutritional factors (glucosinolates) which is responsible for unpleasant taste of feed and is also poisonous. The results of McLeod (1974) also supports present study, who stated that intake of feed is due to higher Tannin contents which reduce the digestibility of feed due to reaction of tannin with mucoproteins in saliva and binding with taste receptors and initiating astringent reaction.

Table 3: Effect of mustard seed cake on milk composition of achai milk.

Milk Composition (%)	Ration Type			p-value
	0 % MSC	12% MSC	18 % MSC	
Fat	4.98±0.78	5.83±0.107	4.51±0.81	<0.05
Protein	3.08±0.025	3.090±0.024	3.070±0.030	0.804
Lactose	4.90±0.012	4.88±0.0.085	4.85±0.090	0.912
SNF	08.82±0.15	8.80±0.16	08.78±0.120	0.841

Milk Composition

Table 3 presents the effect of Mustard Seed Cake on Compositional parameters of Achai milk. Significant difference ($p < 0.05$) of analyzed data shows milk fat percentage of Achai with higher value of 5.83 ± 0.107 percent in group B, followed by Group A 4.98 ± 0.78 and Group C 4.51 ± 0.81 percent. Results further suggested that feeding different levels of MSC have no significant effect on Protein, SNF and Lactose contents of the milk. Lower milk fat in group C was observed which is in line with the findings of Brand et al. (1997) and Vafa et al. (2010) that higher level of Mustard Seed Cake and higher ether Extract contents decrease the cellulytic bacteria ultimately affecting ratio of propionate to acetate in cow's ruminal contents.

Conclusions and Recommendations

These results concluded that milk yield and milk fat was increased with supplementation of Mustard Seed Cake in the dairy cattle ration up to 12 percent, as higher proportion of MSC due to presence of Tan-

nin affect palatability and feed intake of dairy cattle. The proportion of MSC up to 12% in the ration has shown the best efficiency of production as compare to other rations.

Conflict of Interest

No conflict of interest declared

Author's Contribution

Muhammad Sohail and Hayaz uddin design the research project, Muhammad Nauman-ul- Islam, Imtiaz Ali Shah and Abdur Raziq performed research, Subhan ullah, Hayaz uddin and Arsalan Ali Shah write the manuscript. Final draft was approved by all authors.

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