



## Effect of Season on Milk Composition Traits and Test Day Milk Yield of Kosali Cows

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### ABSTRACT

*The present study was conducted to observe the effect of season on milk constituent traits and test day milk yield of Kosali cows, the newly registered cattle breed of Chhattisgarh. This study was conducted from January 2014 to July 2014 with 450 milk samples from 76 Kosali cows. In the present study it was found that all the seasons (summer, winter and rainy) were significantly ( $P < 0.01$ ) affected the major milk constituents (fat, solid not fat, protein, lactose) except total solids. The test day milk yield of Kosali cow was also significantly ( $P < 0.01$ ) affected by season.*

**KEYWORDS:** Kosali cows, season, fat, solid not fat, protein, lactose and test day milk yield.

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### INTRODUCTION

In general the Kosali cows are reared on grazing and offered paddy straw only. Whereas, in urban and semi urban areas this breed is rarely found and mostly reared in semi intensive farming system offering dry fodder along with little concentrates. This breed is preferred in rural Chhattisgarh due to their adaptability and capacity to tolerate heat. Therefore, a comprehensive study is required to observe the status of milk production traits of Kosali so that further improvement in concerned breed can be recommended. Development of breeding programs for augmenting the milk production and changing milk composition require knowledge of the relative influence of genetic and environmental factors affecting milk constituents.

### MATERIAL AND METHODS

A total of 76 cows (54 from rural and 22 from urban area of Durg district) were selected and 20-25 ml of milk samples was collected for analysis of milk constituents. The milk samples were taken at weekly interval for a period of six months. In this way a total of 450 aliquots were collected for laboratory analysis of milk. The milk samples collected in the month of January and February were considered as winter samples, April and May as summer samples and June and July as rainy season samples. About 148 samples were collected during winter, 171 during summer and 131 during rainy season. Statistical analysis of the data were conducted using least-square analysis of variance [4] to study the effect of season on test day milk yield and on different milk constituents.

### RESULTS AND DISCUSSION

The effect of season on milk constituent traits and test day milk yield is given in Table 1.

**Test day milk yield (TDMY):** The effect of season was found to be highly significant ( $P < 0.01$ ) on test day milk yield of Kosali cow. Similar findings were also observed by, Wondifrow *et al.* [10] and Utresa *et al.* [9] where they reported significant effect of season on milk yield. Whereas, Amasaib *et al.* [1] and Habib *et al.* [3] observed non significant effect of season on milk yield. The highest mean for test day milk yield of Kosali cow was recorded in the winter season followed by summer season and lowest milk yield was

found in the rainy season. Similar findings were also observed by Sarkar *et al.* [6] and Wondifrow *et al.* [10] and they reported that maximum production occurred during winter season and depressed in those cows calved in summer. Similarly, Utresa *et al.* [9] also reported that cows calved in cold season had greater milk yield than that of dry and rainy season. The higher milk yield in winter season may be attributed due to availability of better quality feed in winter season. However, the decrease in milk production during summer was due to decline in quality and quantity of available forage. The lowest milk yield in rainy season was associated with inadequate availability of quality feed and grazing area during early rainy season to the cows which already suffered from poor availability of feed and fodder during summer.

**Fat:** The analysis of variance showed significant ( $P<0.01$ ) effect of season on milk fat percentage of Kosali cow (Table1). This is in close agreement with Bahaswan [2] who reported significant effect of season on fat percentage. Contrary to this, Sarkar *et al.* [6] observed non significant effect of season on milk fat percentage. However, in the present study, differences between the mean fat percentage in the winter and summer season were non significant whereas, it was significantly higher in the rainy season. The higher milk fat percentage in the rainy season may be due to lower milk yield in the rainy season because both the traits are adversely correlated.

**Solid not fat (SNF):** The effect of season on milk SNF percentage of Kosali cows was highly significant ( $P<0.01$ ). Suman *et al.* [8] also reported significant effect of season of calving on milk SNF percentage of crossbred cows. In the present study the mean value of SNF percentage was significantly ( $P<0.01$ ) higher in winter season followed by summer and lowest in the rainy season. However, the mean differences of SNF percentage between the summer and rainy season was non-significant. Similar trend was also reported by Sharma *et al.* [7] where they observed highest SNF percentage in winter and lowest in rainy season among crossbred cows. In the present study, the higher value of SNF percentage in winter and lowest in rainy season could be attributed to availability of adequate quality and quantity of green fodder in winter season.

**Table 1 Effect of season on milk constituent traits of Kosali cows.**

Source of variation	Winter	Summer	Rainy
TDMY(Kg)	1.470± 0.071 <sup>c</sup>	1.359 ±0.049 <sup>b</sup>	0.983± 0.094 <sup>a</sup>
Fat (%)	4.009± 0.164 <sup>a</sup>	4.103± 0.113 <sup>a</sup>	5.042± 0.218 <sup>b</sup>
Solid not fat (%)	8.656± 0.063 <sup>b</sup>	8.262 ±0.044 <sup>a</sup>	7.771 ±0.085 <sup>a</sup>
Protein (%)	3.129±0.022 <sup>b</sup>	2.980± 0.015 <sup>a</sup>	2.818± 0.029 <sup>a</sup>
Lactose (%)	4.693± 0.036 <sup>c</sup>	4.491± 0.025 <sup>b</sup>	4.223± 0.048 <sup>a</sup>
Total solids (%)	12.665± 0.184	12.364± 0.127	12.813±0.245

Means superscripted by different letters in the same row are significantly different from each other. ( $P<0.01$ )

**Protein:** All the seasons were significantly ( $P<0.01$ ) influenced the milk protein percentage of Kosali cows. Similar finding was also observed by Sarkar *et al.* [6] who reported significant effect of season on milk protein percentage in Sahiwal, Tharparkar and Karan Fries cows. The least square mean for protein percentage was significantly highest in the winter season followed by summer and lowest in the rainy season. However, the mean differences between summer and rainy season were non significant. In the present study, significantly higher level of protein percentage in winter season could be attributed to better availability of quality green fodder during winter season as compared to that of summer season. In the present research work milk samples for rainy season were collected in the initial stage of rainy season when availability of quality green fodder and adequate grazing area were scanty.

**Lactose:** The influence of season was highly significant ( $P<0.01$ ) on milk lactose percentage in Kosali cows (Table 1). Similar findings were also observed by Painkra [5] who observe significant effect of season on lactose percentage of milk in Sahiwal cows. Whereas, Bahashwan [2] reported non significant effect of season on milk lactose percentage in Dhofari cows. In the present study the mean value for lactose percentage was found significantly higher in the winter season than summer season and lowest in the rainy season. This is in close agreement with the findings of Painkra [5] who reported higher lactose percentage in spring season followed by pre monsoon season and lowest in the summer season. In the present investigation higher value of milk lactose percentage during winter season could be attributed due to better availability of green fodder and adequate grazing area during winter season as compared to summer and rainy season.

**Total solid (TS):** The effect of season was non significant on milk total solid percentage of Kosali cows (Table 1). The least square means of TS was lowest in the summer season afterwards slightly increased in

winter season and highest level in the rainy season. The highest value of TS in rainy season was also observed by Sarkar *et al.* [6]. However, Sharma *et al.* [7] found that the TS percentage in crossbred cows were higher in the winter followed by summer and lowest in the rainy season.

## CONCLUSION

It may be concluded that the effect of season was highly significant ( $p < 0.01$ ) on test day milk yield and all the major milk constituent traits of Kosali cows except total solids. The milk SNF (%), protein (%), lactose (%) and TDMY (Kg) of Kosali cows were significantly higher in the winter season whereas milk fat (%) was significantly higher in rainy season.

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