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Jyoti Sahu
M.V.Sc. Scholar, Department of
Livestock Production and
Management, College of Veterinary
Science and Animal Husbandry,
Anjora, Chhattisgarh Kamdhenu
Vihshwavidyalaya, Durg,
Chhattisgarh, India

D Bhonsle
Associate Professor, Department of
Livestock Production and
Management, College of Veterinary
Science and Animal Husbandry,
Anjora, Chhattisgarh Kamdhenu
Vihshwavidyalaya, Durg,
Chhattisgarh, India

Sharad Mishra
Professor and Head, Department of
Livestock Production and
Management, College of Veterinary
Science and Animal Husbandry,
Anjora, Chhattisgarh Kamdhenu
Vihshwavidyalaya, Durg,
Chhattisgarh, India

VN Khune
Assistant Professor, Department of
Livestock Production and
Management, College of Veterinary
Science and Animal Husbandry,
Anjora, Chhattisgarh Kamdhenu
Vihshwavidyalaya, Durg,
Chhattisgarh, India

GK Dutta
Professor, Department of Livestock
Production and Management, College
of Veterinary Science and Animal
Husbandry, Anjora, Chhattisgarh
Kamdhenu Vihshwavidyalaya, Durg,
Chhattisgarh, India

AK Chaturvedani
PhD Scholar, Department of
Livestock Production and
Management, College of Veterinary
Science and Animal Husbandry,
Anjora, Chhattisgarh Kamdhenu
Vihshwavidyalaya, Durg,
Chhattisgarh, India

Correspondence
Jyoti Sahu
M.V.Sc. Scholar, Department of
Livestock Production and
Management, College of Veterinary
Science and Animal Husbandry,
Anjora, Chhattisgarh Kamdhenu
Vihshwavidyalaya, Durg,
Chhattisgarh, India

Effect of parity on milk composition traits of kosali cows

Jyoti Sahu, D Bhonsle, Sharad Mishra, VN Khune, GK Dutta and AK Chaturvedani

Abstract
The present study was conducted to determine the milk composition and to observe the effect of parity on milk constituent traits and test day milk yield of a newly registered breed, Kosali cow of Chhattisgarh. The study was conducted from January 2014 to July 2014 with 450 milk samples from 76 Kosali cows. The overall least square means obtained for fat, solid not fat, total solids, protein and lactose percentage were 4.385±0.095, 8.229±0.037, 12.614±0.107, 2.975±0.013, and 4.469±0.021 percent, respectively. The overall mean for test day milk yield of Kosali cow was 1.271±0.041 kg/day. Parity significantly affected all the major milk constituents and test day milk yield of Kosali cows.

Keywords: Kosali cows, parity, milk composition, test day milk yield

Introduction
In general the Kosali cows are reared on grazing and offered paddy straw only. While in urban and semi urban areas this breed is rarely available 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 as well as disease resistance. 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.

Materials and methods
In the present study, total of 76 Kosali cows (54 from rural area and 22 from urban area of Durg district) were selected and 20-25 ml of milk samples were collected at weekly interval for a period of six months in this way a total of 450 aliquots were collected for laboratory analysis of milk.Statistical analysis of the data were conducted using least-square analysis of variance (Harvey, 1966) [4].

Results and discussion
Fat - The mean fat percentage in the milk of Kosali cow was found as 4.385±0.095%. Similar findings were also observed by Dash *et al*. (2013) [3] who reported 4.4% milk fat in Binjharpuri cows. Chande (2011) [2] and Bhainsare (2013) [1] reported lower milk fat percent than present finding in Kosali cows as 3.04 ± 0.04 % and 2.66 ± 0.15 %, respectively.

In the present investigation it was observed that parity significantly (*P*<0.01) affected the fat percentage (Table1).The least square means for fat percentage among 1st, 2nd and 3rd parities were significantly (*P*<0.01) different from each other whereas in the 4th parity it lied between 2nd and 3rd parity. The mean fat percentage was decreased from 1st parity to 3rd parity and afterwards it slightly increased in the 4th parity. This finding is in tryst with that of Kayastha *et al*. (2008) [5] where they observed decrease in the milk fat percentage of native cattle of Assam from 1st parity, the differences among 2nd, 3rd and 4th parity were not significant, however milk fat percentage increases in the 5th parity.

Solid Not Fat (SNF) - The average value of solid not percentage (SNF) in the milk of Kosali cows was found to be 8.229 ±0.037 %. This is in close agreement with the finding of Bhainsare (2013) [1] who reported 8.01±0.11 % of SNF in Kosali cows. However, Chande (2011) [2] reported higher value of SNF percentage (9.38±0.11 %) than the present finding. The SNF percentage was significantly (*p*<0.05) influenced by the effect of parity. Sudhakar *et al*. (2013) [8] also observed significant effect of parity on milk SNF content.

In the present study, the mean differences between 1st, 2nd and 3rd parities were non-significant, however it was significantly ($p<0.05$) higher in the 4th parity. The lowest value of SNF was recorded in 3rd parity and the highest value was observed in 4th parity.

Total Solids (TS) - The present estimate for total solids (TS) in milk of Kosali cow was found to be 12.614±0.107 % which was higher than that observed by Bhainsare (2013) [1] in Kosali cow. Similarly, Sarkar *et al.* (2006) [7] reported 13.99±0.23% and 14.22±0.25 % TS content respectively in Sahiwal and Tharparkar cows. The effect of parity was also found highly significant ($P<0.01$) on total solids percentage of milk of Kosali cows. The highest mean TS% was recorded in the 1st parity and lowest in the 3rd parity and afterward again increased in the 4th parity.

Protein- The protein percentage observed in the milk of Kosali cows was 2.975 ± 0.013 % which is in close agreement with the findings of Bhainsare (2013) [1] who reported 3.03 ± 0.06 % protein in Kosali cows. However, higher protein percentage in comparison to present investigation was reported by Krovvidi *et al.* (2013) [6] in Ongole cow as 3.51±0.08 %. The effect of parity was significant ($P<0.05$) on milk protein percentage. (Table 1). It was significantly higher in the 4th parity, however, differences between 1st, 2nd and 3rd parities were non-significant. The significant effect of parity on milk protein percentage has also been reported by Sudhakar *et al.* (2013) [8]. Similar trend for protein percentage was also observed by Kayastha *et al.* (2008) [5] and Krovvidi *et al.* (2013) [6].

Lactose- The least square mean value for lactose percentage found in the milk of Kosali cows was 4.469±0.021%. This is in close agreement with the findings of Bhainsare (2013) [1] who reported 4.41±0.05% lactose in Kosali cows. The effect of parity was found significant ($P<0.05$) on milk lactose percentaget of Kosali cow. However, Sudhakar *et al.* (2013) [8] and Krovvidi *et al.* (2013) [6] reported non-significant effect of parity on milk lactose percentage. In the present study the mean value for lactose percentage decreased from 1st to 3rd parity but the mean differences were non-significant afterwards significant increase was observed in 4th parity. The lowest mean for lactose percentage was recorded in the 3rd parity and highest in the 4th parity.

Test Day Milk Yield (TDMY) - The least square mean value for test day milk yield (TDMY) in Kosali cows was found to be 1.271 ± 0.041 kg. The present estimate was higher as compared to the finding of Chande (2011) [2] who reported 0.912 kg as the average milk yield of Kosali cows. The effect of parity was found highly significant ($P<0.01$) on TDMY. Significant effect of parity on milk yield was also reported by Wondifraw *et al.* (2013) [11] in Holstein Friesian x Deoni cows, Utrera *et al.* (2013) [10] and Talukder *et al.* (2013) [9] in Holstein Friesian x Sahiwal cows. The mean value of TDMY decreased gradually from 1st to 3rd parity inspite of non-significant differences among them and afterwards rises significantly in the 4th parity. This might be due to small size of Kosali cow which attain their full mature size in the later part of parity, hence, highest TDMY was recorded in 4th parity.

Table 1: Effect of parity on major milk constituents and test day milk yield of Kosali cow.

Parity number	N	Fat (%)	SNF (%)	TS (%)	Protein (%)	Lactose (%)	TDMY (Kg)
Overall mean	450	4.385± 0.095	8.229± 0.037	12.614± 0.107	2.975± 0.013	4.469± 0.021	1.271± 0.041
First	151	4.984 ±0.129[c]	8.175± 0.050[a]	13.158± 0.145[c]	2.971± 0.017[a]	4.461± 0.028[a]	1.352± 0.056[a]
Second	102	4.424± 0.137[b]	8.183± 0.053[a]	12.607± 0.154[b]	2.961± 0.018[a]	4.448± 0.030[a]	1.277± 0.059[a]
Third	105	3.919± 0.146[a]	8.158± 0.057[a]	12.077± 0.164[a]	2.939± 0.020[a]	4.413± 0.032[a]	1.097± 0.063[a]
Fourth	92	4.211 ±0.194[ab]	8.402± 0.076[b]	12.614± 0.218[b]	3.030± 0.026[b]	4.554± 0.043[b]	1.356± 0.084[b]

N-number of observation, SNF-Solid Not Fat, TS- Total Solid, TDMY- Test Day Milk Yield.
Note: Means superscripted by different letters in the same column are significantly different from each other $P<0.01$.

Conclusion
From above discussion it may be concluded that parity significantly affected all the major milk constituents and TDMY of Kosali cow. Milk fat percentage and SNF percentage follow the similar trend as it was highest in the 1st parity and lowest in the 3rd parity afterwards again slightly rises in the 4th parity. Whereas, the mean differences of milk SNF percentage, protein percentage, lactose percentage and TDMY were non-significant between 1st, 2nd and 3rd parity but significantly highest in the 4th parity.

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