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Effect of parity on milk composition of jersey x red Sindhi crossbred cows

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Abstract
A study was conducted to assess the influence of parity on milk composition of Jersey X Red Sindhi crossbred cows maintained at Post Graduate Research Institute in Animal Sciences, Kattupakkam. Animals with consecutive parities were grouped together. Animals with parity 1 and 2 were classified as group I; 3 and 4 as group II; and 5 and 6 as group III. Milk samples were collected at weekly interval for the period of six month from December 2015 to May 2016. The milk composition *viz.*, fat, solid not fat, total solid, protein and lactose content of milk were analyzed manually. All parameters of milk except lactose, showed highly significant ($p< 0.01$) difference between parity group.

Keywords: Milk composition, fat, SNF, Protein, parity

Introduction
Milk is a primary source of nutritions for all mammals. It is nearly complete food as it contains carbohydrates, protein, fat, vitamins, mineral and water. The composition of quality of milk is very important in dairy technology, as it indicates the milk processing ability (Ozrenk and Selcuk Inci, 2008) [12]. Several studies have concluded that composition quality of milk is affected by stage of lactation, season, diet, dam age, physiological status and environmental conditions (Slots *et al*., 2009; Mapekula *et al*., 2011; Frelich *et al*., 2012, Myburgh *et al*; 2012 and Lee *et al*., 2014) [18, 10, 2, 11, 9]. Cross breeding policy is highly adopted by dairy farmers in Tamil Nadu. The main goal of introducing high grade exotic breed into indigenous herd is to improve level of production per animal. The awareness about milk composition is as important as milk quantity. Knowing about difference in milk quality is necessary for decision making related to food choice. Hence, the current study was designed to investigate the influence of parity on compositional quality milk.

Materials and Method
Milk samples for analysis of milk composition were collected at weekly interval from December 2015 to May 2016 during evening milking. The information about the stage of lactation and parity were obtained from the record available in the Cattle and Buffalo Breeding Unit at Post Graduate Research Institute in Animal Sciences, Kattupakkam (organized government farm). Thirty animals were randomly selected for each sampling and totally 720 milk samples were collected in this study. Animals with parity between 1 and 6 were selected for this study. Animals with consecutive parities were grouped together. Animals with parity 1 and 2 were classified as group I; 3 and 4 as group II; and 5 and 6 as group III. (Kelly *et al.*, 2000) [8].
Milk samples were collected in clean and sterile plastic container from individual animal by hand milking. From each animal about100 ml of milk samples were collected. After collection, the milk samples were taken to laboratory at Post Graduate Research Institute in Animal Sciences for analysis of milk composition. The milk composition *viz*., fat, solid not fat, protein and lactose percentage were analysed by using standard procedures. Fat was estimated by Gerber's method (ISI, 1977), solid not fat by lactometer method (ISI, 1982) protein by formaldehyde titration method (Pyne, 1932) [14] and lactose by Benedict's quantitative method (Sharma, 2007) [17]. The total solid percentage was determined by adding fat and solid not fat percentage of milk. (Sarkar *et al*., 2006) [16].

Results and Discussion
The Mean ± S.E of milk composition of Jersey X Red Sindhi cow in different parity are presented in table 1.

Table 1: Effect of parity on milk composition of Jersey x Red Sindhi crossbred cows

Components	Group I (Parity 1 and 2)	Group II (Parity 3 and 4)	Group III (Parity 5 and 6)	P value
Fat (%)^{NS}	4.39 ± 0.03	4.39 ± 0.04	4.25 ± 0.05	0.065
SNF (%)^{NS}	8.66 ± 0.02	8.67 ± 0.02	8.61 ± 0.03	0.312
Total solids (%)*	13.05^{a} ± 0.04	13.06 ^{a} ± 0.05	12.87^{b} ± 0.07	0.039
Protein (%)^{NS}	3.32 ± 0.01	3.31 ± 0.02	3.31 ± 0.01	0.099
Lactose (%)^{NS}	4.61 ± 0.01	4.60 ± 0.01	4.62 ± 0.01	0.172

***** - Means bearing different superscript within a row differ significantly (p< 0.05)
****** - Means bearing different superscript within a row differ significantly (p< 0.01)
NS - Not significant

Fat
The mean fat percentage in parity group I, parity group II and parity group III were 4.39 ± 0.03, 4.39 ± 0.04 and 4.25 ± 0.05 per cent, respectively (Table 1). The milk fat content of crossbred cows did not show any statistical significant (p>0.05) difference between parity group. The fat content of milk tends to decrease with advanced parity. The present study corroborates the findings of Sudhakar *et al.* (2013) [19] Gurmessa and Melaku, (2012) [12], Radhika *et al.*, (2012) [15] and Jadhav and Patange, (2009) [6] who also reported a similar non-significant effect of parity on fat content of milk.

Solid Not Fat
The mean of solid not fat content of crossbred cows in parity group I, parity group II and parity group III were 8.66 ± 0.02, 8.67± 0.02 and 8.61± 0.03 per cent, respectively (Table 1). The milk solid not fat content of crossbred cows did not shown any statistical significant (p>0.05) difference between parity group. There was no any specific trend found in solid not fat content with advanced parity. Sudhakar *et al.* (2013) [19], Jadhav and Patange (2009) [6] and Gurmessa and Melaku (2012) [12] reported that the solid not fat content of milk significantly influenced by the order of lactation and age of the animal, respectively. These results are contrary to the findings of present study.

Total solid
The mean ± S.E. of total solid content of crossbred cows in parity group I, parity group II and parity group III were 13.05 ± 0.04, 13.06 ± 0.05 and 12.87 ± 0.07 per cent, respectively (Table 1). The lowest level of milk total solid content was observed in parity group III and statistically significant difference (p<0.05) was found between parity group I and III; and II and III. There was no statistical difference was found between parity group I and II. The present study corroborates the earlier findings of Jadhav and Patange (2009) [6] Sarkar *et al.* (2006) [16] Kayastha *et al. (*2008) [7] and Bhoite and Padekar (2002) [1]. They reported that the order of parity had no significant effect on total solid content of milk.

Protein
The mean protein content of crossbred cows in parity group I, parity group II and parity group III were 3.32 ± 0.01, 3.31 ± 0.02 and 3.31 ± 0.01 per cent, respectively (Table 1). The milk protein content did not show any statistical significant (p>0.05) difference between parity group. However the milk protein content had found to be decreased with advanced parity. In contrary to present findings, Yadav *et al.* (2013) [20], Sudhakar *et al.* (2013) [19] reported that the protein content of milk significantly increased with order of lactation. Moreover Gurmessa and Melaku (2012) [12] found significantly (p< 0.05) lower protein content in young than adult cows.

Lactose
The mean milk lactose content of crossbred cows in parity group I, parity group II and parity group III were 4.61 ± 0.01, 4.60 ± 0.01 and 4.62 ± 0.01, respectively (Table 1). The lactose content of milk did not show any statistical significant (p>0.05) difference between parity groups. The highest level of lactose content was found in parity group III. The results obtained in the present study is in accordance with the findings of Gurmessa and Melaku (2012) [12], Sarkar *et al.* (2006) [16] Sudhakar *et al.* (2013) [19]. They reported that non-significant effect of parity on lactose content of milk.

Conclusion
From the above findings it is concluded that the parity had no significant influence on fat, solid not fat, protein and lactose content of milk but it had significant (p< 0.05) influence on total solids of milk. The highest total solid content of milk recorded in parity group II (13.06 ± 0.05) followed by I (13.05 ± 0.04) and III (12.87 ± 0.07 per cent).The significant difference was found between parity I and III; parity II and III but not between parity I and II.

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