Short Communication

MILK COMPOSITION OF CROSSBRED AND DESI CATTLE MAINTAINED IN THE SUB-TROPICAL HIGH RANGES OF KERALA

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ABSTRACT

A comparison of milk yield and composition of various indigenous and crossbred cattle was undertaken to evaluate their performance in the sub-tropical high altitudes of Kerala.A total of 173, 95, 63 and 63 morning milk samples from 42 CBHF, 12 Vechur, six Sahiwalandsix Kankrej cows of early second lactation were analyzed for total solids, fat, solids-not-fat, lactose, protein and chloride by conventional methods. Least squares analysis revealed that breed and test-day climate significantly influenced the milk yield and composition ($P \geq 0.05$). The mean lactation yield in Vechur, Sahiwal, Kankrej and CBHF were 514.62 ± 42.87 Kg, 1025.65 ± 358.15 Kg, 1102.45 ± 358.15 Kg and 1763.93 ± 128.16 Kg respectively. Kankrej had higher fat and total solids while Vechur had higher SNF, protein and lactose ($P \geq 0.05$). Vechur had lesser seasonal fluctuations in major constituents,indicating it's adaptability and climatic resilience as the native breed of Kerala.

Composition of milk is found to be influenced by many genetic and environmental factors such as parity, breed, stage of lactation and agro-climatic conditions (Radhika and Iype, 1999; Sarkar *et al*. 2006; Krovvidi *et al*. 2013).The information on milk composition of our Indian cattle breeds and their climatic consistency in the impending days of global warming is of much significance in the present scenario. The present study was therefore undertaken to study the milk composition of *desi* cows like Vechur, Sahiwal and Kankrej along with HF crossbreds and evaluated their componentswhen reared under high altitudes of sub-tropical climatic zone.

A total of 173, 95, 63 and 63 morning milk samples collected from 42 HF crossbreds, 12 Vechur, six Sahiwal and six Kankrej cows belonging to second parity and early stage of lactation, calved over a period of two years during 2011-2013 and maintained at the Instructional Farm, Pookode, located at analtitude of 867 m above MSL with an ambient temperature of 18-29 ºC, relative humidity of 95% and an annual rainfall of 2500

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mm, were collected for the study.The samples were analyzed for percentages of total solids, fat, solids-not-fat, lactose, protein and chloride percentages by conventional methods *viz.,*Gravimetric method for solids, Gerber's method for fat, Lane-Eynon method for lactose, Pyne's method for protein and Mohrs' method for chloride estimation.Seasonsor test-day climates of recording were defined as (1) winter (December-February) (2) summer (March-May) (3) South-West monsoon (June-September) and (4) North-East monsoon (October-November).Least squares analysis (Harvey, 1990) and DMRT (Kramer, 1957) were employed toanalyze the effects of breed and test-day climate on the various components and for the comparison of means.

Breed and test-day climate were significant sources of variation for lactation milk yields and almost all the milk constituents (Pd"0.05).The mean lactation milk yield in Vechur, Sahiwal, Kankrej and HF crossbreds were 514.62 ± 42.87 Kg, 1025.65 ± 358.15 Kg, 1102.45 ± 358.15 Kgand 1763.93 ± 128.16 Kg respectively. The estimates in Vechur and Kankrej were found to be in accordance with the earlier reports (Nivsarkar *et al.* 2000; Bindya Liz Abraham and SosammaIype, 2010) while Sahiwal and HF crossbreds gave lower yields than the earlier reports (Nivsarkar *et al.* 2000 and Radhika *et al.* 2012).

The estimates of milk constituents in crossbreds (Table 1) were found to be higher than earlier reports from the same agro-climatic conditions (Radhika *et al.* 2012).The fat percentage for Sahiwal was found to be much lower than the reports from their home tract (Nivsarkar *et al.* 2000) probably because the breed is more suitable for regions with extreme hot and cold climates, different from that of the present sub-tropical zone.Comparing the *desi* cows among themselves and with HF crossbreds, it was found that Kankrej had significantly higher fat and total solids percentages while Vechur had higher estimates of SNF,protein and lactose (Pd"0.05). Minerals and density were in comparable ranges among the indigenous genetic groups.

Milk fatand total solids percentage in Vechur increased significantly by 10.63% to 33.44% over the seasons with the highest estimates in summer, a trend in contrast to the other breeds. The SNF, protein and lactose levels were also maintained without much fluctuations over the seasons in Vechur cattle, the native breed of Kerala, indicating it's adaptabilityand climatic resilience with respect to the major constituents of milk.

Table 1. Milk composition profile of crossbred and *desi* cattle under sub-tropical climates

Breed	Total Solids (%)	Fat (%)	SNF (%)	Lactose (%)	Protein (%)	Chloride (%)	Density (Kg/m^3)
CB HF	13.29[b] ±0.19	4.75[b] ±0.34	8.54[b] ±0.13	4.73[c] ±0.07	3.12[b] ±0.06	0.69[ab] ±0.01	1029.38[ab] ±0.52
Vechur	12.69[c] ±0.71	3.61[c] ±0.27	9.09[a] ±0.07	4.99[a] ±0.04	3.33[a] ±0.03	0.75[a] ±0.01	1032.86[a] ±0.46
Sahiwal	12.72[c] ±0.41	4.36[b] ±0.29	8.35[c] ±0.12	4.62[d] ±0.07	3.04[c] ±0.04	0.68[ab] ±0.01	1029.14[ab] ±0.31
Kankrej	14.33[a] ±0.16	5.54[a] ±0.12	8.81[b] ±0.13	4.89[b] ±0.28	3.19[b] ±0.27	0.71[ab] ±0.01	1030.11[ab] ±0.42

Means bearing at least one common superscript do not differ significantly (P≤0.05)

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