COMPARATIVE STUDY OF PHYSICO-CHEMICAL PARAMETERS AND CHEMICAL COMPOSITION OF MILK OF GIR COW AND JAFARABADI BUFFALO IN JALGAON DISTRICT MAHARASHTRA

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ABSTRACT:

This study was conducted to evaluate the physico-chemical composition of milk of Gir cow and Jafarabadi Buffalo raised by Kathiyawadi people residing in different tehsils of Jalgaon district of Maharashtra. Their milk samples were analysed to observe pH, Lactometer readings and Specific gravity, Acidity, Concentration of total solids, SNF and selected minerals like Calcium, Magnesium, Phosphorous and Chloride. Result shows higher tested parameters in buffalo milk.

Keywords:- Milk composition, Gir cow, Jafrabadi buffalo, physico-chemical parameter, SNF, Selected minerals, total solid.

INTRODUCTION :

Jalgaon district in North Maharashtra is located over 300 km from the west coast and on the northern edge of the Deccan plateau, receives an average rainfall of just 750 mm yearly and contribute 25% bananas production of the India which is wholly produced by independent growers (Financial Express, 2018).

Jalgaon district have 15 tehsils, of which Chopda, Yawal, Raver and Bhusawal tehsils have more settlements of Kathiyawadi populations since a long time with the native breed   of cows and buffalos that mainly include Gir, Red Sindhi, Khillar, Sahiwal and Surti, Murrah, Nagapuri, Mehsana, Jafarabadi respectively. Along with local farmers, Kathiyawadi people plays significant role in each of these tehsils by providing cow's milk by local trading and supplying the milk to Jalgaon Jilha Sahakari Dudh Utpadak Sangh (JJSDUS).

MATERIALS AND METHOD :

Adult, healthy and lactating desi Gir cow and Jafrabadi buffalo raised by Kathiyawadi people residing in different tehsils of Jalgaon district of Maharashtra were selected for isolation and characterization of milk. The collected data were subjected to statistical analysis. Data were analysed by completely randomized design and critical difference test at 5% level of significance (p<0.05) using NCSS, LLC Statistical Software 2021 analysis.

The physico-chemical analysis of the milk samples collected from Gir cows and Jafarabadi buffalos were done by methods described by APHA, (1967) and Bhatia et al., (2015). Sanitary quality tests for milk of cow and buffalo conducted were Percent acidity (Khan et al., 2004). Results of milk quality parameters are shown in tables from 1 to 6.

Mean having same figures are statistically not significantly differ from each other (P<0.05).

RESULT AND DISCUSSION :

pH of milk-The result in table 1 shows the pH value of Gir cow range from 6.54 to 6.71 and 6.62 to 6.92 in buffalo milk. The buffalo milk shows slight increase in pH as compare to cow milk. These findings are very much near with the finding of S.Ahmed et al., (2008) and Asif Mahmood (2010).

Lactometer reading (LR) and specific gravity- Table 2 shows 29.9 and 28.3 mean value for LR for cow and buffalo respectively and mean Sp.

Gravity 1.03 for cow and 1.02 for buffalo. Lactometer reading and specific gravity findings are in the range as suggested by Darshan B. Prajapati et al., (2017), Takoberwa Madinah (2022) and change in LR and specific gravity reading means there is adulteration of water.

Titratable acidity (TA) Titratable acidity was calculated as 0.14 - 0.19 for cow and 0.15- 0.20 for buffalo as shown in table 3 which is also evaluated by Asif Mahmood (2010). TA for buffalo was more as compare to Darshan B. Prajapati et al., (2017).

Concentration of Total solids (TS) Table 4 shows the value of Concentration of Total solids which was 11.46 to 14.65 for cow and 15.59 to 19.44 for buffalo which shows the difference from the finding of K Sudharani (2021) and Asif Mahmood(2010). As the TS of buffalo was significantly higher than cow milk.

Solid Not Fat (SNF)

In table 5 SNF value was 7.24 -7.98 for cow and 8.23 – 8.93 for buffalo. Calculated values were higher in buffalo than cow. Overall Mean value of SNF value for cow was lower than the finding of P.U. Gajbhiye et al.,(2019). **Selected mineral**

In the table 6 Calcium was 123.6 for cow and 173.7 for buffalo, Magnesium was 13.41 for cow and 17.79 for buffalo and Phosphorous and chloride was 87.26 and 0.12 for cow and 106.9 and 0.12 for buffalo respectively. The findings was similar with slight variation as found by Dhartiben B. Kapadiya et al., (2016) and are lower than Manju singh et al., (2019). Calcium and phosphorous are known as bone mineral and essential for healthy bone (Kevin D. Cashman 2006).

CONCLUSION :

Milk is the richest source for micronutrient and minerals. In our findings Jafarabadi buffalo milk was highest in properties as compare to Gir cow milk. All over findings indicates that milk is the good source of essential minerals and full-fill the need of daily nutrition.

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Table 1: The pH values of milk samples of cow and buffalo

pH value				
Source of milk	Min.	Max.	Mean	SD (±)
Gir cow	6.54	6.71	6.62	0.05
Jafarabadi Buffalo	6.62	6.98	6.73	0.08
Cow milk v/s Buffalo milk*	Significance: *= $p < 0.05$			

Table 2: Lactometer reading (LR) and Specific gravities of cow and buffalo milk

Source	LR (Range)	LR (Mean)	Sp. Gravities (Range)	Sp. Gravities (Mean)
Gir Cow	28-33	29.9	1.02- 1.03	1.03
Jafarabadi Buffalo	26-29	28.3	1.02- 1.02	1.02

Table 3 The Titratable acidity (%) of milk of cow and buffalo.

Source of milk	Min.	Max.	Mean	SD (±)
Gir cow	0.14	0.19	0.165	0.01
Jafarabadi Buffalo	0.15	0.20	0.175	0.03
Cow milk v/s Buffalo milk	Significance:*= $p < 0.05$			

Table 4: Concentration of total solids in milk collected form cow and buffalo.

Source of milk	Min.	Max.	Mean	SD (±)
Gir cow	11.46	14.65	13.05	0.56
Jafarabadi Buffalo	15.59	19.44	17.52	0.85
Cow milk v/s Buffalo milk ***	Significance: *** = $p < 0.001$			

Table 5: The percentage of Solid Not Fat (SNF%) in milk of cow and buffalo.

Source of milk	Min.	Max.	Mean	SD (±)
Gir cow	7.24	7.98	7.61	0.07
Jafarabadi Buffalo	8.23	8.93	8.58	0.12
Cow milk v/s Buffalo milk***	Significance: *** = $p < 0.001$			

Table 6: Selected minerals in milk samples of cow and buffalo.

Milk source	Calcium (mg/100ml)	Magnesium (mg/100ml)	Phosphorous (mg/100ml)	Chloride (%)
Gir Cow(C)	123.6 ± 5.68 (112.5 to 134.8)	13.41 ± 2.14 (11.58 to 15.24)	87.26 ± 9.02 (75.96 to 98.57)	0.12 ± 0.02 (0.10 to 0.14)
Jafarabadi Buffalo (B)	173.7 ± 6.89 (164.8 to 182.7)	17.79 ± 1.94 (15.47 to 20.12)	106.9 ± 9.02 (92.33 + 121.5)	0.12 ± 0.03 (0.11 to 0.13)
Significance				
C v/s B milk	***	**	***	n.s.
Significance: *** $p<0.001$ **= $p<0.01$ n.s. $p>0.05$				
Each figure is Mean ± Standard Deviation of 6 observations. n.s. =non-significant. Figures in bracket are range of parameters.				