International Journal of Advanced Biochemistry Research

ISSN Print: 2617-4693
ISSN Online: 2617-4707
IJABR 2025; 9(2): 436-438
www.biochemjournal.com
Received: 13-12-2024
Accepted: 16-01-2025

D Bharali
Senior Scientist, AAU-Zonal Livestock Research Station, AAU, Mandira, Assam, India

HK Bhattacharyya
ADEE, AAU, Khanapara, Guwahati, Assam, India

Prasanta Boro
Scientist, AAU-Zonal Livestock Research Station, AAU, Mandira, Assam, India

M Sonowal
Senior Scientist, AAU, Goat Research Station, Byrnihat, Meghalaya, India

G Das
Scientist, AAU-Zonal Livestock Research Station, AAU, Mandira, Assam, India

D Choudhury
Scientist, AAU-Zonal Livestock Research Station, AAU, Mandira, Assam, India

MC Kalita
Principal Scientist, AAU-Zonal Livestock Research Station, AAU, Mandira, Assam, India

J Thakuria
Scientist, AAU-Zonal Livestock Research Station, AAU, Mandira, Assam, India

Corresponding Author:
Prasanta Boro
Scientist, AAU-Zonal Livestock Research Station, AAU, Mandira, Assam, India

Milk composition of Murrah buffalo cows reared under agro-climatic condition of Assam

D Bharali, HK Bhattacharyya, Prasanta Boro, M Sonowal, G Das, D Choudhury, MC Kalita and J Thakuria

DOI: https://doi.org/10.33545/26174693.2025.v9.i2f.3815

Abstract
Milk is very essential for growth and development of human health as well as for neonates. Economically important milk constituents include fat, protein, SNF, lactose, ash, water, amino acids, vitamins, lipids, fatty acids and minerals. These milk constituents plays important physiological role in the human as well as in animal body. There is less information on milk composition of Murrah buffalo cows reared under agro-climatic condition of Assam and factors affecting its composition. Eighteen numbers (18) milking buffalo cows of 2nd to 4th lactation were selected for the study from 2021 to 2023. The milk samples were collected in the morning and evening during milking time from each of the milking cows. These samples were analyzed with the help of milk analyser within 1 hour of milk collection. During the first 12 weeks of lactation in murrah buffalo, the average milk yield, fat, protein, SNF and lactose were found to be 5.5 kg ±0.08 kg, 5.7±0.07%, 3.70±0.04%, 8.17±0.06% and 4.67±0.02%, respectively.

Keywords: Milk, fat, protein, SNF, lactose, agro-climatic condition, lactation

Introduction
Buffalo milk plays an important role in human nutrition as well as in animals. As compared to cow milk, buffalo milk is richer in almost all the main milk nutrients. Special Mozarrella cheese and ghee can be made from buffalo milk. People having allergies with cow milk can consume buffalo milk. Buffalo milk contains high levels of fat, actose, protein, casein, and ash contents (Abd El-Salam, 1990) [1]. Besides, milk calcium is essential for healthy bones and teeth and helps prevent hypertension. Several bioactive components, essential amino acids and fatty acids are available in milk. Thus, buffalo milk is having a high biological value compared to meat.

Dairy Buffalo contributes more than 50% of the total milk production in India. Milk production is very low in Assam as Assam falls under the Agro-climatic zone i.e Eastern Himalayan Region which is characterised by hot humid and heavy rainfall which have severe consequences on production, reproduction and milk composition of dairy animals. Introduction of high yielding breeds like Murrah buffalo can meet up the milk deficit in Assam. The effect of genetic and non-genetic factors on the milk constituents of dairy buffaloes is rather scanty under Assam agro-climatic conditions especially for murrah buffaloes. Hence, considering these points, the present study was done to study milk composition of Murrah buffalo cows reared under agro-climatic condition of Assam.

Materials and Methods
The study was conducted at Murrah Buffalo Farm, LRS, Mandira from April, 2021 to Dec, 2023. Eighteen numbers (18) milking buffalo cows of 2nd to 4th lactation were selected for the study from 2021 to 2023. The milk samples were collected in the morning and evening during milking time from each of the milking cows and samples were analyzed within 1 hour of collection. The samples were analyzed for the entire lactation. The milk composition of Murrah Buffalo cows reared at AAU-ZLRS, Mandira was analyzed by using Milch Analyzer. The data generated was analysed for descriptive statistics using SPSS software as presented in the table (1) and (2).

Results and Discussion

From the present study, the composition of Murrah buffalo milk, reared at AAU-ZLRS, Mandira under the agro-climatic zone of Assam was analysed for the first time. The composition of Murrah Buffalo milk and milk yield were given in table no. 1 and 2. The composition of Murrah buffalo milk in terms of average milk yield, fat, protein, SNF and lactose is 5.5 ±0.08 kg, 5.7±0.07%, 3.70±0.04%, 8.17±0.06% and 4.67±0.02%, respectively. Milk composition is not constant in dairy buffaloes and is influenced by breed and species differences, parity or lactation order, age and size of the cow, dietary composition, season, pregnancy, Sire, service period, BCS, DP, lamness, heat stress, behaviour or milking temperament, udder health, locality and stage of lactation.

The average milk yield per day per animal was 5.5 ±0.08 kg during first 12 weeks which decreases gradually towards the end of lactation period reaching to 2.8±0.14 kg. During winter average milk yield per animal per day was 4.7±0.44 kg whereas in summer it was 3.6±0.32 kg with significance difference ($p \leq 0.05$) between them. The average Fat percent ranges from 5.7±0.07% to 7.4±0.15% with highest fat% during late lactation which correlates with the findings of Kholif 1997 [6] and Sodi *et al*. 2008 [11]. During winter average milk fat per animal per day was 6.8±0.21% whereas in summer it was 7.1±0.33%. Similar findings were also reported by Bhonsie *et al*., 2003 [3] and Ranjupt *et al*., 1982 [10]. Protein percent ranges from 3.55±0.14% to 3.70±0.04%, SNF percent ranges from 8.8±0.14 to 9.5±0.40 and Lactose percent ranges from 4.58±0.01% to 4.67±0.02% with no much variation during the lactation period. These findings were in accordance with the findings of other researchers on milk composition of murrah Buffalo (Misra *et al.* 2008; Yadav *et al*., 2013, Dubey *et al*. 1998; Kholif 1997; Sodi *et al*.., 2008; Lee and Kim, 2006) [9, 12, 5, 6, 11, 7]. During winter and summer protein% is 3.60±0.12% and 3.50±0.02%, respectively. Solid not fat (snf) % during winter and summer is 8.20±0.04 and 8.40±0.02, respectively. Lactose% during winter and summer is 4.5±0.14 and 4.4±0.34, respectively. No significant variation in protein%, snf% and lactose% has seen in summer and winter during the lactation period. Density percent ranges 20.7 to 36.8 with average 29.7%. Freezing Point percent ranges 0.525 to 0.736 and average 0.69%. Effect of season has been noticed in terms of milk yield and fat% with minimal effect on other milk constituents (Bhonsie *et al*., 2003; Ranjupt *et al*., 1982, Misra *et al.* 2008; Yadav *et al*., 2013) [3, 10, 9, 12].

Table 1: Variation in milk yield and composition during lactation in Murrah buffaloes

Milk yield and constituents Mean± SE	1-12 wks	13-24 wks	25-36 wks	37-48 wks	>48 wks
Yield (kg)	5.5 ±0.08^{a}	5.1±0.09^{b}	4.5±0.06^{c}	3.5±0.08^{d}	2.8±0.14^{e}
Fat (%)	5.7±0.07^{a}	6.5±0.15^{b}	6.9±0.17^{c}	7.2±0.09^{c}	7.4±0.15^{c}
Protein (%)	3.70±0.04^{a}	3.65±0.50^{a}	3.62±0.08^{a}	3.60±0.12^{a}	3.55±0.14^{a}
SNF (%)	8.17±0.06^{a}	8.5±0.15^{b}	9.5±0.40^{c}	8.8±0.14^{b}	9.4±0.16^{c}
Lactose (%)	4.67±0.02^{a}	4.65±0.01^{a}	4.62±0.04^{a}	4.60±0.10^{a}	4.58±0.01^{a}

*Figures with different superscripts differ significantly ($p \leq 0.05$)

Table 2: Effect of season on milk composition in Murrah buffaloes

Particulars	Milk yield (kg)	Fat%	Protein%	SNF%	Lactose%
Winter (Dec-Feb)	4.7±0.44^{a}	6.8±0.21	3.60±0.12	8.20±0.04	4.5±0.14
Summer (May-Aug)	3.6±0.32^{b}	7.1±0.33	3.50±0.02	8.40±0.02	4.4±0.34

*Figures with different superscripts differ significantly ($p \leq 0.05$)

Conclusion

Milk constituents plays important physiological role in animal body and is very much essential for the neonates. Milk production potential of dairy animal and its milk composition depend upon the prevailing agro-climatic condition where they have been reared. Quality milk is essential for consumption as well as production of good quality dairy products. Now-a-days, consumer pay the price of milk based on its composition. A suitable concentrate feed and other managemental strategies can be formulated to maintain optimum milk composition to improve milk quality.

References

1. Abdel-Salam SAM, Abou-Bakr MAM, Sadek RR, Abdel-Aziz AS, Alim KA. The productive performance of Egyptian buffalo in a dairy herd. World Review of Animal Production. 1990;14(2):57-64.
2. Ayadi M, Caja G, Such X, Rovai M, Albanell E. Effect of different milking intervals on the composition of cisternal and alveolar milk in dairy cows. Journal of Dairy Research. 2004;71:304-310.
3. Bhonsie D, Chourasia SK, Singh M, Jain RK. Factors influencing major milk constituents in Murrah buffaloes. Indian Journal of Animal Sciences. 2003;73:107-109.
4. Dubey PC, Suman CL, Sanyal MK, Pandey HS, Saxena MM, Yadav PL. Factors affecting the composition of milk of buffaloes. Indian Journal of Animal Sciences. 1997;67:802-804.
5. Dubey AR, Gupta SC. World Buffalo Congress. New Delhi, Abstracts of Contributory Papers. 1988;1:27.
6. Kholif AM. Effect of number and stage of lactation on the yield, composition and properties of buffalo's milk. Egyptian Journal of Dairy Science. 1997;25:25-39.
7. Lee JY, Kim IH. Advancing parity is associated with high milk production at the cost of body condition and increased periparturient disorders in dairy herds. Journal of Veterinary Science. 2006;7:161-166.
8. Mclachlan CNS. Beta-casein A1, ischemic heart diseases, mortality and other illnesses. Medical Hypotheses. 2001;56:262-272.
9. Misra SS, Sharma A, Bhattacharya TK, Kumar P, Saha RS. Association of breed and polymorphism of α-s1 and α-s2 casein genes with milk quality and daily milk

and constituent yield traits of buffaloes (Bubalus bubalis). Buffalo Bulletin. 2008;27:294-301.
10. Ranjupt YS, Bhavadasan MK, Singh A, Ganguli NC. Heat stability of buffalo milk as affected by the addition of urea and glyceraldehydes. New Zealand Journal of Dairy Science and Technology. 1982;17:185-195.
11. Sodi SS, Mehra ML, Jain AK, Trehan PK. Effect of non-genetic factors on the composition of milk of Murrah buffaloes. Indian Veterinary Journal. 2008;85:950-952.
12. Yadav SP, Sikka P, Kumar D, Sarkar S, Pandey AK, Yadav PS, *et al*. Variation in milk constituents during different parity and seasons in Murrah buffaloes. Indian Journal of Animal Sciences. 2013;83(7):747-751.