

POSTER

Physical and chemical composition of swamp and water buffalo milk: a comparative study

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ABSTRACT - The research was carried out to compare the physical and chemical parameters of Swamp and Water buffalo milk collected from Senbari village in Trishal Upazila under Mymensingh district of Bangladesh. Results revealed that average color, flavor and taste score of Swamp and Water buffalo milk differed significantly ($P < 0.01$). The specific gravity of Swamp buffalo milk slightly differed ($P > 0.05$) with Water buffalo milk. Texture of all samples was normal. It was observed that average fat, total solids (TS), solids-not-fat (SNF) and protein content differed significantly ($P < 0.01$) with Swamp and Water buffalo milk. Lactose content was also differed significantly ($P < 0.05$) with the same. However, no differences ($P > 0.05$) were found among, acidity, water. From these results, it may be inferred that the quality of Swamp buffalo milk is superior to that of Water buffalo milk.

Key words: Swamp buffalo, Water buffalo, Total solids (TS), Solids-not-fat (SNF).

INTRODUCTION - Milk is the almost complete and nutritious food for human diet and the first food of the newly born human being and other mammals. It is a food that contains all the nutrients required for the newly born baby to old age. There is no doubt that milk and milk products have played a key role through out the development of human civilization and supply most of the essential nutrients in significant amounts than any other single food. It is very essential for the growth and development of newly born child. Milk contains all the essential nutrients like protein, fat, lactose, vitamins, mineral matter etc. for normal growth and performing different functions for the body systems. It is not only the most important food during early childhood but in one form or other form also continues to be used normal diet throughout the life. It is also the most versatile of all the animals desired food commodities and it is a component of the diets of many physical forms like cheese, yoghurt, ice cream, ghee, powdered milk and many other forms of fluid milk. The calcium content is higher in buffalo milk than in milk from cow and it contains more colloidal calcium and phosphorus (Ganguli, 1974). Buffaloes are second largest source of milk supply in the world. In India, nearly half of the milk processed by the organized dairies comes from buffaloes (Aneja, 1990). Buffalo milk is richer in fat than milk from cattle; generally, it has also higher levels of proteins, lactose and ash, although these differences are not as in fat. The absence in buffalo milk of β -carotene, which is present in cow milk, is another notable characteristic (Dastur *et al.* 1971). The Swamp buffalo has traditionally been regarded primarily as working animals especially in China and other rice growing countries of the Far East. It is, however, milked in many countries and yields a product rich in butter fat and similar in all respect to that of milch river breeds. It is probable that the animal

has a considerable potential for milk production if managed and bred to that end. Therefore, this experiment was aimed to compare color, flavor, taste, texture, specific gravity as well as fat, TS, SNF, protein, lactose and ash content of Swamp and Water buffalo milk.

MATERIAL AND METHODS - The present experiment was carried out at Dairy Technology Laboratory, Department of Dairy Science, Bangladesh Agricultural University, Mymensingh, during the 3rd February to 3rd April 2003. Out of 6 samples 3 samples are collected from Swamp buffalo and the rest of 3 from Water buffalo of different individual farmers from individual farmers of Kani Hari Union, Village- Senbari of Upazila- Trishal. Samples were collected one time for eight days and each time the samples were transported to laboratory for analysis, The following tests were performed on each milk sample such as physical test: organoleptic test (color, flavor, taste and texture); specific gravity; chemical test (fat, TS, SNF, protein, lactose, ash, acidity and water content). The physical parameters were performed according to Nelson and Traught, 1964. P^H was measured with the help of a P^H meter. The specific gravity test was performed using Quevenne lactometer, cylinder and floating dairy thermometer and fat test by Babcock fat test method as described by Aggarwala and Sharma (1961). Acidity was done by titrating milk with N/10 NaOH solution as per method described by Association of Official Agricultural Chemists (AOAC, 2003). TS and SNF content of milk samples were performed according to the Eckles *et al.* (1951) and protein was estimated by formal titration method. The data were analyzed according to Completely Randomized Design (CRD).

RESULTS AND CONCLUSIONS - Physical Parameter. The result for physical parameters of buffalo milk samples obtained from the above breeds is given in the Table 1 and 2. There are remarkable differences among the physical parameters like color, flavor, taste and specific gravity of milk samples obtained from the above-mentioned breeds. But the texture score was the same within two breeds.

Table 1. The color, flavor, Taste and Texture quality of Swamp and Water buffalo milk.

Physical Parameter	Swamp buffalo	Water buffalo
Color	Whitish	Bluish white
Flavor	Milky with slightly aromatic	Normal flavor (Milky)
Taste	Slightly sweet	Slightly watery
Texture	Free flowing fluid	Free flowing fluid

Table 2. Average score of physical parameters of milk collected from Swamp and Water buffalo.

Physical Parameter	Swamp buffalo Mean±SD	Water buffalo Mean±SD	Level of Significance
Color	91.10±0.95	86.10±0.95	**
Flavor	87.50±0.83	95.00±0.00	**
Taste	96.30±0.64	90.37±2.32	**
Texture	100±0.00	100±0.00	NS
Sp.gr.	1.032±0.00	1.030±0.00	NS

** = (P<0.01), NS = Not significant.

Chemical parameters. The results for chemical parameters of milk samples are shown in the Table 3, and the results obtained are discussed in this section.

Table. 3. Average chemical parameters of milk collected from swamp and water buffalo during experimental period.

Chemical parameter	Swamp buffalo Mean±SD	Water buffalo Mean±SD	Average Mean±SD	Level of significance
Fat (g/kg)	84.25±0.25	72.67±0.58	78.46±6.36	**
TS (g/kg)	176.46±0.35	167.00±0.02	171.73±5.19	**
SNF (g/kg)	94.80±0.15	92.20±0.19	93.50±1.42	**
Protein (g/kg)	39.68±0.06	37.67±0.26	38.673±1.11	**
Lactose (g/kg)	48.00±0.1	47.55±0.18	47.77±0.28	*
Ash (g/kg)	7.13±0.00	7.07±0.02	7.1±0.04	NS
Acidity (%)	0.164±0.00	0.155±0.00	0.160±0.00	NS
Water (g/kg)	826.600±5.55	832.967±0.06	829.783±4.95	NS
p ^H	6.37±0.017	6.52±0.124	6.450±0.11	NS

* = (P<0.05), ** = (P<0.01), NS = Not significant.

The mean of total solids, fat, SNF, protein content of milk samples collected from Swamp and Water buffalo were differed significantly (P<0.01) (Table 3). The average total solids content of buffalo milk in experiment was 171.73 ± 5.19 g/kg which was similar with the results of El-Salam and El-Shibini (1966). Normally milk fat of buffalo milk varies from 4.4 to 8.9% (Faruque, 1996). The result of present study agrees the findings of above author. Mean SNF content of milk collected from both buffalo were normal and the average SNF content of buffalo milk in our experiment was 93.50 ± 1.42 g/kg which was nearly similar with the result of Sharma *et al.* (1980). The average protein content of milk from buffaloes was 38.673 ± 1.11 g/kg, which agree with the works of Sharma *et al.* (1980). Statistical analysis showed that the differences between lactose content of above two breeds were significant (P<0.05) (Table 3). In our experiment the average lactose content of milk from two types of breed was 47.77 ± 0.28 g/kg. The lactose content for swamp and water buffalo milk at Senbari of Trishal Upazila were within the normal range ($4.11 \pm 5.55\%$). The differences between ash, water, acidity, and pH content of above two breeds were non-significance (P>0.05) (Table 3). But the average ash content of milk from two types of breeds was 7.1 ± 0.04 g/kg. This result agrees with Sharma *et al.* (1980), who found 0.72% ash from non-described breed, which is similar with the ash content of milk samples of this experiment. From the results, it is evident that the acidity percentage of milk from Swamp Buffalo was higher than that of Water buffalo. The average acidity percentage of milk from two types of breed was 0.160 ± 0.00 . It was reported by El-Salam and El-Shibini (1966) that the acidity percentage of buffalo milk was 0.148 ± 0.0084 , which is lower than the milk samples collected from the two different breeds. However, in our experiment the acidity percentage of all samples from the above breeds were within the normal range. The average P^H of milk samples collected from Swamp and Water buffalo were within the normal range. P^H of buffalo milk was found

6.90 (Ghafoor *et al.* 1985). The average water content of milk from two types of breed was 829.78 g/kg which was slightly lower than the result of EL-Salam and El-Shibini (1966). It may be concluded from the above study that the quality of Swamp buffalo milk is superior to that of Water buffalo milk.

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