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Comparable Assessment of Nature of Milk Accumulated from Buffalo, Cow, Goat and Sheep of Beed District Maharashtra India

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Abstract:

Milk is an excellent source of vitamins and minerals, particularly calcium. It has an important role in bone health. In the present investigation, the milk of four different species like cow, buffalo, goat, and sheep was collected dairy farms, street vendor, and chilling center of Beed district Maharashtra India. The Physico chemical and microbiological analysis of milk of different species was done and results showed that the cow milk have highest LR and specific gravity i.e., 32.52 and 1.30, respectively than other three species i.e. buffalo, goat and sheep. The cow milk showed maximum pH value (6.75) while sheep milk samples showed maximum titratable acidity (0.98%). The minimum pH value (6.50) was of sheep milk while the minimum titratable acidity (0.20%) was of the cow milk samples. The results of SNF found in this study showed significant difference ($P<0.05$) among the milk of buffalo (8.22%) and of goat milk (8.89%). In contrast, the SNF of milk samples obtained from cow and sheep (9.99 and 10.66%, respectively). The other parameters like Total solid %, Protein %, Total Nitrogen %, Lactose %, and fat % was also determined by chemical method.

The SPC (log cfu/ml) Coliform count (log cfu/ml) & TBC were found to be highest in goat (7.22 ± 0.04), sheep (4.42 ± 0.03), and buffalo (6.99 ± 0.39) respectively Yeast and mould count was not at all observed in any of analyzed milk samples of Beed district. The present study concluded that the milk from dairy shop and street vendor was mainly adulterated with water without any consideration with purity of water which may lead to several health hazards.

Keywords: Milk, PH, Specific gravity, Microbiological analysis, Beed district

Introduction:

Milk is a significant wellspring of all essential supplements expected for individuals. [1] Milk is an extremely mind boggling food with over 100.000 different sub-atomic species found. There are many elements that influence the organization of crude milk like variety, age and actual condition of the bison and occasional varieties. In this manner, just a surmised milk organization of 87-88 % water and 12-13 % all out solids can be given. The absolute solids comprise of approx. 4 % fat and 9 % solids- -fat (SNF) (proteins, lactose, minerals, nutrients, and so forth) [2].

India keeps on being the biggest maker of milk in world by creating 155.5 million tons in 2015-16 appearance a yearly development of 6.27%. The per capita accessibility of milk in our nation is 337g while at world level it is 299 g each day in the year 2015-16 (Yearly report, 2016-17, DAHD&F, GOI). This of the country. Milk creation thickness is 58.6 tones/square km in a space of around 11691 million square kilometers. It has 563 g/day per-capita accessibility which is more than the public normal. [3] All milks contain similar sort of constituents however in fluctuating sum. Inside a given animal groups, hereditary elements and ecological circumstances, for example, the environment and the phase of lactation impact the creation. [4]

Milk is a significant wellspring of all essential supplements expected for warm blooded creatures including people [5]. The presence of food borne microorganisms in milk is because of direct contact with polluted sources in the dairy ranch climate and to discharge from the udder of a contaminated animal [6]. The cow milk contains 12.5% complete solids, 3.8% fat, 8.7% strong nonfat, 4.6% lactose, 0.8% debris, 0.2% NPN (Non Protein Nitrogen), 3.1% protein and 87.5% water. Sheep's milk is higher in fat, protein, calcium and potassium than human or cow's milk. [7]

The general mean degrees of complete solids, fat, SNF, debris, protein, lactose and energy for goats were 17.4, 6.8, 10.6, 0.88, 4.5, 4.7% and 4.44 MJ kg-1, individually. The separate qualities for sheep were 18.3, 6.0, 12.3, 0.94, 5.2, 4.9% and 4.39 MJ kg [8]

The Objective of Study:

The objective of the work is collection of milk samples of different animals (Cow, Buffalo, Goat and Sheep) from different dairy farm street vendor, and chilling center of Beed district

Maharashtra India. And study the physicochemical and microbiological analysis of different animals (Cow, Buffalo, Goat and Sheep).

Materials & Methods

The milk of four different species cow, buffalo, goat, and sheep was collected from dairy farms, street vendor, and chilling center of Beed district Maharashtra India. in the sterile bottles and transferred to laboratory & kept in ice for further study. Samples were brought to the laboratory within three to four hours after collection. All chemicals were analytical grade.

Chemical Analysis:

Fat, specific gravity, protein, lactic acid (Acidity), total solid, Total nitrogen, SNF, content of four different species like cow, buffalo, goat, and sheep was determined by pre – calibrated Lactostar milk analysis device (FUNKE GERBER Germany), PH value of milk samples were determined by InoLab (PH Level L 01280054) PH meter device.

Microbiological analysis

The microbiological examination of milk was carried out by estimation of standard plate count, coliform count and yeast and mould count as per AOAC, 2016.

Statistical analysis

The results were statistically analyzed as per the methods described by Snedecor and Cochran (1989). One-way analysis of variance (ANOVA) was conducted to analyse the results of physicochemical and microbiological properties of milk of Beed District by using analytical software Sigmastat 4.0

Results & Discussion:

The Physico - chemical Analysis of four different species like cow, buffalo, goat, and sheep milk from Beed District Maharashtra India is shown Table. 1 The results obtained were analyzed using appropriate statistical method and presented as follows:

The typical cow milk has most elevated LR and specific gravity i.e., 32.52 and 1.30, separately The LR esteem is least in sheep which is 28.88 while specific gravity is most minimal in goat which is 1.02. These outcomes showed that goat and sheep milk is non-altogether unique yet cow and bison milk is fundamentally not the same as one another. [9]

The greatest typical PH esteem was 6.75 (cow) while the least PH esteem was 6.50 (sheep) among this multitude of species from Beed area. The titratable sharpness test is a straightforward corrosive base response. This test permits a computation of % of causticity in milk. The most extreme typical titratable corrosiveness % esteem was (0.98 ± 0.03) (Sheep) while the least titratable sharpness % esteem was (0.20 ± 0.02) (cow) among this large number of species. The outcomes showed that buffalo, cow, goat milk are non-fundamentally not quite the same as one another however sheep milk is altogether unique in relation to any remaining three species.

Table.1 Physico-chemical analysis of milk samples of different species of Beed district

Species / Parameter	Cow (Average Value)	Buffalo (Average Value)	Goat (Average Value)	Sheep (Average Value)
LR	32.52	29.25	30.01	28.88
Specific Gravity	1.30	1.23	1.02	1.38
PH	6.75	6.69	6.60	6.50
TTA %	0.20 ± 0.02	0.46 ± 0.06	0.40 ± 0.04	0.98 ± 0.03
TS %	14.90 ± 0.42	15.33 ± 0.14	14.06 ± 1.04	20.22 ± 0.50
SNF %	9.90 ± 0.22	8.22 ± 0.72	8.89 ± 0.06	10.66 ± 0.48
Protein %	6.33 ± 0.13	5.23 ± 0.25	4.18 ± 0.08	7.55 ± 0.11
Total Nitrogen %	0.88 ± 0.04	0.74 ± 0.05	0.63 ± 0.01	1.06 ± 0.05
Fat %	7.30 ± 0.12	8.67 ± 0.54	7.85 ± 0.09	10.05 ± 0.06
Lactose %	4.99 ± 0.48	3.86 ± 0.44	3.12 ± 0.08	5.56 ± 0.42

(LR – Lactometer reading, TTA – Titratable Acidity, TS – Total Solid, SNF – Solid nonfat,)

Table.2 Microbiological analysis of milk samples of different species of Beed district

Parameter/ Species	SPC (log cfu/ml)	Coliform count (log cfu/ml)	Total Bacteria Count	Yeast & Mould Count
Cow	6.90 ± 0.05	2.88 ± 0.04	5.55 ± 0.48	Nil
Buffalo	5.40 ± 0.03	3.64 ± 0.05	6.99 ± 0.39	Nil
Goat	7.22 ± 0.04	3.98 ± 0.02	5.22 ± 0.29	Nil
Sheep	4.52 ± 0.06	4.42 ± 0.03	6.60 ± 0.24	Nil

The milk tests gathered from various species showed that the fat and complete strong items in the milk of buffalo were (8.67 ± 0.54) and (15.33 ± 0.14) %, separately. Also, tests gathered from various species showed that the fat and complete strong items in the milk of cow were (7.30 ± 0.12) and 14.90 ± 0.42 %, separately. The fat and all out strong items in the milk of sheep were (10.05 ± 0.06) and (20.22 ± 0.50) %, separately which is very high when contrasted with different examples.

The consequences of fat (%) showed that buffalo cow, goat milk are non-essentially not quite the same as one another however sheep milk is fundamentally unique in relation to other three species. The consequences of SNF showed that bison and goat milk is non-essentially unique in relation to one another yet sheep and cow milk are fundamentally not the same as any remaining species. The outcomes showed that the sheep milk had the most noteworthy typical protein contents (7.55 ± 0.11 %). Be that as it may, the milk of cow (6.33 ± 0.13 %) and bison (5.23 ± 0.25 %) were altogether not the same as one another from sheep milk. The milk of goat showed the most reduced protein contents (4.18 ± 0.08 %) as contrast with different species. Sheep milk has most elevated % of complete nitrogen (1.06 ± 0.05) contents when contrasted with other three species and consequently fundamentally not quite the same as them. Be that as it may, goat milk showed least worth (0.63 ± 0.01 %) of absolute nitrogen. The worth of % lactose is most noteworthy in sheep milk (5.56 ± 0.42 %) while least worth was shown by goat milk 3.12 ± 0.08 %), yet the upsides of buffalo milk (3.86 ± 0.44%) and of cow milk was (4.99 ± 0.48%) that reaches between the upsides of previously mentioned two species.

The Microbiological Analysis of four different species like cow, buffalo, goat, and sheep in Beed District Maharashtra India is shown Table. 2 The results obtained were analyzed using appropriate statistical method and presented as follows:

The highest standard plate count SPC (log cfu/ml) value among all these species from Beed district is found in goat which is (7.22 ± 0.04) while the lowest standard plate count SPC (log cfu/ml) value is from sheep which is (4.52 ± 0.06). The highest coliform count (log cfu/ml) value among all species found in sheep, which is (4.42 ± 0.03) while the lowest coliform count (log cfu/ml) value is from cow which is (2.88 ± 0.04).

The highest total bacteria count (TBC) value among all species found in buffalo, which is (6.99 ± 0.39) while the lowest (TBC) value is from goat which is (5.22 ± 0.29). The main reason for these relatively higher counts of TBC should be ascribed to poor hygiene condition during making collection and transport. [10]. The main physical characteristic of milk is defined as PH & electrical conductivity in addition to fat content of buffalo milk is the most variable milk component which is caused by genetic & specific factor. [11] The lower lactose may be due to the effect of psychotrophic bacteria [12].

Yeast and mould count were not at all observed in any of analyzed milk samples of Beed district

Conclusion:

All the tested parameters were nearer to normal values in buffalo milk samples collected from dairy farms and chilling centers. when compared to dairy shops and street vendors which indicates that adulteration of milk with water or they might have done the skimming or both together. It would be of great interest if further investigations are carried out to examine other organic and inorganic components of milk. The study will create awareness among the producers and policy makers.

References:

1. S. A. Peerzade Physico - chemical & Microbiological Analysis of Buffalo Milk In Selected Area In Osmanabad District Maharashtra India. International Journal of Advance and Applied research. ISSN 2347-7075 Vol. 10 Issue 3 Impact factor – 7.328 pages (151 – 154) Jan – feb. 2023
2. Bendale, V. T; Patil, C. L; Chavan R. P. And Shinde, D. N. (2015). Analysis of Milk Quality & Adulteration in Milk Samples Collected from Thane. International Journal of Pharma and Bio Sciences. 6(4): 729 – 733.
3. Bauman DE. Griinari, JM; Nutritional regulation of milk fat synthesis. Annual review of nutrition, 2003; 23(1): 203-227.
4. Athar, I.H and M.A. Shah, 1994. Dairying in Pakistan, country report. National Agricultural Research center, Pakistan Agricultural Research Council. Park Road, P.O. NIH, Islamabad, Pakistan, pp: 78-82.
5. Nalwaya, S.B., B.I. Prajapati, A.R. Bariya, M.M. Goswami and Roy, S.K. 2018. Evaluation of Physico-Chemical and Microbiological Quality of Milk of Banaskantha District, India. Int.J.Curr.Microbiol.App.Sci. 7(12): 1635-1641
6. Dehinenet G, Mekonnen H, Ashenafi M, Emmanuelle, Determinants of raw milk quality under a smallholder production system in selected areas of Amhara and Oromia National Regional States, Ethiopia, Agriculture and Biology Journal of North America, 2013, 4(1): 84-90
7. Malcolm, E.C. and W. Paul, 1979. Modern Milk Products. 1st Edn., Magraw Hill Brok Co., New York, pp: 81-83.
8. Khalil, I.A. and F. Manan, 1990. Chemistry One (Bioanalytical Chemistry). 2nd Edn., Taj Printing Press, Peshawar, Pakistan, pp: 26-30.
9. Lampert, L.M., 1965. Modern Dairy Products. Chemical Publishing Co. Inc., New York, USA., pp: 345-350
10. Wells J. G., Shipman L. D., Greene K. D., Sowers E. G., Green G. H., Cameron D. N., Downes F. P., Martin M. L., Griffin P. M., Ostroff S. M., (1991) Isolation of Escherichia Coli serotype 0157- H7 & other Shiga – like –

toxin producing E. Colifrom dairy cattle. J. Clin Microbial, (29): 985 - 989
11. Sarfaraz A., Gaucher I, Rousseau F, Beaucher E, Piot M, Gronget J. F., Gaucheron F., (2008) Effect of acidification on physico – chemical characteristics of buffalo milk: A comparison with cow's milk Food chem, 106 (1): 11 – 17.
12. Ballou LU, Pasquini M, Bremel RD, Everson T, Sommer D; Factors affecting herd milk composition and milk plasmin at four levels of somatic cell counts. Journal of dairy science, 1995; 78(10): 2186-2195.