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Physico - chemical & Microbiological Analysis Of Buffalo Milk In Selected Area In Osmanabad District Maharashtra India

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Abstract:
Milk is an important source of all basic nutrients required for human beings. In present study Physico - chemical & Microbiological Analysis of Buffalo Milk in Selected Area in Osmanabad District Maharashtra India was carried out. A total ten buffalo milk samples were collected from ten places (Singoli, Tugaon, Yedshi, Dhokee, Palsap, Thair, Aadni, Ternanager, Tadwale, & Khed.) from Osmanabad district Maharashtra India. The average PH, Fat, Total solid, Solid Non-Fat, Protein, Acidity were found to be (6.43), (6.63 ± 0.47), (16.45 ± 0.99), (7.41 ± 0.48), (5.45 ± 0.25), (0.16 ± 0.002) respectively while SPC (log cfu/ml) Coliform count (log cfu/ml) & TBC were found to be (6.22 ± 0.03), (3.53 ± 0.05), (6.54 ± 0.25) respectively Yeast and mould count was not at all observed in any of analyzed milk samples of Osmanabad 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. These findings didn't show awareness among consumers level in Osmanabad district and may be helpful for the concerned governmental regulatory bodies to monitor the quality of the commercial milk in the market.

Key Words: Buffalo milk, chemical analysis, Microbiological analysis, Osmanabad district,

Introduction:
Milk is a very complex food with over 100.000 different molecular species found. There are many factors that affect the composition of raw milk such as breed, age and physical state of the buffalo and seasonal variations. Therefore, only an approximate milk composition of 87-88 % water and 12-13 % total solids can be given. The total solids consist of approx. 4 % fat and 9 % solids- -fat (SNF) (proteins, lactose, minerals, vitamins, etc.) [1].

milk quality
Milk quality is composed of:
1) Chemical quality 2) Microbiological quality 3) Physical quality 4) Sensory quality
The chemical quality of milk describes the content of principal solids of milk such as fat, protein, lactose and minerals. These ingredients are called main because they represent major part in the milk. They can be calculated as a percentage of solids, solids-non-fat (SNF) or fat-in-solids (FIS). In this category we can also find minor components such as individual minerals (calcium, phosphorus etc.), vitamins, enzymes, and other milk- pollutants such as heavy metals, aflatoxins, pesticides, antibiotics, detergents and disinfectants, whose presence is harmful and therefore illicit.
[5] When we speak of microbiological quality, we distinguish two categories: total bacterial count and the presence of pathogenic microorganisms. The total bacterial count reflects the level of hygiene of milk production, storage and transport as well as cooling efficiency, while the presence of pathogenic bacteria reflects hygienic and health conditions of milking animals and people who are in contact with milk. The most important characteristics that determine the physical quality are milk density, freezing point, titratable acidity and pH value. Sensory quality is determined by taste, odor, color, flavor and consistency. [10]
India continues to be the largest producer of milk in world by producing 155.5 million tonnes in 2015-16 showing an annual growth of 6.27%. The per capita availability of milk in our country is 337g whereas at world level

it is 299 g per day in the year 2015-16 (Annual report, 2016-17, DAHD&F, GOI). This of the country. Milk production density is 58.6 tonnes/square km in an area of about 11691 million square kilometers. It has 563 g/day per-capita availability which is more than the national average. [3]

Milk is an important source of all basic nutrients required for mammals including human beings [2]. The presence of food borne pathogens in milk is due to direct contact with contaminated sources in the dairy farm environment and to excretion from the udder of an infected animal [4].

In the present work Physico - chemical & Microbiological Analysis of Buffalo Milk In Selected Area In Osmanabad District Maharashtra India is a small attempt in this direction. Where in selective places of Osmanabad district of Maharashtra is taken which are (Singoli, Tugaon, Yedshi, Dhokee, Palsap, Thair, Aadni, Ternanager, Tadwale, & Khed.).

The Objective of Study:

The objective of the work is collection of milk samples from different places of Osmanabad district & determination of physico – chemical & microbiological analysis of buffalo milk

Materials & Methods:

The buffalo milk samples were collected from street vendor, dairy shop, dairy farms & chilling center of Osmnabad district (Singoli, Tugaon, Yedshi, Dhokee, Palsap, Thair, Aadni, Ternanager, Tadwale, & Khed.) 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, protein, lactic acid (Acidity), total dry matter content of buffalo milk samples 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 Osmanabad District by using analytical software Sigmastat 4.0.

Results & Discussion:

The Physico - chemical Analysis of Buffalo Milk in Selected Area in Osmanabad District Maharashtra India is shown Table. 1 The results obtained were analyzed using appropriate statistical method and presented as follows:

The average PH value was 6.43 the highest PH value among all these ten places from Osmanabad district is from Tadwale which is 6.55 while the lowest PH value is from Aadni which is 6.36. The average fat %value was 6.63 ± 0.47 the highest fat % value among all these ten places from Osmanabad district is found in Dhokee which is 7.89 ± 0.66 while the lowest fat % value is found in TernaNager which is 5.56 ± 0.25. The average Total solid % value was 16.45 ± 0.99 the highest Total solid % value among all these ten places from Osmanabad district is found in Tadwale which is 17.80 ± 1.09 while the lowest Total solid % value is found in Singoli which is 14.33 ± 1.05. The average solid non – fat (SNF) % value was 7.41 ± 0.48 the highest solid non – fat (SNF) % value among all these ten places from Osmanabad district is found in Dhokee which is 7.99 ± 0.99 while the lowest solid non – fat (SNF) % value is found in Aadni which is 7.10 ± 0.13. The average protein % value was 5.95 ± 0.25 the highest protein % value among all these ten places from Osmanabad district is found in plasap which 6.78 ± 0.40 while the lowest protein % value is found in Tugaon which is 5.11 ± 0.16. The average Acidity (Lactic Acid) % value was 0.16 ± 0.002 the highest Acidity (Lactic acid) % value among all these ten places from Osmanabad district is found in Singoli which 0.19 ± 0.004 while the lowest Acidity (Lactic acid) % value is found in Dhokee which is 0.14 ± 0.001.

The Microbiological Analysis of Buffalo Milk in Selected Area in Osmanabad District Maharashtra India is shown Table. 2 The results obtained were analyzed using appropriate statistical method and presented as follows:

The average standard plate count SPC (log cfu/ml) value was 6.22 ± 0.03 the highest standard plate count SPC (log cfu/ml) value among all these ten places from Osmanabad district is found in Singoli, Palsap &

TernaNager which is 6.30 ± 0.04 while the lowest standard plate count SPC (log cfu/ml) value is from Thair which is 5.97 ± 0.01. The average coliform count (log cfu/ml) value was 3.53 ± 0.05 the highest coliform count (log cfu/ml) value among all these ten places from Osmanabad district is found in Singoli, which is 3.88 ± 0.05while the lowest coliform count (log cfu/ml) value is from TernaNager which is 3.33 ± 0.06. The average Total bacteria count (TBC) value was 6.54 ± 0.25 the highest Total bacteria count (TBC) value among all these ten places from Osmanabad district is found in Singoli, which is 7.45 ± 0.38 while the lowest Total bacteria count (TBC) value is from Tadwale which is 6.12 ± 0.26. The main reason for these relatively higher counts of TBC should be ascribed to poor hygiene condition during making collection and transport. [6] 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. [7] The lower lactose may be due to the effect of psychotrophic bacteria [9].

Table.1 Physico-chemical analysis of milk samples in selective places of Osmanabad district

Parameter/ Places	PH	Fat %	Total Solid %	Solid Non-Fat (SNF %)	Protein %	Acidity %
Singoli	6.38	5.90 ± 0.55	14.33 ± 1.05	7.22 ± 0.46	5.99 ± 0.12	0.19 ± 0.004
Tugaon	6.46	6.02 ± 0.13	16.55 ± 0.95	7.88 ± 0.33	5.11 ± 0.16	0.18 ± 0.003
Yedshi	6.37	7.72 ± 0.89	15.22 ± 1.02	7.11 ± 0.72	5.88 ± 0.18	0.16 ± 0.002
Dhokee	6.44	7.89 ± 0.66	17.58 ± 0.54	7.99 ± 0.99	6.19 ± 0.32	0.14 ± 0.001
Palsap	6.50	6.62 ± 0.13	15.90 ± 1.03	7.13 ± 0.60	6.78 ± 0.40	0.17 ± 0.003
Thair	6.48	6.70 ± 0.88	16.21 ± 1.06	7.28 ± 0.41	5.70 ± 0.32	0.16 ± 0.002
Aadni	6.36	5.80 ± 0.27	17.29 ± 1.08	7.10 ± 0.13	5.80 ± 0.12	0.18 ± 0.003
Ternanager	6.45	5.56 ± 0.25	16.66 ± 1.01	7.67 ± 0.15	5.92 ± 0.40	0.15 ± 0.003
Tadwale	6.55	7.67 ± 0.55	17.80 ± 1.09	7.44 ± 0.66	5.55 ± 0.11	0.16 ± 0.002
Khed	6.40	6.46 ± 0.44	16.99 ± 1.08	7.28 ± 0.42	5.96 ± 0.46	0.18 ± 0.003

Table.2 Microbiological analysis of milk samples in selective places of Osmanabad district

Parameter/ Places	SPC (log cfu/ml)	Coliform count (log cfu/ml)	Total Bacteria Count	Yeast & Mould Count
Singoli	6.30 ± 0.04	3.88 ± 0.05	7.45 ± 0.38	Nil
Tugaon	6.00 ± 0.01	3.54 ± 0.03	6.99 ± 0.33	Nil
Yedshi	6.22 ± 0.02	3.78 ± 0.04	6.22 ± 0.11	Nil
Dhokee	6.12 ± 0.03	3.42 ± 0.03	6.50 ± 0.25	Nil
Palsap	6.30 ± 0.04	3.66 ± 0.04	6.36 ± 0.28	Nil
Thair	5.97 ± 0.01	3.49 ± 0.06	6.22 ± 0.11	Nil
Aadni	6.25 ± 0.02	3.42 ± 0.03	6.88 ± 0.31	Nil
Ternanager	6.30 ± 0.04	3.33 ± 0.06	6.42 ± 0.32	Nil
Tadwale	6.46 ± 0.05	3.35 ± 0.05	6.12 ± 0.26	Nil
Khed	6.33 ± 0.04	3.46 ± 0.06	6.28 ± 0.31	Nil

Therefore, nutritionally enriched milk and its products with enhanced biological potential and without health risks are generally demanded [8].

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

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