

STANDARD PARAMETERS OF MILK IN MORENA (M.P)

Author's Name: Ramakant Sharma¹

Affiliation:

1. Department of chemistry Ambah P G.(Autonomous) College, Ambah, Morena, MP,
India

Corresponding Author Name & E-Mail: Ramakant Sharma, ramakant1178@gmail.com

ABSTRACT

The aim of this paper is to present some aspects regarding milk quality and its importance for milk processors, taking into account a study case at Sanchi Dugdha Sangh Banmor India. The study analysis how milk quality is checked from the bulk milk to final product according to the Milk Quality Program in force. The main aspects concerning raw milk selection criteria such as: antibiotic test, temperature, bacteria, organoleptic properties, acidity, somatic cell count, but also main milk components such as water, butterfat, solids, protein, lactose, solids non fats, minerals, acids have been approached. Milk processing assures the destruction of human pathogens, the maintenance of product quality without significant loss of flavor, appearance, physical and nutritive properties and the selection of organisms which may produce unsatisfactory products.

Keywords: Milk Quality, Importance, Milk Processors, Sanchi Dugdha Sangh Banmor India.

INTRODUCTION

Milk is very important due to its special nutritive value and important role for human health. It has all the substances needed by organisms in its easiest assimilable form. It has high value proteins (casein, lactalbumin and lactoglobulin providing essential amino acids), fat providing energy (9.3 kcal /g), a low melting point (29-34 °C), small globules stimulating an easy assimilation, A and D vitamins playing a special role in Calcium and Phosphorus fixation in bones, low cholesterol compared to other foods of animal origin (fresh milk 10, skimmed milk 3, butter 280, fat cheese 150-200, pork 100-120, egg yolk 1400 mg/100 g product), milk or milk sugar. Due to the bacteria living in the intestine is transformed in lactic acid with a beneficial influence upon our body. Consuming animal source food containing suboptimal levels of antimicrobials for long periods can increase the rate of development of bacterial resistance and spread of antimicrobial-resistant microorganisms [1,2]. Minerals are also very important (Calcium, Phosphorus etc). Due to its nutritive value, milk is recommended to young and old people, being considered a complete food. The nutritive and energetic value of milk per kilogram corresponds to the ones of 0.5 Kg beef or 8-9 eggs. Per kilogram of milk contains: water 84-90 %, fat 2-6 %, protein 3-4 %, lactose 4-5 %, minerals < 1 % and supplies about 668 Kcal. Therefore, milk is a very important raw material for food industry. There are estimated to be some 8 to 10,000 different types of milk products produced in the world. Dairy industry is considered a large and dynamic economic branch of many nations and consumption of dairy products continues to increase throughout the world. A new definition of “high-quality” milk has been imposed and Quality Management System has appeared as a compulsory tool for assuring milk quality from cow udder to consumer’s cup. In this context, previous studies in Tanzania mainland so that majority of the people consume raw untreated cow milk, a practice that puts the public at the risk of milk-borne diseases [3,4]. The present paper approaches milk quality aspects in India. According to the standards in force giving an example how milk quality is checked by milk processors in close relationship to the quality of milk products at Sanchi Dugdha Sangh Banmor India.

MATERIALS AND METHODS

This paper is carried out from Sanchi Dugdha Sangh Banmor India, in order to present how milk quality is checked from the bulk milk to final product according to the Milk Quality Program in force in India. Important aspects concerning raw milk selection criteria such as

: antibiotic test, temperature, bacteria, organoleptic properties , acidity, sorbetol adulteration , somatic cell count , but also main milk components such as water, butterfat , total solids, protein, lactose , solids non fats , minerals, acids have been approached .

RESULTS AND DISCUSSION

Production of quality milk is the concern of dairymen, veterinarians, state regulatory departments, milk and milk product processors, retail distributors (super markets) and consumers of dairy products . In order to assure the delivery of safe quality products to consumers , the regulatory control of milk and milk products is run under the milk sanitation program of the United States Public Health Service/Food and Drug Administration, divisions of the Department of Health and Human Services which have developed a statement of policy and regulations with regard to milk quality. This model regulation is known as the "Pasteurized Milk Ordinance of 1978" (PMO), which also contains the milk quality standards recommended to states, counties and municipalities. The main milk quality problems at herd level are : the increased number of clinical mastitis , high somatic cell counts , high bacteria counts and antibiotic residues in the bulk milk

The company applies Total Quality Management System whose slogan is “ To deliver safe milk to consumers “. High quality milk should be white in appearance, have no objectionable odors and be free of abnormal substances such as pesticides, added water or antibiotic and antiseptic residues. The company pays a special attention to the quality of raw milk because this is conditioning the quality of its dairy products and profit level.

TABLE 1.
RAW MILK REJECTION CRITERIA AT SANCHI DUGDHA SANGH BANMOR , INDIA

Specification	Rejection milk criteria
Antibiotics Test	any positive or indeterminable results
Temperature	greater than 42 degrees F
Bacteria	anything greater than 90,000/slide sample
Added Water	0.5-1%
Sorbetol Adulteration	0.12% min
Acidity	0.391% as oleic acid
Direct Microscopic Somatic Cell Count	greater than 690,000

For this reason, every tanker of milk is carefully checked concerning the presence of antibiotics prior to the tank being unloaded. If the truck is confirmed positive for the presence of antibiotics, another test is run in order to identify which farmer contaminated the milk. The entire tanker load of contaminated milk must be dumped and the offending farmer is fined. A farmer who repeatedly violates antibiotic residue standards will be prohibited from selling milk. Antibiotic residues are undesirable for public health reasons and because of their potential impact on the manufacturing process .

If raw milk passes the antibiotics test , milk samples are collected from the bulk milk in order to determine temperature, bacteria content ,Sorbetol Adulteration , acidity and somatic cell count .A high quality milk has to have less than 42 degrees F , less bacteria than 90,000/slide sample, no or less than 0.5-1 % added water and less than 0.391% acidity. Also the organoleptic properties are checked such as appearance and odor . Somatic cell count (DMSCC) must be less than 690,000 cells/ml.

In most developed dairy countries, milk quality is defined by the somatic cell count (SCC) in pre-pasteurized bulk tank milk. The SCC of milk are influenced by mastitis . The company prefers to purchase milk with low SCC , offering financial incentives to farmers for high quality milk. High SCC milk is not desirable because it reduces the shelf life of dairy products and diminishes the quality and quantity of milk protein; thereby reducing cheese yields. For instance , for a milk counting 240,000 somatic cells/ml an amount of 9.748 lbs cheese should be

produced from 100 lbs milk, while in a milk counting 640,000 cells/ml just 9.430 lbs cheese is achieved .

Milk is an excellent medium growing for bacteria , originating from either mastitis or from contamination of the milk with environmental pathogens during the milking or milk handling process. High quality milk originates from healthy cows that are free of mastitis . The company experts pay a special attention to the standard plate count (SPC), in pre-pasteurized bulk tank milk too . Less bacteria than 90,000/slide sample have to be found as milk bulk to be accepted for processing.

Because the bacterial quality and somatic cell content of raw milk are important for product shelf-life, flavor and yields (particularly cheese), the company strives to obtain the highest quality raw product possible from its suppliers . The quality of A grade milk allows a maximum of 90,000 bacteria/ml. in raw bulk milk. The raw milk’s samples are used for determining milk components : water, butterfat, total solids, protein, lactose, solids-non-fat, minerals, acids, enzymes , gases and vitamins as shown in Table 2.

TABLE 2
ANALYSIS OF RAW MILK COMPOSITION AT SANCHI DUGDHA
SANGH BANMOR , INDIA

Farmer’s name	% Water	% Butterfat	% Total Solids	% Protein	% Lactose	% Solids Non Fat	% Minerals	% Acids
Ramu	86.4	3.88	16.68	3.67	4.90	8.98	0.64	0.391
Admitted limits of variation	85.5 –88.7	2.2 – 5.5	15.05 - 16.70	3.69	4.90	7.9 – 10.0	0.65	0.395

Butterfat percentage is determined by means of butterfat test both at farm place, in the tanker’s milk and finally the receiving butterfat is established. The amount of milk in pound is weighted both at farm level and also at the Dairy Plant reception department . Then the amount of butterfat is calculated taking into account the butterfat percentage and the amount of milk delivered at the farm place and in the tanker.

According to the Milk Quality System (ISO), milk is tested every moment along the whole

chain of its processing in the Dairy Plant into various products such as Skim milk, 1 % milk , 2 % milk and whole milk . This dairy products have to meet the requirements concerning the product specification as shown in Table 4. The company pays a special attention to Total Quality, as a component of its culture, attitude and organization . Customers’ needs must be satisfied. Quality is approached in all aspects of the company's operations, with processes being done right the first time and defects and waste eradicated from operations. The whole company is focused to Total Quality Management, involving the integration of all the organizational functions such as marketing, finance. design, engineering and production, customer service, etc.

TABLE 3.
STANDARD PARAMETERS OF SANCHI DUGDHA SANGH BANMOR, INDIA

Name	Fat	Solid non fat	Protein	Acidity	Lactose	Solids	Vegetable oil adulteration	Detergent adulteration	Formaldehyde adulteration	Glucose adulteration	Sorbitol adulteration
Ramu	7.11	8.98	3.67	0.391	4.90	16.68	0.00	0.43	0.00	0.00	0.12
Pappu	7.10	8.99	3.99	0.382	4.95	16.37	0.00	0.29	0.00	0.00	0.11
Ramveer	7.09	8.93	3.71	0.396	4.73	16.31	0.00	0.74	0.00	0.00	0.13
Amit	7.12	8.95	3.79	0.380	4.76	16.94	0.00	0.71	0.00	0.00	0.12
Ajay	7.11	8.96	3.86	0.382	4.82	16.40	0.00	0.10	0.00	0.00	0.16
Sonu	7.13	8.99	3.72	0.373	4.69	16.42	0.00	0.20	0.00	0.00	0.15

TABLE 4.
SPECIFICATIONS CONCERNING BUTTERFAT, SOLIDS AND ACIDS FOR
VARIOUS DAIRY PRODUCTS

Product	% Butterfat	solids	Acidity	Protein
Skim milk	0.01-0.20	16.68- 16.69	0.390- 0.395	3.67
1% Milk	0.80-1.20	17.90- 17.95	0.390- 0.395	3.67
2% Milk	1.60-2.40	17.85- 17.95	0.390- 0.395	3.67
Whole Milk	3.25-3.35	17.95- 18.00	0.390- 0.395	3.67

CONCLUSIONS

Milk processing is destined to provide the consumer with a wholesome, nutritious and safe product. The production of quality milk and milk products begins on the farm and continues through further handling, processing and distribution. Milk processing assures the destruction of human pathogens, the maintenance of product quality without significant loss of flavor, appearance, physical and nutritive properties and the selection of organisms which may produce unsatisfactory products. Total Quality Management is successfully applied as a combination of quality and management tools destined to increase the company business and reduce losses. The company has no problems with bacteria and incidents with positive tests. It is facing customers complaints very rarely, meaning that milk quality is assured along the milk chain from farm gate to final dairy products. Production of quality milk is the concern of dairy farmers, veterinarians, state regulatory departments, milk and milk product processors, retail distributors (super markets) and consumers of dairy products.

REFERENCES

1. S. Layada, D. Benouraeth, W. Coucke, and M. Andjelkovic, "Assesment of antibiotic residue in commercial and farm milk collected in the region of Guelma (Algeria)," *International Journal of Food Contamination*, vol 3, no. 1, 2016.
2. F. Granados-Chinchilla and C. Rodriguez, "Tetracyclines in Food and

- Feedingstuffs : From Regulation to Analytical Methods , Bacterial Resistance, and Environmental Health Implications,” *Journal of Analytical Methods in Chemistry* , vol . 2017, Article ID 1315497, 24 pages, 2017.
3. H. E. Nonga , H. A. Ngowi , R. H. Mdegela et al., “Survey of physicochemical characteristics and microbial contamination in selected food locally vended in Morogoro Municipality ,Tanzania *Microbiology*,” *BMC Research Notes* , vol. 8, no.1, pp. 2-10, 2015.
 4. H.B. Kanyeka, Assesment of microbial quality of raw cow’s milk and antimicrobial susceptibility of selected milk-borne bacteria in Kilosa and Mvomero districts, Tanzania , Dissertation for award of degree of Msc. at Sokoine University of Agriculture, Morogoro , Tanzania , 2014.
 5. M. Mhozya , Assesment of Brucellaabortous and antimicrobial residue in raw milk in Bukombe, Tanzania , Dissertation for award of degree of MSc. at Sokoine University of Agriculture, Morogoro, Tanzania 2017.
 6. J.D. Orwaj , J.W. Matofari, P.S. Muliro, and P.Lamuka , “Assessment of sulphonamides and tetracylines antibiotic residue contaminants in rural and peri urban diary value chains in Kenya,” *International Journal of Food Contamination* , vol. 4, no. 1, 2017.
 7. Shearer J.K., Bachman K.C., Boosinger J, 2003, *The production of Quality Milk* ,University of Florida , IFAS Extension, Gainesville.
 8. Ruegg Pamela , *ABVP Dairy* , 2001, *Milk secretion and quality* Tamime A.Y., 2008, *Milk Processing and Quality Management*, Wiley Blackwell.