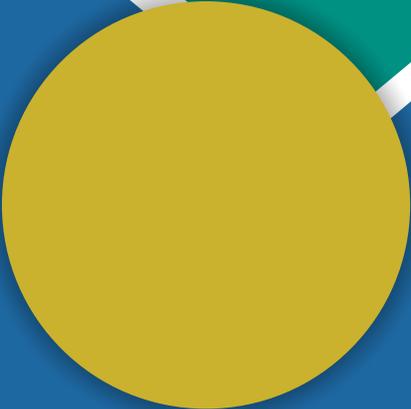


Optimization of Processing Conditions for Manufacturing of Mozzarella Cheese from Buffalo Milk



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Pakistan is the 2nd largest buffalo milk producer in the world. The produced milk possess several physicochemical characteristics different from milk of other dairy animals such as a higher content of fat, casein proteins, total solids, calcium and phosphorous that make it ideal for processing into value added dairy products. Cheese is the product which is widely used in hotels, restaurants, fast food corners, airlines, shipping lines and households. Mozzarella cheese is considered the most suitable for pizza topping as about 30% cheese used for pizza topping in the world is mozzarella. Growing popularity of Western-style cuisine, increasing urbanization, growing per capita income and increasing two-income families are fueling this demand. Local demand for Mozzarella cheese has grown in such a way that local manufacturers cannot meet and the supply-demand gap which is being filled by imported cheese. Moreover, the quality of locally produced Mozzarella cheese is not compatible with the imported cheese due to non standardized cheese manufacturing procedure. Hence, one can capture certain market share by producing quality cheese at a reasonable price. Along with many other factors different processing variables like casein to fat ratio, pasteurization temperature, milling pH, acidification method, stretching temperature play significant role in the development of good quality Mozzarella cheese with optimum yield. Therefore, these variables must be standardized to produce a consistency in the quality of Mozzarella cheese and to meet the regulatory standards. The HEC project entitled "Development of standard method through optimization of processing conditions for manufacturing of Mozzarella cheese from buffalo milk" was aimed to adapt better method for cheese preparation to get maximum recovery for buffalo Mozzarella cheese and to explore the buffalo milk as a positive feature in Pakistan for development of certain dairy products especially cheese. The research work comprised of different parts such as process standardization on the basis of

casein to fat ratio, pasteurization temperature, milling pH, acidification method, manufacturing procedure and cheese stretching temperature. After process standardization, Mozzarella cheese was manufactured under standardized as well as non-standardized conditions and compared for their compositional, functional, sensorial and pizza baking performance during storage period of 60 days. Functionality of Mozzarella cheese is of foremost importance because of its use as functional ingredient on pizza topping. Free oil formation, stretch distance and melt time are main functional attributes of Mozzarella cheese. All these parameters varied over narrow range in standardized process when compared with non-standardized process for Mozzarella cheese manufacturing. Process standardization improved the cheese texture as it ensures uniform composition of cheese. Cheese firmness and tensile strength were found to be almost constant in case of standardized process cheese. Uniformity in cheese composition and greater control over processing variables as resulted from process standardization increased the cheese yield. Minimum cheese yield was found to be 11.3 and 13.4% in non-standardized and standardized process respectively keeping the milk source constant.

Process standardization minimized the variation in cheese composition which ultimately produced the Mozzarella cheese with reproducible results as far as its baking performance was concerned. Effectiveness of process standardization was assessed by large scale production of Mozzarella cheese. Non-significant variation with respect to cheese composition, functionality and yield among industrial and lab scale manufactured Mozzarella cheese indicated the success of the project. Manpower training is important part to achieve self sufficiency and for skill development. Keeping in view these goals, training was also provided to local stakeholders, students and dairy technicians.

Table: Standardized conditions for Mozzarella cheese manufacturing

Process variable	Optimized condition
Casein to Fat ratio	0.8
Milk Pasteurization Temperature	63°C/30 minutes
Acidification method	Direct acidification method
Processing method	Chaddering method
Cheese milling pH	5.10
Stretching temperature	92°C

