

EXTENSION OF THE SHELF LIFE OF SACHETTED PASTEURIZED MILK

By

K.E. Udayathilaka

B.Sc (specialized in Nutrition and Community resources Management)
Rajarata University of Sri Lanka

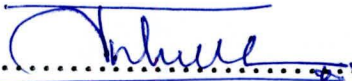
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The work describe in this thesis was carried out by me under the supervision of Prof. Arthur Bamunuarchci and Mr. R.A.J.N.L. Rupasinghe and a report on this has not been submitted in whole or in part to any university or any other institution for another Degree/Diploma


.....
K.E Udayathilaka

I / We certify that the above statement made by the candidate is the true and that this thesis is suitable for submission to the university for the purpose of evaluation

.....
External Supervisor
Prof. Arthur Bamunuarchi
B. Sc (Cey), M. Sc. Fd. Tech (U.C.D)
Ph .D (N.S.W)
M.I.F.T (U.S.A), A.I.F.S.T. (AUST)
M.A.A.C.C (U.S.A)
M.I CHEM (CEY)
Consultant food scientist & technologist
Coordinator food science & technology programmes,
University of Sri Jayawardanapura.


.....
Internal Supervisor
Mr.R.A.J.N.L Rupasinghe
Manager Quality Assurance, Research & Development
Milco (PVT) Ltd.
No 45
Nawala Rd.
Colombo-05

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ABBREVIATIONS

| | |
|--------------|--|
| TCC | Total Colony Count |
| CCC | Coliform colony count |
| MBDRT | Methylene Blue Dye Reduction Test |
| MQIP | Milk Quality Improvement Program |
| SPC | Standard Plate Count |
| CFU | Colony Forming Units |
| PPC | Post Pasteurization Contamination |
| LPC | Laboratory Pasteurization count |

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ABSTRACT

Milk is an excellent source of energy for humans, and yet in a different context. The same nutrients in it provides the most suitable medium for microbial growth and its metabolism. Hence milk has to be treated with heat to eradicate pathogenic which are associated with milk. The process called pasteurization by which the milk is prepared for human consumption inherits defects due to bad handling by man which demand address. The present day shelf life of pasteurized milk sachets at Milco (Pvt) Ltd., Narahenpita, which is limited to 3 days only. The distribution and marketing of pasteurized milk has become a serious problem.

This study is mainly focused to find out the measures, which could be taken within the processing methodology to increase its shelf life.

The project objectives endeavors to find out the inter relationship between the initial bacterial count and the shelf life of pasteurized milk, the optimum pasteurization conditions, the establishment of post pasteurization contaminations if any and effects of storage temperature on shelf life.

Testing was done on a randomly selected 10 samples, to establish the optimum pasteurization temperature, and time combination in a pilot experiment (maintained temperature at 76°C for 40 seconds) and the results were compared with milk produced with the existing conditions. The evidence of post pasteurization was checked by the detection of Coliform which is an indication of the possibility of post pasteurization contamination. The effect of storage temperature on shelf life was tested, by storing milk sachets at two different temperatures ($<10^{\circ}\text{C}$ and $10 - 15^{\circ}\text{C}$) All these treatment effects were analysed through microbiological testings.

In conclusion the present processing conditions proved to be insufficient to hold satisfactory shelf life. It was established that by increasing the time temperature combination of pasteurization to 76°C for 40 seconds.

It is not satisfactory with present plant hygienic conditions and chemical sanitization must be applied in addition to thermal sanitization to improve the cleaning programme. Storage temperature after pasteurization is highly effective on the shelf life of pasteurized milk satches and maintain less than 10°C is cause for a longer shelf life.

1. INTRODUCTION

1.1. Milk

Milk is the fresh lacteal secretion (practically free from colostrums) obtained by the complete milking of one or more healthy cows or buffaloes without the addition of any substances or abstraction of fat or any other constituents. (Specification for raw and processed milk, SLS 181:1983.)

Milk composition

The structures and properties of these components profoundly influence the characteristics of milk and have important consequences for milk processing.

Table 1.1 Quantitative composition of whole milk

| Main constituent | Mean value (%) |
|------------------|----------------|
| Water | 87.5 |
| Total solids | 13.0 |
| Fat | 3.9 |
| Proteins | 3.4 |
| Lactose | 4.8 |
| Minerals | 0.8 |

1.2. Importance of milk

Milk is an excellent source of nutrients for humans, and yet in a different context. These same nutrients for humans provide a most suitable medium for microbial growth and metabolism. Milk, in its natural state, is a highly perishable material, subject to microbial and chemical degradation.

1.4. Scope of the project

MILCO (Pvt) Ltd. is one of the leading dairy processing companies in Sri Lanka. The activities of the company touch on many types of dairy products beginning with yogurt, drinking yoghurt, curd as culture products and ice cream, butter, sterilized milk, pasteurized milk under the brand of "Highland".

This study is mainly focused on shelf life improvement of pasteurized milk sachets. Initially, the existing conditions were analyzed. Based on those conditions, project was focused to find out the measures to improve the shelf life, especially within the processing plant. Samples were taken from different processing points starting from silo to milk packet.

1.5. Pasteurization

The public health objective of milk pasteurization is to eliminate all non spore-forming pathogens commonly associated with milk. Pasteurization also effectively destroys a majority of potential spoilage organisms and contributes to product keeping quality under required refrigeration storage.

1.6. Shelf life improvement

Food product shelf life is the length of time that a food can be kept under practical storage conditions and still retains acceptable quality characteristics. These characteristics include sensory appeal (odor, flavor, texture, physical appearance) and product safety.

Low shelf life of pasteurized milk is caused for two main problems.

- (1) Distribution of pasteurized milk is limited only for the areas near by the processing plant.
- (2) Marketing becomes a problem, as shop owners do not like to buy a product, which is highly perishable.

If we can improve the shelf life of pasteurized milk, it will lead to expand the area of distribution. The processing company can reach the new markets. Marketing will also not a problem as retailers can keep and sell the product for a reasonable time. They do not hesitate to buy the product. Retailers can introduce the product to the new customers, and the demand for product will increase.

The main aim of this project is to evaluate the existing condition in the processing plant and to improve the shelf life of pasteurized milk sachets.

1.7. Goal and Objectives

Goal

- (1) Shelf life improvement of pasteurized milk sachet

Objectives

- (1) To identify the physical, chemical, microbiological parameters in present milk pasteurization process.
- (2) To identify the strength and weakness in the present system
- (3) Modify and improve the critical Point and expand the shelf life at least 7days