Development of HACCP Plan for Ice Cream Manufacturing Process at MILCO (Pvt) Ltd.

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Introduction

The Hazard Analysis Critical Control Point (HACCP) approach for food safety moves away from testing of final product, and instead emphasizes on raw materials and process control. Control is taken out of the laboratory and in to the processing environment. HACCP provide a structured and systemic approach to the control of identified hazards, which may be biological (microbiological), chemical, physical or combination of the three. A Critical Control Point (CCP) is a raw material, stage, practice or operation within the process where a hazard has been recognized and steps are in place to eliminate, prevent or reduce the possibility of hazard occurring. The application of the HACCP system cover seven principles including identification of potential hazards associated with food production at all stages for processing, manufacture, and distribution until the point of consumption and preventive measures for their control (SLS 1173: 1998).

The effectiveness of HACCP depends on the correct application of its principles, combined with other programs (prerequisite programs) such as Good Manufacturing Practices (GMPs), Good Hygiene Practices (GHPs), Standard Operation Practices (SOPs) and Sanitation Standard Operating Procedures (SSOPs).

Ice cream, a milk-based product, is a good media for microbial growth due to high nutrient value, almost neutral pH value (pH 6 to 7) and long storage duration (Kanbakan et al., 2004). The quality of ice cream or any food product, can be defined against a wide range of criteria, including for example, the chemical, physical, microbiological and nutritional characteristics. Food or dairy manufacturers aim is to ensure the safety and quality of their products which will satisfy the expectations of the consumers.

Considering all above factors, it is critically important to develop a HACCP plan for the ice cream manufacturing process line in MILCO (pvt) Ltd, Narahenpita which practices adequate prerequisite programs to ensure a safe product.

Methodology

In preliminary studies, all the existing pre requisite programs were assessed and improvements needed were identified. The existing pre-requisite programs were assessed by; preparing an inspection checklist for prerequisite programmes, depth observations of the factory premises and working practices, studying the past and present records, discussing with management staff and observing the available facilities and production equipment. Then ice cream manufacturing process was thoroughly observed and understood by observing the steps of ice cream manufacturing in the factory and then the flow diagram was prepared. Each and every step of the process was

analysed for potential microbiological, chemical and physical hazards. Identification of critical control points (CCP) was done using a decision tree and critical limits were established for each critical control point. Then corrective actions were established for deviations that observed during monitoring. Finally verification was carried out to develop the HACCP system.

Results and discussion

Four critical control points were identified for the of ice cream manufacturing process at MILCO (Pvt) Ltd. Those were chilled milk storage in silos, pasteurization, aging and filling. The details of the identified CCPs are given in Table 1.

Table 1: Identified Critical Control Points (CCP), Potential hazard, established critical limits and corrective actions were established for deviation that observed during monitoring

CCPs	Hazard Type	Potential Hazard	Critical Limits	Corrective actions
Chilled milk storage	Biological	Heat resistant enzymes (lipase & protease) and toxins produced by bacteria	Storage temperature below 5 °C, Maximum storage period of 72 hours	Hold the affected silos and, Inform the quality control executive and to decide on disposition
Pasteurization	Biological	Vegetative pathogens	Temperature not less than 90 °C and holding time less than 15 seconds	Inform quality control executive and re-pasteurize whole batch
Ageing	Biological	vegetative pathogens and spores outgrowth	Temperature Maintain blow 5 °C and minimum holding time not less than 6 hours	Maintain the temperature to 5 °C by adjusting the circulation of cold water
Filling	Biological	Microbial Cross contamination	Microbial count in the filling environment should be zero	Microbial count (yeast & mould) not be exceed 180, Inform the quality control executive

Conclusions

Implementation of HACCP system is a best option for further reducing the risk that is associated with ice cream manufacturing process. Existing pre requisite programs

(GMP, SOP, and SSOP) which are already implemented in the factory is not sufficient and improvement should be done accordingly. According to the study, four critical control points were identified. Those are chilled milk storage in silos, pasteurization, aging and filling. Critical limits, monitoring procedures, corrective actions and verification procedures were developed for each identified critical control point, and then the HACCP plan was completed.

References

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