APPLICATION OF THE HACCP SYSTEM ON THE LINEAGE OF PRODUCTION OF SHVARCVALD CHERRY ICE CREAM

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Abstract

The implementation of the HACCP system in the Republic of Macedonia is a legislative regulation for all food operators which allow marketing high quality and clinically safe products.

The purpose of this paper is to present the implementation and application of HACCP system on the production line for family packing ice cream Schwarzwald cherry in the factory- Milina in Prilep. The implementation and application of the HACCP system is showed in the documentation for the system, starting from the decision to form the HACCP team, product description, diagram flow, danger analysis and to determine the critical control points. By using the decision tree with logical analysis in two phases of the production process of the Schwarzwald cherry ice cream (pasteurization and storage and conservation in the compartments for the finished product) the critical control points (CCP) have been determined. For each of the CCPs a HACCP plan is made which sums the analysis results and the preview of the dangers, critical limits, monitoring, correctional measures, verification of HACCP records [2].

By using the HACCP system and efficient enforcement of the control and record measures, the safety and quality of the Schwarzwald cherry ice cream have been improved.

Key words: Quality, Safety, Implementation, HACCP system, Critical control points, Ice cream.

1. Introduction

Pursuant to the Law on Food Safety (Official Gazette 157/2010) which is according to the provisions of the European Union, every food operator must implement and incorporate HACCP system based on the identification and analysis of the hazards of the critical control points. Jovanova [3]

The production facilities orient towards implementing the safety production of food products when they accept the HACCP concept. The HACCP system is not independent program, but a control system for the conditions in the production lines which contributes to the safety procedures of the whole production process. The programs which should be implemented and documented are listed here: GPP - good production practice, GHP - good hygienic practice, standard operational procedures - SOP, standard sanitary operational procedures - SSOP [1].

The contaminants which are carried over through the food can cause undesirable effects on the consumers so there is a possibility for emergence of illnesses which can be unpleasant and fatal in the worst case. The bad food causes huge economic losses for the companies and loss of confidence by the consumers [6].

A retrospective of the HACCP implementation in the production line of the milk ice cream Schwarwald cherry in the factory Milina is given in our research. In the diagram for the production process, the description of the product and hazards analysis, it is possible to distinguish the critical control points (CCP) with a tree of decisions and an HACCP plan is made for the critical control points.

2. Materials and Methods

The production of the milk ice cream Schwarwald cherry in the factory Milina is based upon the present day technology and setting latest trends so that the products can be recognized on the market. When it’s about ice cream, apart from the milk other additional chemistry can be combined for the production of different kinds of flavors which are alluring for the consumers.
Because the ice cream is listed in the high risk food products it is necessary to secure safety watch throughout all parts of the production. The research has the aim to determine the critical control points and to draw an HACCP plan so that the product safety hazards, which can come up in certain parts of the production process, can be eliminated or to be reduced to an acceptable level. The following documentation was used in the research [4]:

- Description of the technological process
- Product description (family pack ice cream - Schwarzwald cherry)
- Production flow diagram
- Production line hazards analysis
- Records made pursuant to the Law on Food Safety (Off. Gazzete 157/2010)

3. Results and Discussion

In the production flow diagram all the phases of the ice cream production have been presented starting from the raw material distribution to the distribution of the finished product (Figure 1). Our research was about the production line of family pack Schwarzwald cherry ice cream [5].

From the detailed view of the production phases and the tree of decisions, the critical control points can be determined.

![Figure 1. Production flow diagram](image-url)
According hazards analysis and decision tree made on the basis of the flow diagram in the Schwarzwald cherry milk ice cream production line, two critical control points have been determined (Table 1).

**CCP 1 - Pasteurization:** Based upon the hazard analysis of the production of Schwarwald cherry ice cream the pasteurization of the ice cream blend is determined as CCP 1 because it is a process which influences the destruction of the pathogenic microorganisms and the safety of the product as well.

Because of that it is necessary to control the temperature and the duration of the pasteurization to prevent the product to go to the next phase of the production process, and to contain living pathogenic microorganisms which could change the quality properties of the product, making it dangerous for the health of the consumers.

**CCP 2 - Storage and conservation of the finished product in the freezing compartments:** Because of the hazard for emergence of pathogenic microorganisms resulting from the inappropriate temperature for the conservation of the finished product, based upon the analysis if the hazards, this step from the production process is determined as CCP 2.

For the critical control points the HACCP plan is made (Tables 2 and 3), which represents a document made in compliance with the HACCP principles with the aim for securing control of the hazards important for the safety of the ice cream. The HACCP plan sums up the results of the hazards analysis, critical limits, correctional measures and records from the production steps of the Schwarzwald cherry upon which the CCP has been determined [7].

### Table 1. Critical control points Critical in the production line of milk ice cream Schwarwald cherry

<table>
<thead>
<tr>
<th>Production step</th>
<th>Type of hazard</th>
<th>P 1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
<th>CCP</th>
<th>Reason for the decision</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase 4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pasteurization</td>
<td>Physical</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chemical</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Biological</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>CCP 1</td>
<td>The procedure is specially designed with the aim to eliminate or reduce to acceptable level the probability of hazard occurrence</td>
</tr>
<tr>
<td><strong>Phase 12</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage and</td>
<td>Physical</td>
<td>No</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>conservation</td>
<td>Chemical</td>
<td>No</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>CCP 2</td>
<td>The next procedure does not eliminate the unidentified hazard and does not reduce the probability of its occurrence to an acceptable level</td>
</tr>
<tr>
<td>in the freezing</td>
<td>Biological</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>compartments for finished products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 2. Critical control point 1 - Pasteurization

<table>
<thead>
<tr>
<th>Step</th>
<th>Hazard</th>
<th>Control measure</th>
<th>CCP</th>
<th>Critical limits</th>
<th>Monitoring</th>
<th>Corrective action (What/Who)?</th>
<th>Verification</th>
<th>Records</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Biological living pathogenic organisms</td>
<td>GHP, GPP Control of T</td>
<td>CCP 1</td>
<td>T 72-80 °C</td>
<td>T with a drill at every basic flow</td>
<td>The basis circulates through bypass and repasteurizes after it reaches the necessary T (Technologist)</td>
<td>Records Microbiological analysis Calibration of thermometers</td>
<td>Control of T for pasteurization</td>
</tr>
</tbody>
</table>

#
Table 3. Critical control point 2 - Storage and conservation in the freezing compartments for the finished product

<table>
<thead>
<tr>
<th>Step</th>
<th>Hazard</th>
<th>Control measure</th>
<th>CCP</th>
<th>Critical limits</th>
<th>Monitoring</th>
<th>Corrective action (What/Who)?</th>
<th>Verification</th>
<th>Records</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>FIFO</td>
<td>CCF 2</td>
<td>T -18 to 25 °C</td>
<td></td>
<td>Marking and return of incompatible product in technological process (Warehouse man)</td>
<td></td>
<td>Control of T in premisses for finished product</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control of T and GHP</td>
<td>T</td>
<td>By built-in indicator of T</td>
<td>Everyday, on every 8 h</td>
<td>Records, Microbiological analysis, Calibration of thermometers</td>
<td></td>
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</tbody>
</table>

4. Conclusions

- The factory Milina Ice from Prilep successfully implements and incorporates the HACCP system so it’s distinguishable on the market by the production of not only safe, but also quality ice cream. The safety and quality of the products have been confirmed by the regular microbiological analyses which are carried out in the Public Health Institution in Prilep.

- Legal provisions, DPP and DHP are followed for the production of the ice cream. With the implementation of the principles of the HACCP system, in Milina it is possible to watch on and control the hazards which can come out in the two production steps, the pasteurization and storage and conservation of the finished products. HACCP plan has been made for each CCP so the risk of any product contamination is reduced to a minimum.

5. References


