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ANALYSIS OF THE FRESHNESS AND HYGIENE STATUS OF THE CREAM USED IN THE PRODUCTION OF TABLE BUTTER

Madalina Alexandra DAVIDESCU[1], Ioana BOLOHAN[1], Claudia PANZARU[1], Bianca Maria MADESCU[1], Ioana POROSNICU[1], Marius Gheorghe DOLIS[1], Alexandru USTUROI[1]

1"Ion Ionescu de la Brad" Iasi University of Life Sciences (IULS), 700490, Mihail Sadoveanu Alley, no.8, Romania

Abstract

In the dairy industry, the quality of raw materials is essential for producing safe, high-quality finished products. The aim of this study was to evaluate the freshness and hygiene of the cream used in the production of table butter. Free acidity was measured using the Thörner titrimetric method, both before and after the application of heat treatments. In the first stage, the condition of the untreated cream was analyzed, and the results showed variations in acidity and hygiene characteristics depending on storage conditions. Subsequently, the high-temperature pasteurization process of the cream was validated, assessing the effectiveness of the thermal treatment by measuring free acidity and performing the peroxidase test to verify sterilization. The results confirmed a reduction in microbial load and an improvement in the chemical stability of the cream, demonstrating the effectiveness of pasteurization in maintaining quality.

Introduction

The quality of dairy products is critically influenced by the freshness and hygiene status of their raw materials, particularly cream in the case of table butter. Cream, being a highly perishable dairy product, is susceptible to microbial contamination and rapid spoilage if not properly handled and stored. These factors can significantly affect not only the sensory properties of the butter—such as flavor, texture, and appearance—but also its safety and shelf life. As consumer demand for high-quality, safe food continues to rise, it becomes increasingly important to monitor and assess the microbial load, storage conditions, and chemical indicators of freshness in cream before it undergoes butter production. This study aims to analyze the microbiological and physicochemical parameters of cream used in table butter manufacturing, providing insight into the critical control points that ensure product safety and quality. By understanding these variables, producers can implement more effective quality assurance protocols, ultimately contributing to public health and consumer satisfaction.

Material and method

The determination of free acidity was carried out using the Thörner titration method, applied both prior to and following thermal treatment. Initially, the untreated cream was evaluated, revealing differences in acidity levels and hygiene indicators influenced by storage conditions. In the next phase, the pasteurization process at high temperature was examined, with its effectiveness assessed through measurements of free acidity and a peroxidase test, used to confirm successful sterilization.

Results and discussions

The results confirmed a reduction in microbial load and an improvement in the chemical stability of the cream, demonstrating the effectiveness of pasteurization in maintaining quality.

The research conducted generated relevant results, compared with specific standards, confirming the importance of rigorous control over the freshness and hygiene of the cream, as well as the effectiveness of the high-temperature pasteurization process in optimizing the quality of table butter (Table 1).

Table 1. Results of Cream Analysis Before and After Heat Treatment

Sample	Storage Conditions	Free Acidity (°Th) - Before	Free Acidity (°Th) - After	Peroxidase Test	Observations
S1	4°C, 24h	16	14	Negative	Good pasteurization efficiency
S2	4°C, 72h	18	16	Negative	Increased acidity, but controlled
S3	10°C, 24h	20	17	Negative	Slight spoilage, but treatment effective
S4	10°C, 72h	24	21	Positive	Incomplete inactivation, microbiological risk

The table highlights the influence of storage conditions on free acidity and the effectiveness of thermal treatment applied to cream, assessed through the peroxidase test.

Samples stored at 4°C (S1 and S2) showed lower initial acidity values (16–18 °Th). After heat treatment, acidity slightly decreased, and the peroxidase test was negative, indicating effective pasteurization and good cream quality, even after 72 hours of storage. Samples stored at 10°C (S3 and S4) exhibited higher acidity values (20–24 °Th), which signals deterioration due to higher storage temperatures. For sample S4 (10°C, 72h), the peroxidase test was positive, indicating that thermal treatment was insufficient to fully inactivate enzymes, posing a microbiological risk.

Overall, the results show that the temperature and duration of cream storage significantly affect the quality and safety of the final product. Storage at lower temperatures (4°C) helps maintain microbiological and chemical stability of the cream, enhancing the effectiveness of subsequent heat treatment.

Conclusions

The results of this study emphasize the critical importance of proper storage conditions for cream intended for table butter production. Cream stored at lower temperatures (4°C) maintained better physicochemical and microbiological quality, allowing for more effective pasteurization and ensuring product safety. In contrast, cream stored at higher temperatures (10°C), especially for extended periods, showed increased acidity and incomplete enzymatic inactivation, posing a potential microbiological hazard. Therefore, strict control of storage temperature and duration is essential to preserve cream freshness and hygiene, and to guarantee the safety and quality of the final butter product.