11. A life cycle assessment of sweet cream butter with a fat content of 82.5%

Diana Cherniavska, Nadiia Sherstiuk
National University of Food Technologies, Kyiv, Ukraine

Introduction. The product life cycle includes all processes from identifying consumer needs to product disposal. The quality of extra sweet cream butter (82.5% fat content) is formed at all stages and determines product safety and competitiveness [1].

Materials and methods. The study is based on the analysis of the product life cycle stages and quality assurance procedures for butter production. The "quality loop" concept was used, including marketing, design, supply, production, control, packaging, distribution, operation, and disposal. The assessment was carried out using regulatory requirements, technological documentation, and process analysis [2].

Results. The analysis showed that the most significant impact on butter quality occurs at the stages of raw material supply, production, and quality control. High-quality extra sweet cream butter must comply with established standards and regulatory requirements.

Specifically, the product should meet the following normative indicators (in accordance with national and international quality standards for butter):

Fat content: 82.5%, Moisture content: ≤ 80 %, Non-fat solids: 2%

Storage temperature: -12°C to -18 °C%; Shelf life from the moment of receipt at the specified temperature, not exceeding: for butter in a block - 10 days; for clarified butter in transport packaging - 15 days [3].

These values form part of the regulatory requirements, such as those defined by the relevant national standards (e.g., DSTU/Technical Specifications) and commonly accepted quality specifications in the dairy industry. At the production stage, stable product quality is ensured through controlled processing conditions, including defined temperature regimes (e.g., pasteurization at approx. 72–75 °C for 15–20 seconds) and proper handling throughout cream churning and butter formation. Compliance with technological instructions and normative limits prevents defects and ensures product safety.

Quality control includes laboratory testing of raw milk and cream for compliance with regulatory parameters (fat, moisture, acidity), in-process monitoring, and final product testing to guarantee conformity to the recognized quality standards.

Packaging and storage conditions are also regulated to prevent quality deterioration. Butter must be protected from light, oxygen, and temperature fluctuations, which can contribute to oxidative rancidity and sensory defects. The conducted analysis confirms that effective quality assurance requires systematic control at all life cycle stages, with particular emphasis on compliance with normative requirements.

Conclusions. The quality of extra sweet cream butter (82.5% fat content) depends on a comprehensive approach to managing all stages of the product life cycle. The most critical stages are raw material supply, production, and quality control, which directly affect product safety and consumer properties.

References

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