

Streszczenie i słowa kluczowe w języku angielskim

Pasta filata cheeses are among the most popular dairy products worldwide, partly due to their desirable sensory properties and versatile culinary use. The most famous pasta filata cheese is Mozzarella. These cheeses are eaten both cold (e.g. in a salad) and warm (e.g. as a pizza topping). However, one of the negative features observed in case of many pasta filata cheeses is the leachate of the water-fat serum, which appears after unpacking and portioning of the cheese. This is noticeable and negatively perceived by both producers and consumers. The technology of producing pasta filata cheese is based on the processing of milk from various species of mammals. Traditionally, cow's milk, sheep's milk, buffalo's milk or their mixtures are used to produce these cheeses. Sheep's milk is an excellent raw material for cheese production, and at the same time it has high health-promoting potential. The consumer demand for sheep's milk and dairy products made from it is therefore increasing. However, the supply of sheep's milk depends on the low productivity of sheep's, the seasonality of milk production and the short lactation period. The limited amount of obtained sheep's milk requires the collection of this raw material and the use of alternative storage techniques to ensure the continuity of production in the dairy plant. Therefore, **the aim of the research was to analyze the effect of sheep's milk, including that added after freezing and as powdered milk (in native and reconstituted form), on the stability of the protein-fat matrix and the molecular properties of water determining the leachate from fresh pasta filata cheese packed in brine and subjected to portioning and heating.** Based on the obtained results, it was shown that the production of pasta filata cheese from frozen and then thawed sheep's milk is possible. However, such cheese is characterized by, among others: less extensibility and elasticity, and greater hardness and flowability. Freezing the milk also increased water activity and increased the mobility of bulk water. The production of pasta filata cheese from a mixture of cow's milk and frozen/thawed sheep's milk in a ratio of 70:30 contributed to significant changes in the characteristics of the cheese, which was negatively assessed by consumers during the sensory evaluation. It was shown that freezing sheep's milk and its subsequent use in the production of pasta filata cheese is not a good alternative to fresh raw material. At the same time, the research showed that pasta filata cheeses made from a mixture of cow's milk and fresh sheep's milk in a ratio of 70:30 were more sensorially acceptable to consumers and had less leachate, but the leachate was still greater than in the case of cheeses packed in brine, especially after they were portioned. The amount of water-fat serum leachate and its dependence on the packaging method

and fragmentation degree can be described by a mathematical model, which allowed to confirm that packaging using a brine reduces the effect of portioning on the amount of leachate. This was also confirmed by microscopic observation of retained water-fat serum in the structure of the produced pasta filata cheese. Further experimental research showed that instead of frozen milk, powdered sheep's milk can be used to produce pasta filata cheese, which allows the production of elastic, glossy and generally sensory-acceptable pasta filata cheese, but the sheep's milk powder must be reconstituted and the share in the mixture with cow's milk cannot exceed 30%. Pasta filata cheese produced in this way, after storage in the brine, has a lower ability to leak the water-fat fraction compared to cheeses produced without the reconstitution stage. However, the limitation of changes in the cheese mass during storage in the brine is also influenced by the addition of lactose in the amount of 20 g/kg and citric acid in the amount of 0.42 g/kg to the brine. At the same time, it was shown that the proposed composition of the brine for storing pasta filata cheese made of a mixture of cow's milk and reconstituted sheep's milk powder improves the texture and meltability of the cheese, and also increases the chrome of its color after baking on pizza. Pasta filata cheese produced and stored in this way meets the expectations of potential consumers characterized by the model of consumer behavior on the market and determinants of dairy product consumption. This cheese was also highly rated by the panelists based on sensory evaluation descriptors conducted at various stages of the technological process and storage. Research carried out on fresh pasta filata cheeses made from a mixture of cow's milk and sheep's milk powder allowed to develop a recipe for the production of a storage brine and sensory-acceptable cheese. Moreover, it has been shown that the production of fresh pasta filata cheese from a mixture of cow's milk and sheep's milk powder (regardless of its form) increases production efficiency, which can be confirmed primarily by the presented mathematical equation taking into account the amount of cheese produced in relation to the amount of raw material used.

Słowa kluczowe: pasta filata cheeses, sheep's milk, storage brine, leachate,

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