EFFECT OF FOOD FIBERS ON THE QUALITY CHARACTERISTICS OF WHEY-CREAM CHEESES

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Abstract

Improvement of whey-cream cheeses' technology using food fibers is relevant. The stage of structure formation and change in biological value of the finished product on addition the above-mentioned herbal ingredients with various properties requires research. The aim of the work was to determine the effect of food fibers on the quality characteristics of whey-cream cheeses and correct the technological production processes.

For the research, whey-cream cheeses without and with the addition of wheat food fibers and sesame fibers to the cream in the structure formation process has been used. Fat holding capacity of the above-mentioned food fibers has been determined in milk cream with a mass fat fraction of 15, 20, and 33% at a temperature of 20 ^{0}C. Lactose crystal size, to characterize the consistency of whey-cream cheeses, has been determined by microscopic examination of preparations using a MICROmed light microscope at increasing of 600 times with their fixation by a Canon digital camera. According to the water activity indicator, the effect of food fiber on the water binding degree has been determined depending on the time of thermal treatment, which can characterize the structure formation process during concentration to an increased content of dry substances. The amino acid composition in whey-cream cheeses with food fibers has been determined by the method of high-liquid chromatography. To assess the balance of the amino acid composition in whey-cream cheeses with food fibers, the amino-acid score has been determined according to the content of essential amino acids. The above-mentioned indicator shows the content of each amino acid in the research protein relative to its content in the ideal protein. Then it has been compared with the ideal protein amino acid scale recommended by FAO/WHO. The biological value of whey-cream cheese without and with food fibers has been determined by indicators set: amino acid score, RCAAS, utilitarian coefficient. The studies were repeated three times and processed the data statistically using Microsoft Excel 2007 to provide accuracy of the obtained results.

The technological characteristics of wheat food fibers Vitacel and sesame fibers, namely the ability to fat holding in milk cream with various fat content, have been established. The highest value of this indicator has been recorded for Vitacel wheat food fibers at a high level - 101.4 ± 1.2%. With different values of the mass fat fraction in cream, the variance of above-mentioned indicator is within the range of 16 ± 2%, which makes it possible to use a medium with a high-fat content of 15% and 33%. Given the need to achieve maximum plasticity, which is typical for whey-cream cheeses, and to reduce the technological process of structure formation, it is advisable to use a cream with a high dry matter content. Lactose crystal size in whey-cream cheeses with food fibers has been determined by microscopy and it has been found 90.3% of them from the total amount do not exceed 100 microns. The structure formation process of whey-cream cheeses with food fibers was carried out to a constant mass fraction of dry substances 73 ± 2%, which corresponds to a similar value for the control sample. Whey-cream cheeses with the addition of wheat food fibers and sesame fibers in the amount of 5 ± 0.1% are characterized by a water activity value of 0.832 ± 0.002. The same value has a control sample obtained under similar thermomechanical processing conditions and the process duration is 20 ± 2 min. longer.

The reduction in the process duration is associated with the technological properties of food fibers, which, according to the technology, are added to the cream, then added to the condensed whey. It has been found that the proteins in the experimental sample contain all essential amino acids.

The biological value of whey-cream cheeses with food fibers is 1.9 times higher compared to the product without plant ingredients. Expediently to use the research results in the technologies of milk-protein products, and the proposed method for the production of whey-cream cheese with food fibers can be realized in production conditions.

The research results have shown the addition of wheat food fibers and sesame fibers to whey-cream cheeses has a positive effect on the quality characteristics of the finished product, namely the lactose crystal distribution, biological value and corrects the reduction in the technological process of structure formation.

Key words: *Milk whey, Food fibers, Whey-cream cheese, Biological value.*