The use of bioantioxidants for raising of butter storing abbility

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Summary

Influence of bioantioxidants (black, red pepper) on butter keeping quality was studied. It was revealed that biological additions applying to milk fat inhibits peroxide accumulation and also oxidation kinetics of conjugated fat acids.

Butter is a valuable food. Its percentage in common dairy products manufacture in Ukraine is approximately 17 %. Special significance of butter is determined by pleasant organoleptic characteristics, high assimilation level, wide spectra of fatty acids and number of physiologically valuable concomitant substances – vitamins, phospholipids, microelements. But most of these substances are unstable high-molecular polyunsaturated organic compounds, which can oxidize in the process of fat storage and cause rapid lowering of biological value. Organoleptic changes such as unpleasant taste and odour occurred in the process of fat storage. Sometimes creation of toxic products is possible.

Substances with antioxidant activity are used for inhibition of oxidization. Number of synthetic substances-antioxidants added to foods is proposed. But their use is not always approved by hygienic of nutrition. Use of bioantioxidants particularly spices are the most perspective update.

The aim of our investigation was to study the antioxidant effect of such spices as black and red peppers and cloves in milk fat.

Investigation of milk fat with biological additives was made by rapid-kinetic methods under temperature 102 °C with free access of oxygen. 0,1 % of dispergated additives are added to fat. Quality of fat was estimated every 8 hours during 3 days of storage in the conditions of rapid-kinetic oxidation. Organoleptic characteristics and dynamic of peroxides accumulation were revealed in milk fat.

Melted fresh butter had intensive-yellow colour, pleasant well expressed typical taste and odour and high peroxide index (0,16 ml 0,01 N $Na_2S_2O_3$).

According to results of investigations, butter without additives was exposed to defects rapidly. It acquired the sour and foreign odour after first day of storage and later – poorly expressed odour of rancid fat and light colour caused by partly oxidation of carotene. Poorly expressed foreign odour appeared in samples of milk fat with black and red pepper after 48 hours of storage, and with cloves after 56 hours.

Worsening of organoleptic characteristics was caused by oxidized changes of milk fat.

Dynamic of peroxide compounds accumulation is a demonstration of this one. Peroxide index of milk fat without additives became 53,8 times more after 3 days of storage. Peroxides accumulation occurred irregularly during this period. So, peroxide index of milk fat became 5.3 times more after 24 hours of storage, 7,8 times more after 48 hours, and 1,3 times more after 72 hours. It took place because of significant part of peroxides and hydroperoxides which were transformed with increase of their concentration.

Introduced additives have raised the stability of milk fat against autooxidizing significantly. Rapid of peroxide accumulation became 2,7 time less with black pepper addition and 2,8 times less with red pepper addition than in case of fat without additives. Cloves had the highest stabilisation effect. Its addition delayed milk fat oxidising in 3,1 times.

The content of fat acids with two, three and four conjugated double links was changed as a result of oxidizing transformations. These acids are the most labile components of milk fat.

Change of their quantity and ratio is one of the first attributes of oxidation which can be detected.

The content of conjugated fat acids changed spasmodically (unevenly) aside reduction, and such tendency was most expressed for conjugated fat acids with four double connections. In milk fat without additives the content of these compounds was decreased from 2,4 mg% in the beginning of storage to 0,05 mg% after 72 hours of storage, that is 48 times less. Fat acids with four conjugated double links in milk fat with cloves were exposed to the least transformations. Their concentration became 4 times less.

Not only oxidation of conjugated compounds takes place During storage of milk fat, but also formation of such ones which is the result of oxidation of fat acids with isolated double links. That is why changes of conjugated fat acids content had the spasmodic character.

Thus addition of biological additives in milk fat delays the accumulation of peroxide compounds and also the oxidation of conjugated fat acids in it. In our investigations such spice as cloves had the highest antioxidizing activity.