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APPLICATION OF NATURAL ANTIOXIDANTS TO ENHANCE CONSUMER PROPERTIES AND MAINTAIN THE QUALITY STABILITY OF FAT-FILLED WAFERS

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To preserve wafer quality and extend shelf life, antioxidants are incorporated into fat filling formulations in order to inhibit oxidative processes in fats [1]. In modern food production, both synthetic and natural antioxidants are widely used; however, recent trends indicate a gradual replacement of synthetic compounds with natural substances of plant origin. Natural antioxidants include flavonoids, phenolic compounds, tocopherols, carotenoids, phospholipids, selenium, and antioxidant enzymes [2].

Natural antioxidants derived from plant materials contain polyphenolic compounds and carotenoids capable of interacting with peroxide radicals and decomposing hydroperoxides without generating free radicals. As a result, lipid oxidation processes are slowed down and product stability is improved. In addition, natural antioxidants contribute to the enhancement of the biological and physiological value of food products.

Sources of natural antioxidants include berries, fruits, vegetables, medicinal plants, and bee products. Among the most promising raw materials are cranberries, black currants, grape seeds, rosehips, sea buckthorn, lemon balm, rosemary, green tea, and propolis [2]. Considerable attention is also given to the use of plant-processing by-products such as bran, fruit powders, and herbal extracts characterized by a high content of phenolic compounds.

Studies have shown that basil and bay leaf extracts possess pronounced antioxidant activity and can be effectively used in fat-containing products. It has also been established that cranberry and black currant powders added at 0.5% of fat mass inhibit lipid oxidation processes by approximately 1.5 times [3]. This makes it possible to improve the quality of wafer fillings and increase their storage stability.

Special attention is paid to the use of propolis and flower pollen, which contain a significant amount of biologically active substances. Research has demonstrated that the addition of bee products slows down fat oxidation in confectionery products by approximately three times [1]. In addition to antioxidant effects, these ingredients improve the nutritional value of wafers and provide pleasant sensory characteristics.

Vegetable oils obtained from wheat germ, pumpkin seeds, amaranth, grape seeds, and rosehip fruits are also considered effective natural antioxidants. Such oils contain high amounts of tocopherols and polyphenolic compounds that inhibit oxidative processes in fat fillings [4]. The use of these ingredients contributes not only to quality stabilization but also to the enhancement of the functional properties of confectionery products.

One of the promising directions in wafer technology is the combined application of natural antioxidants with dietary fibers and non-traditional raw materials. These additives positively affect the structure of wafer fillings, improve consistency, and provide additional biological value to finished products. Furthermore, the use of natural antioxidants corresponds to modern trends in healthy nutrition and the production of functional foods.

Thus, the analysis of scientific studies confirms the high efficiency of natural antioxidants in the technology of wafers with fat fillings. Their use makes it possible to slow down lipid oxidation, extend shelf life, improve consumer properties, and increase the biological value of confectionery products. The introduction of natural antioxidants into wafer formulations is therefore a promising direction for the improvement of confectionery technologies.

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