

Influence of Citrate, Lactate and Calcium Carbonate on Microbiological and Biochemical Processes in Dough

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Introduction. Bakery industry in Ukraine is one of the main sectors of food industry. The major drawback of the wheat bread is its low physiological value, especially the lack of important bioactive ingredients such as minerals. Enrichment of bread by minerals is relevant and appropriate to our time. There are some methods of products enrichment by organic and inorganic salts [1]. The aim of the research was to determine the effect of calcium citrate derived by nanotechnology, as well as calcium lactate and calcium carbonate on the activity of the yeast microflora, quantity and quality of gluten of flour and to compare this effect to determine the most promising fortificants. Materials and methods. To achieve this goal there were used calcium citrates, lactates and carbonates. Fructose was used as a sugar substitute in the recipe of products for diabetics. Fermenting yeast activity was defined by the standard method, gas producing ability of flour - by the AG-1 device, the amount of gluten was determined by its washing, and its quality by determining its elasticity on the - IIR device. Results. During the experiments calcium citrate, lactate and carbonate were put into the dough, based on the concentration of these elements and the recommended dose of their daily consumption, namely 50% of the dose. As the control sample dough without addition of calcium was selected. The results showed that the addition of salts improved the lift of yeast. Zymazna activity got better especially when adding calcium citrate. An important indicator in bread –making is gas producing ability of flour. It characterizes the state of carbohydrate-amylase complex. Gas producing capacity depends on the content of sugars in flour and its own sugar producing ability, which is caused by the activity of amylase enzymes. The experiment was conducted during 4 hours. It has been found that in the sample with citrate 1,520 cm³ of CO₂ , were separated with lactate - 1440 cm³ CO₂, with carbonate - 1,392 cm³ of CO₂. In the control sample 1,368 cm³ of CO₂ have been separated. Analyzing the results we can suggest improving gas producing in the sample with calcium citrate compared with calcium carbonate and calcium lactate. Structural and mechanical properties of dough are crucial in getting the volume output, structure of bread crumb porosity, its shape stability. Structural and mechanical properties of dough depend on the quantity and quality of gluten of flour. The amount of wet gluten in the studied samples has been defined: control sample - 25.2%, a sample with calcium citrate - 24.6%, with calcium lactate - 24.6%, with calcium carbonate - 24.8%. Conclusion. The feasibility of using calcium in technology of bakery products from wheat flour with fructose for diabetics in order to enrich them by minerals has been proved. When comparing the obtained parameters

we can say that the best results are obtained when adding calcium citrate. It has the best effect on the microbiological and biochemical processes in the dough. This can allow to intensify the technological process by calcium salts.

References.

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