

## 12. Influence of whey protein on the technological process of making bread with fructose and minerals

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**Introduction.** Nowadays an urgent problem all over the world is diabetes because the number of patients who suffer from it is increasing every year. One of the main food products is bread, but there is a small number of diabetic types of bread enriched with nutrients with a low glycemic index. In a rational diet animal proteins are important, as they are balanced in amino acids, as well as minerals as deficient nutrients for patients with diabetes [1]. Along with the influence of additives on the nutritional value of the product their impact on the quality of products is also important.

Previous researches at the department of bakery and confectionery products set positive effect of organic compounds of metals on the process of bread making. That's why the aim of our study was to determine the total impact of whey protein and citrates on fermentation yeast activity and structural and mechanical properties of dough for diabetic bakery products.

**Materials and Methods.** The influence of whey protein on the technological process of making bread with top grade flour containing fructose 5% to the weight of flour was studied. Protein was dosed in an amount that satisfies 20, 30 and 40% of daily dose of protein and calcium, magnesium, zinc and iron citrates – 50% of their daily requirement when consuming 277 grams of bread. As indicators of the process there were investigated elastic properties of dough by studying specific volume, visco-plastic properties by spreading dough balls, quantity and quality of gluten and gas producing ability. As a control there was a sample with fructose.

**Results.** The decreasing of gas producing with whey protein in specified amounts has been set by 9.0%, 10.9% and 12.0% respectively. It can be explained by the creation of an unfavorable pH of dough for enzymatic hydrolysis of starch and accumulation of maltose, which is a reason for reducing the intensity of fermentation.

When determining structural and mechanical properties of dough it was found that the addition of whey protein increases specific volume of dough with fructose and contributes to its dilution, because whey protein reduces water absorption ability of dough. It is a negative factor because whey protein as well as fructose in the recipe reduces viscosity of dough.

Structural and mechanical properties were also characterized by determining the quantity and quality of gluten. We can trace the trend of reduction of wet gluten by 23.4 and 25.9% when adding 20% and 30% of protein. When adding 40% of protein we could wash no gluten. It can be explained by the fact that milk proteins are not involved in the formation of gluten.

**Conclusion.** As a result of our studies of the impact of whey protein on manufacturing process there has been established that its addition reduces the intensity of gas producing and promotes dilution of dough. Therefore, it is necessary to explore different technological methods that will improve the quality of diabetic bread with added whey protein. But due to the valuable amino acid composition of this protein it can be told about the feasibility of its application to provide the organism of people who suffer from diabetes by complete proteins.

### References

1. Marion, J. Franz Protein Controversies in Diabetes / J. Franz Marion // Diabetes Spectrum. - 2000. - № 3, V. 13, - P. 132.