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The influence of hemicellulase on the biotechnological process in baking industry

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Abstract: *This study presents the influence of hemicellulase enzymes used in different dosages, in the bread dough.*

• Introduction

This study presents the influence of hemicellulase enzymes used in different dosages, in the bread dough. Different factors can influence the baking potential of flour such as environmental conditions of growth and fertilizer use, carbohydrates and proteins content, enzyme activity of amylase, protease and hemicellulase. Multiple studies about addition of hemicellulase show higher quality of the product, and better machinability of the dough.

• Material and method

The following analysis have been performed: determination of moisture using Sartorius MA 30 analyzer and the alveographic determination of the rheological characteristics of the dough performed with the Alveograph Chopin. Materials used for the preparation of the dough samples are rye flour, salt, water, yeast, hemicellulase enzymes. Each sample is mixed for 15 min in the laboratory mixer to form dough. The first dough sample Blank does not have any addition of hemicellulase. The other three samples contain different dosages of hemicellulase, such as 5, 15, 25g per 100kg of flour. After dividing each dough sample in five circular dough patties, they are rested for 20 min in a temperature-regulated compartment at 25 °C from the alveograph. After testing individually each dough patty, the result is calculated as the average of the five dough patties.

• Results and discussions

The dough humidity after addition of different dosages of enzyme preparation based on hemicellulase has not been influenced in any way. Alveographic test shows the quality characteristics of the flour. When using 5g hemicellulase/100kg we noticed the best characteristics are the elasticity index, the dough resistance to deformation, and the configuration ratio of the alveographic curve. Moreover the total quantity of absorbed energy in the dough during stretch has improved as well in comparison to the other samples.

• Conclusions

Hemicellulose content has a negative effect over the gluten chain, but addition of 5g hemicellulase/100kg hemicellulase in dough reduces this impact. Positive effects can be seen as well on the warranty period and freshness of the products. Using higher dosage of hemicellulase worsened the structure of the core, leading to very soft and sticky dough. Using low doses of hemicellulase has no significant influence on the elasticity of the bread, but it negatively influences the volume and porosity of the core.