The influence of different oxidative agents on rye dough properties

Krzysztof Buksa, Stanisław Kowalski

Department of Carbohydrate Technology, Faculty of Food Technology, Krakow University of Agriculture, Balicka str 122, Krakow, (krzysiek_b@onet.eu)

Summary

Rye flour is rich in water soluble fraction, mainly composed of arabinoxylans and protein. Due to ferulic acid presence in arabinoxylans and amino acids with aromatic ring in protein it is possible to crosslink the molecules. Oxidative agents added to the flour can provide crosslinking reaction causing changes in rheological properties of the dough.

The aim of this work was to examine the influence of various oxidative agents such as ascorbic acid, KIO₃, H₂O₂, peroxidase and yeast on rye dough properties.

Rye flour type 1000 obtained from population variety Amilo was used as a material for preparation of the dough.

Water soluble fraction contain majority of arabinoxylans and protein which can crosslink under oxidative conditions. First step of this research was an examination of changes in relative viscosity of rye flour water extracts which provided information about optimal level of each used oxidative agent.

In the second part of the research oxidant agents were added to the dough in amount determined by extracts analysis. Properties of dough obtained in this way were examined using Brabender Farinograph and texturometer TAYT2.

Addition of 0.8% of ascorbic acid lowered dough consistency whereas 100ppm H₂O₂ caused increase of this parameter. The dough with addition of ascorbic acid had the largest stability, the longest time to breakdown and the highest Farinograph quality number. The dough with addition of 0.8 unit of peroxidase per 1g of the flour and 20ppm H₂O₂ had the highest hardness and gumminess measured by texturometer. Both ascorbic acid and yeast decreased adhesiveness of the dough.

Key words: rye, dough, crosslinking, water absorption, consistency