

EFFECT OF SOURDOUGH ON THE FERMENTATION OF DOUGH PIECES AND QUALITY OF BREAD MADE WITH RYE FLOUR

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Abstract

Flour quality, flour type and particularly the fermentation step in dough preparation are among major factors that contribute to high quality bread-making. Short fermentation steps have some advantages. However, they generally produce bread that has a short shelf life and is markedly crumbly and almost neutral in aroma and flavour. Therefore, a recent tendency in bread making has been to allow long fermentation when working with sourdough which is used in bread dough and bread making. The objective of this study was to analyse the effect of sourdough on the fermentation of dough pieces and quality of bread made with a mixture of rye and wheat flours (TYPE 500 wheat flour and whole-grain rye flour - 60 : 40) and determine the advantages of sourdough over the direct bread dough mixing method.

Three bread dough mixing methods were used: I - indirect mixed rye/wheat bread making method using flour steaming (including the yeast dough preparation step - steaming with warm water and resting for about 90 minutes, mixing and fermentation of yeast dough for 4 hours, and the bread dough preparation stage – mixing the yeast dough with flour and other components); II - indirect mixed rye/wheat bread making method without flour steaming (sourdough preparation without flour steaming); III - direct mixed rye/wheat bread making (directly without sourdough - mixing all the components at once). The study involved monitoring of the following: microbial characteristics of flour and dough (total counts of bacteria, yeasts and lactic acid bacteria) and of bread (presence of *Enterobacteriaceae*, yeasts and moulds); dough yield; chemical properties of dough and bread (pH and degree of acidity); organoleptic characteristics of bread (volume, porosity according Dallman, elasticity of the medium, pore uniformity, pore structure fineness, crust colour and glossiness, physical properties of the crust, bread crumb total score, external appearance, crumb appearance, odour and flavour of both the crust and the crumb) and bread yield.

Results show the highest counts of lactic acid bacteria and yeasts in the indirect bread dough mixing method using rye flour steaming. Mixed rye/wheat bread made with sourdough had a mild sourish flavour, an intense aroma, a prolonged shelf life and reduced crumbliness. This bread making method prevented the growth of the causal agents of ropiness and mouldiness in bread, thus prolonging its shelf life. The bread made using the direct method was better only in terms of bread volume.

The study suggests that the technological process of mixed rye/wheat bread making with sourdough is an important requirement in improving bread quality and assortment and can be used in any bakery facility.

Key words: Fermentation, Bread, Sourdough, Quality, Bread dough mixing.