

Volatile compounds in whole meal bread crust: The effects of yeast level and fermentation temperature

Abstract

The influence of fermentation temperatures (8 °C, 16 °C, and 32 °C) and yeast levels (2%, 4%, and 6% of the flour) on the formation of volatile compounds in the crust of whole meal wheat bread was investigated. The fermentation times were regulated to optimum bread height for each treatment. The volatile compounds were extracted by dynamic headspace extraction and analyzed by gas chromatography-mass spectrometry. The results were evaluated using multivariate data analysis and ANOVA. In all crust samples 28 volatile compounds out of 58 compounds were identified and the other 30 compounds were tentatively identified. Higher fermentation temperatures promoted the formation of Maillard reaction products 3-methyl-1-butanol, pyrazine, 2-ethylpyrazine, 2-ethyl-3-methylpyrazine, 2-vinylpyrazine, 3-hydroxy-2-butanone, 3-(methylsulfanyl)-propanal, and 5-methyl-2-furancarboxaldehyde whereas at lower temperature (8 °C) the formation of 2- and 3-methylbutanal was favored. Higher levels of yeast promoted the formation of 3-methyl-1-butanol, 2-methyl-1-propanol and 3-(methylsulfanyl)-propanal, whereas hexanal was promoted in the crust fermented with lower yeast level.