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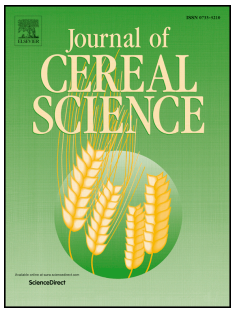

Application of image analysis to optimization of the bread-making process based on the acceptability of the crust color

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ACCEPTED MANUSCRIPT

Application of image analysis to optimization of the bread-making process based on the acceptability of the crust color

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Abstract

Consumption of bread and the demands concerning its quality features, being one of them its appearance, have been experiencing rapid growth. Thus, the standardization of its production aiming to keep its quality, applying new methods. The objective of this research was to develop a method to optimize the bread-making processes based on the acceptability of its crust color. For this effect, bread was experimentally produced using a Box-Behnken experimental design with three factors (sugar-flour relation, Baking temperature and Baking time) and three answer variables (*L**, *a**, *b** = parameters of CIELab color space); determination of color, by means of the acquisition, pre-processing, and analysis of images of bread samples until getting the color expressed in CIELab coordinates; an analysis of sensorial acceptance was made determining the *L**, *a**, and *b** with the highest acceptance by consumers; finally, the optimization of the production process was made based on the *L**, *a**, and *b** parameters, getting the optimal production parameters. The results show that by using the proposed method, it is possible to correlate the parameters of CIELab color space and the acceptance of the final consumer aiming to optimize bread making processes, it means getting bread with crust color of maximum acceptability.

Key words: Image analysis, CIELab, darkening, surface of response

1. Introduction

Cereals and its derivatives, especially bread, constitute an important element of the human diet from the earliest civilizations, and its consumption is experiencing a sharp increase accompanied by more strict demands in terms of its appearance, texture, and

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