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EXTENSION OF WHOLE WHEAT BREADSTICK SHELF LIFE BY FORMULATION AND PACKAGING STRATEGIES

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Quality decay of whole wheat breadsticks during storage is caused by different deteriorative events, among which lipid oxidation and loss of crispness are the main phenomena. As a result, the formation of off-flavors and the texture worsening account for the consumers' rejection of the product. In order to improve the breadstick shelf life and make this food product more sustainable, a combined formulation and packaging strategy is fundamental. Thus, the aim of this research was the evaluation of the effects of antioxidant addition and modified atmosphere packaging on whole wheat breadstick shelf life. Breadsticks were prepared with and without the addition of a rosemary extract, and packed both in air and under nitrogen atmosphere. The four samples were subjected to real time and accelerated shelf life tests at 20°, 27°, 35°, and 50°C for a maximum of 6 months. At determined storage times, breadstick quality was evaluated in terms of moisture, water activity, peroxide value, texture, and hexanal development. Breadsticks stored at 35°C were also frozen at different sampling time and maintained at -18°C until sensory acceptability analysis. Analytical data were modeled as a function of temperature by means of the Arrhenius equation, while survival analysis was applied to sensory results. This approach enabled the estimation of the relationship between quality depletion and consumers' acceptance limit, in order to predict the whole wheat breadstick shelf life.

Keywords: breadsticks, oxidation, survival analysis, shelf life modeling