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Evaluation of gluten-free bread made from quinoa and banana flour, cassava starch, lupine flour or whey protein, with hydroxypropyl methylcellulose (HPMC) and transglutaminase, as improvers

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Abstract

In this study, rheological, functional and sensory properties of gluten-free bread formulations from quinoa and banana flour, cassava starch, lupine flour (HC) or whey protein (PL) with hydroxypropylmethylcellulose (HPMC) and transglutaminase (TG), as enhancers, were evaluated. The effect of TG at different concentrations (0; 0.5; 1.0 and 1.5 %) on HC or PL proteins was evaluated, quantifying free amino groups and thiols, apparent viscosity and electrophoresis. Cross- linking analyzes showed better results at 1% of TG. The characterization of the dough, pasting properties were evaluated by MIXOLAB and RVA, respectively. The firmness, crumb structure and loaf volume were analyzed, respectively, through a texturometer, ImageJ software and baking capacity. An experimental design of response surface was carried out to determine different breadmaking mixtures, where the HPMC and HC or PL varied from 0.5-2.5 % and 3.0-9.0 %, respectively. In addition, an optimization was carried out to get the best percentages of HPMC (1.80%) and HC (8.30%) or PL (8.33%). In HC, positive correlations of 0.84 and 0.92 between protein parameters (C2) with starch retrogradation (C3) and starch fragmentation (BD) with maximum starch viscosity (PV), respectively, were found. In PL, a R2 = 0.99 was determined between C3 and alpha-amylase activity (C4) and R2 = 0.85 and 0.83 between C2 with PV and C2 with BD were reported. Thus, the interaction between raw materials and improvers was evidently maximized for breadmaking.

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Biography:

Pedro Maldonado-Alvarado is Associate Professor at the Department of Food Sciences and Biotechnology in EPN and Collaborator professor of Ecuadoran universities as UTPL and UTA. He is PhD in Biochemistry, Chemistry and Food Technology of the Université Montpellier, France. Dr. Maldonado is director of 3 scientific projects and collaborator of 4 national and international projects. He have more than 20 scientific publications. He works in Valorization of Ecuadorian products and by-products, particularly farinaceous. Also, extraction of active principles and interest molecules of food and non-food matrix. Finally, on food safety in Ecuador, particularly the incidence of heavy metals on foods

Speaker Publications:

1. Alternativas de valorización de subproductos de cereales y afines. In R. Salazar Gonzalez & F. Cornejo Zúñiga (Eds.), Valorización integral de cereales, pseudocereales, tubérculos, raíces y leguminosas del Ecuador (p. 65). Guayaquil: Espol - Unidad de Publicaciones. ISBN: 978-9942-35-672-7

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