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Rheological and Sensory Attributes of Dough and Crackers Including Amaranth Flour (Amaranthus spp.)

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Abstract : Amaranth is an emerging pseudocereal rich in such essential nutrients as protein and dietary fiber, which was employed as an ingredient in the formulation of crackers to evaluate the rheological performance and sensory acceptability of the obtained food. A completely randomized factorial design was used with two factors: (A) ratio of wheat and amaranth flour used in the preparation of the dough, in proportion 90:10 and 80:20 (% w/w) and (B) two levels of inulin addition of 8.4% and 16.7 %, having two control doughs made from amaranth and wheat flour, respectively. Initially, the functional properties of the formulations mentioned were measured, showing no significant differences in the water absorption capacity (WAC) and swelling power (SP), having mean values between 1.66 and 1.81 g/g for WAC and between 1.75 and 1.86 g/g for SP, respectively. The amaranth flour had the highest water holding capacity (WHR) of 8.41 ± 0.15 g/g and emulsifying activity (EA) of 74.63 ± 1.89 g/g. Moreover, the rheological behavior, measured through the use of farinograph, extensograph, Mixolab, and falling index, showed that the formulation containing 20% of amaranth flour and 7.16% of inulin had a rheological behavior similar to the control produced exclusively with wheat flour, being the former, the one selected for the preparation of crackers. For this formulation, the farinograph showed a mixing tolerance index of 11 UB, indicating a strong and cohesive dough; likewise, the Mixolab showed dough reaches stability at 6.47 min, indicating a good resistance to mixing. On the other hand, the extensograph exhibited a dough resistance of 637 UB, as well as extensibility of 13.4 mm, which corresponds to a strong dough capable of resisting the laminate. Finally, the falling index was 318 s, which indicates the crumb will retain enough air to enhance the crispness of a characteristic cracker. Finally, a sensory consumer test did not show significant differences in the evaluation of aroma between the control and the selected formulation, while this latter had a significantly lower rating in flavor. However, a purchase intention of 70 % was observed among the population surveyed. The results obtained in this work give perspectives for the industrial use of amaranth in baked goods. Additionally, amaranth has been a product typically linked to indigenous populations in the Andean South American countries; therefore, the search for diversification and alternatives of use for this pseudocereal has an impact on the social and economic conditions of such communities. The technological versatility and nutritional quality of amaranth is an advantage for consumers, favoring the consumption of healthy products with important contributions of dietary fiber and protein.

Keywords : amaranth, crackers, rheology, pseudocereals, kneaded products
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