

Enrichment of bakery model foods with antioxidants from Mediterranean red fruits: a physicochemical study

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Incorporation of naturally derived bioactive compounds into new food products has been a concept with rising popularity in the food industry; supplementation with antioxidant-rich formulations has been proposed for the enhancement of staple food nutritional profile and shelf life.

In this study cherry and sour cherry formulations were used for the enrichment of model bakery products; the physicochemical, rheological and textural properties of the dough and bread as well as the antioxidant profile and sensory attributes of the final product were evaluated. Six different fruit formulations were used for the fortification, based on fruit powder, aqueous-ethanol fruit extract, lyophilized fruit extract and their combinations; alongside, the effect of two different raising agents (yeast and baking powder) was comparatively assessed.

Enrichment source (cherry or sour cherry) significantly affected dough pH values under both raising conditions; depending on the fruit acidity differences were observed, revealing pH variations of more than one unit.

During proofing time the presence of ethanol negatively affected swelling of yeast-prepared doughs, as opposed to baking powder ones. In the absence of ethanol yeast-prepared breads had better organoleptic characteristics (taste, texture, odor), which were significantly correlated with swelling ability. Acidification was noticed for samples with yeast activity, which was reflected by swelling increase. Color parameters (L^* , a^* , b^* , ΔE) were highly associated with total phenolic and antioxidant content. Enriched samples presented significantly lower values of lightness and higher values of color difference (ΔE) compared to control.

Rheological and textural properties were significantly affected by the enrichment type and raising agent used. Baking powder formulations demonstrated elevated hardness, viscosity, storage and loss modulus values than yeast ones. Ethanol presence and acidity (pH) affected texture and rheological parameters of the dough.

This study highlights the importance of incorporating natural phenolic compounds from red fruits in model bakery products as an efficient means for increasing their nutritional value in terms of bioactivity. Moreover, this study outcomes point to the promising results of the direct use of extracts in baking powder-based formulations.