

Physico-Chemical, Organolytical and Microbiological Characteristics of Substituted Cupcake by Potato Processing Residues

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ABSTRACT

Utilization of potato processing residues to produce a low caloric cupcake in present study was targeted. The functional properties of wheat flour (WF 72%) and dried potato peel varieties [Hermus (PPH) and Russet (PPR)] were carried out. Consequently, WF was partially substituted by both potato peels (PP) at 5% - 20% to prepare mixtures for cupcake making. Approximate chemical composition and physical characteristics were determined. Rheological parameters of prepared formulas were assayed using Mixolab. Moreover, total phenolic compounds (TPC) and relative antioxidant activity (AOA) were evaluated. Quality parameters such as thiobarbituric acid (TBA), staling and microbiological attributes during storage were determined. In addition, a sensory evaluation of different substituted cupcake was performed as well. Results indicated that PPR had the highest water absorption capacity (WAC), oil absorption capacity (OAC) and swelling capacity (SC) followed by PPH then WF flours. Indeed, substituted WF with both PP at 5% and 10% didn't influence the thermo-mechanical properties including dough time development, stability, viscosity, gluten and starch characteristics drastically. Likewise, this substitution levels didn't affect the organoleptic properties which were confirmed by panelists, cupcake external and cross sections. Substituted WF by 5% - 10% PP recorded sensory scores aftermost WF. Mildly, WF cupcake was higher in protein and fat contents than WF-PP cupcakes while lower in crude fiber. The WF-PP cupcakes at different substituted levels recorded lower energy value than WF cupcakes. Arguably, increasing both PP levels increased the TPC and AOA especially for WF-PPR cupcakes. Afterwards, WF-PPR 15% and 20% recorded the highest TPC and AOA contents to be 2.32 mg GAE g⁻¹ dw and 3.44 μmol TE g⁻¹ dw, respectively. No significant difference (p > 0.05) was found between WF-PP at 5% and WF cupcakes in physical and staling properties. WF-PPR cupcakes at different concentrations were lower TBA than WF cupcakes and mostly stable during storage period. It was revealed that substitution levels of 5% and 10% with PPH and PPR produced acceptable cupcakes which did not significantly differ from WF cupcakes.

KEYWORDS

Low Caloric Cupcake, Potato Peel Residues, Rheological Properties, Quality, Stability, Revalorization

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