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Edible Mushrooms: Novel Food Fortification Approach Towards Food Security

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Abstract

Physicochemical attributes of mushrooms (*Agaricus bisporus* & *Pleurotus ostreatus*) and their blends with maize flour, as well as the colour and sensory acceptability of the fortified maize-mushroom porridge were investigated using standard analytical techniques and Pearson's correlations. The maize flour was replaced with mushroom flours at different levels; a control sample (0%), 10%, 20%, 30%, 40% and 50% of mushroom flour. Increasing mushroom content resulted in increasing of protein, ash, fiber, zinc and iron content in both composite flours and fortified maize-mushroom porridges. Furthermore, the fortified maize-mushroom porridges *in vitro*-protein digestibility increased with increasing the mushrooms content. Adding *P. ostreatus* flour resulted in increasing of the pH and decreasing of the total titratable acidity (TTA). On the other hand, increasing the *A. bisporus* flour content resulted in decreasing of the pH and increasing of the TTA. A strong significant ($p < 0.05$) linear correlation (-0.73) was observed between the *in vitro*-protein digestibility and the viscosity in maize-mushroom porridges. Besides, increasing mushroom content resulted in decreasing of the fat, carbohydrates and energy content in both composite flours and fortified maize-mushroom porridges. The fortified maize-mushrooms viscosity also decreased with increasing mushroom flour content. In addition, a positive significant linear effect ($p < 0.05$) in the composite flours on foaming capacity, foam stability, fat absorption capacity, water retention capacity, water absorption capacity, solubility index and swelling capacity was observed, while a negative linear effect on compact density, bulk density and syneresis was found. However, the gelation capacity, emulsifying activity and emulsions stability in the blend were not affected with adding *P. ostreatus*, while a slight decrease was observed with adding *A. bisporus*. Increasing mushroom flours content resulted in decreasing of the lightness (L^*) value and increasing of redness (a^*) and yellowness (b^*) in both composite flours and porridge. Based on the colour as well as the consumer acceptability, porridge and maize flour supplemented with 10% and 20% *P. ostreatus* flours were found to be the best. The information provided in this study increases the attractiveness of the mushroom flours as a novel food fortification due to their nutritional attributes that are associated with numerous health-promoting benefits.

Keywords: Consumer acceptability, fortified porridge, maize flour, physicochemical properties