

ABSTRACT

Zinc Bioaccessibility in Finger Millet Porridge Blended with Zinc-Dense Mushroom Karenya S. Luvitaa, Munyaka A. Wambui, Musieba Fredrick C., Ojwang D. Otieno

Introduction: Zinc deficiency is a common health problem among people who rely heavily on cereal-based foods. Consequently, most people from low-income families, particularly young children in Sub-Saharan Africa, who rely mainly on cereal-based meals, have suffered from Zinc deficiency related health issues. It is therefore recommended that children who show signs of zinc deficiency like poor growth and cognitive impairment be fed zinc-rich meals; however, in severe cases, they should be given zinc supplements to reduce risks of morbidity and mortality. In that regard, since edible mushrooms are nutritionally rich and contains essential minerals as well as health-promoting compounds, they are a promising tool for improving the nutritional and health quality of commonly carbohydrate-rich foods. **Objective:** The objective of this study was to examine the Zinc bioaccessibility and sensory properties of HMT finger millet porridge blended with Zinc-dense mushroom. **Methods:** Oyster mushroom (*Pleurotus ostreatus*) was grown on rice straw enriched with zinc sulfate at various concentrations. After reaching full maturity, the mushrooms were harvested, dried, and milled into a fine powder. Zinc-rich mushroom powder was mixed with millet flour in various proportions and used to prepare porridge. The zinc bioaccessibility in millet-mushroom flour blends was determined using a simulation method of gastro intestinal digestion. In addition, panelists comprising of mothers and caregivers of children aged between 6 and 23 months were asked to evaluate the sensory attributes of millet-mushroom porridge. **Results:** Adding Zinc to growth substrates had a significant ($p < 0.05$) effect on mushroom yield. Control substrates without Zinc yielded 120 g of mushroom per kilogram substrate. However, when 100 mg Zinc was added to the substrate, the yield increased by 65.6%. The study further noted that substrates with Zinc beyond 100 mg had a negative effect on mushroom yield. Consequently, substrates with the highest Zinc level (600 mg) produced the lowest mushroom yields. Increasing substrates Zinc content, on the other hand, had positive effect on mushroom Zinc levels. Substrates without Zinc produced mushrooms containing 8.9 mg Zinc, which increased by 30.9% when 600 mg Zinc was added. Furthermore, HMT finger millet porridge without mushrooms had a phytates: Zinc molar index of 60.3, which decreased to 34 when 20% (w/w) mushroom proportions were added. Despite having the highest bioaccessible Zinc with the least effect on texture and appearance, a 20% mushroom proportion in HMT finger millet porridge considerably compromised the taste, aroma and general consumer acceptability. **Conclusion:** Amending HMT finger millet flour with mushroom powder improved Zinc bioaccessibility of the porridge. However, when added beyond a certain limit, mushroom reduced organoleptic qualities of the porridge, which affected overall consumer acceptance. The study recommends, therefore, that mushroom powder be added to finger millet flour in the appropriate proportions to enhance nutritional and health benefits of porridge while minimizing possible negative impacts on sensory properties.

Keywords: zinc bioaccessibility, finger millet, porridge, zinc-dense mushroom.