

## Abstract

The growing prevalence of gluten-related disorders has increased demand for gluten-free alternatives to wheat-based products, including bread, which is a global dietary staple. However, gluten-free breads often exhibit inferior properties compared to regular bread, especially in their texture, due to the low protein content in gluten-free flours. Okara, a high-protein by-product of soy milk production, has potential as an ingredient to improve gluten-free breads. This study evaluated the effects of incorporating okara flour at 0%, 10%, 15%, and 20% substitution levels into MOCAF and rice flour-based gluten-free bread, assessing physical characteristics and sensory acceptance. It was found that the fiber content of okara flour negatively impacted the physical qualities of the resulting breads, such as a 23.97% reduction in loaf volume and 55.5% increase in crumb hardness at 20% substitution level. Furthermore, higher okara flour substitution led to undesirable characteristics, such as reduced porosity and bounciness, as well as increased dryness and crumbliness. Therefore, sensory likability was also negatively affected, with 20% okara flour bread receiving the lowest acceptability and preference. In contrast, gluten-free bread with 10% okara flour substitution achieved comparable properties to the control. These findings suggested that okara flour inclusion in lower amounts would still be acceptable without compromising much of the quality.

**Keywords:** gluten-free bread, okara flour, physical characteristics, sensory attributes, sensory acceptability