

## ACEROLA FRUIT AS A NATURAL ANTIOXIDANT INGREDIENT FOR GLUTEN-FREE BREAD FOR CELIAC PATIENTS

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### Introduction & Objectives:

For patients with celiac disease, the only available treatment is a lifelong strict adherence to gluten-free diet. This result in nutrient deficiency caused due to the insufficient nutrients in the gluten-free diet (Gallagher et al., 2004). Despite the advances in research with respect to gluten-free bread, most gluten-free breads prepared with rice still have lower nutritional and bioactive profile, physical and sensory properties than those made with wheat breads (Fratelli et al., 2018). *Acerola* (*Malpighia emarginata* DC) is a small fruit known for its high content of functional components particularly vitamin C (Realini et al., 2015). The aim of this study is to use acerola fruit powder to improve the nutritional quality of gluten-free bread.

### Methodology (Material and methods):

The formula of gluten-free was based on rice flour. The *Acerola* fruit powder (AFP) was incorporated into formula of gluten-free bread. The levels of AFP from 1 to 5% used were fixed on the base of preliminary trials and taste acceptance by substitute rice flour: 100/0, 99/1, 98/2, 97/3, 96/4, 95/5 w/w. Control gluten-free bread without any addition of acerola fruit powder was used for comparison. Sensory evaluation and antioxidant properties (total phenolic content and antioxidant activities: DPPH, ABTS, RED) were determined.

### Results and Discussion:

According to the results, *Acerola* fruit powder positively affected the antioxidant properties of enriched breads. The total phenolic content of extracts was found to be increased with the addition of acerola fruit powder from 2.5 mg/g d.w for control bread to 10.1 mg/g d.w for bread with 5% of acerola. All antioxidant activities were found to be increased with increasing quantities of acerola fruit powder. The sensory attributes of the bread showed that a partial replacement of the rice flour with up to 3% of acerola fruit powder provided satisfactory results. The optimum level of acerola fruit powder for all parameters tested was found to be 3% w/w.

### Conclusion:

Gluten-free breads were successfully developed with the addition of AFP as the improver of bread quality. *Acerola* could be a natural vitamin C replacement for all bakery products. This fruit can be used as good ingredients in the formulation of health benefits from gluten-free products.

**Keywords:** *Acerola* fruit, antioxidant, gluten-free bread, celiac disease.

