Development of Gluten-Free Bread from Brown Rice-Potato Starch Composite Flour Incorporated with Red Seaweed Kappaphycus alvarezii powder

ABSTRACT

Gluten free diets and lifestyles are rapidly increasing in popularity mainly due to the increase in consumer awareness about gluten related disorders and gluten intolerances. With increasing demand, the food industry strives to develop new food products that are gluten-free and able to be consumed by those who suffer from these conditions. The objective of this study was to develop a gluten-free bread from brown rice-potato starch composite flour incorporated with red seaweed Kappaphycus alvarezii (KA) powder. KA powder, ranging from 2% to 10%, was added, and the physical properties of the glutenfree bread were assessed. Sensory evaluation was conducted using two methods, the descriptive and hedonic tests. The amount of seaweed significantly ($p < 0.05$) influenced the loaf volume, with F5 (10%), the highest concentration of seaweed, having the highest reduction of volume of 15.38% compared to the control F0 (without seaweed). With increasing seaweed concentration, the brightness and yellowness of each bread decreased. The texture profiles of KA-incorporated bread formulations were also affected with the firmness of bread being the most significant change. The descriptive test showed that F5 (10%) had the highest intensity of seaweed effect which affected the colour, texture, aroma, taste and aftertaste of the bread. The hedonic test showed that the most acceptable formulation was F1 (2%). From these formulations, the best formulation F1 (2%) was chosen for further nutrient analysis where it was compared to the control (without seaweed). It was shown that F1 had significantly ($p < 0.05$) higher moisture, ash, fat, and dietary fibre content, but lower carbohydrate and protein content compared to F0 (without seaweed). In conclusion, the formulation of gluten-free KAincorporated brown rice-potato starch bread had an impact on the bread texture, colour, volume, and nutrient content.