Abstract

The incorporation of gluten-free ingredients may result in an inferior quality of gluten-free bread in terms of its physical and sensory properties. Therefore, the addition of hydrocolloids is often used to tackle this problem; as such, this study will mainly focus on investigating the effects of increasing concentrations of CMC (carboxymethyl cellulose) and k-carrageenan on the physical characteristics and sensorial properties of gluten-free bread. Five different formulations (control, 2% CMC, 2% CARA, 4% CMC, and 4% CARA) were made and compared with each other. Physical analysis, including moisture content, color, texture, baking loss, and specific volume, was performed. The analysis showed that there is a significant effect ($p<0.05$) of increasing concentration of CMC and k-carrageenan on all of the physical characteristics except specific volume. For instance, the addition of 2% CMC and 4% CARA had shown to decrease the hardness value up to 50.33 ± 9.54 and 45.56 ± 5.22 respectively. Furthermore, at the same concentration, both CMC and k-carrageenan showed a significant difference in all physical characteristics, and a similar result was observed as the concentration increased when compared to each other. Through the CATA and hedonic preference ranking test, 4% CMC was shown to be the most preferred with the highest overall liking and ranked first amongst all treatments. Therefore, this study has successfully revealed that the addition of hydrocolloids such as CMC and k-carrageenan does improve the physical and sensory properties of gluten-free bread, and the concentration used may be a crucial factor.

Keywords: gluten-free bread, CMC, k-carrageenan, physical characteristics, sensory properties