

PHYSICOCHEMICAL PROPERTIES OF CHOCOLATE BROWNIES ENRICHED WITH BLACK JASMINE RICE FLOUR

Nutsuda Sumonsiri^{1,2*}, Sakonwan Takjirawut², Kanistha Serepong²

¹School of Health and Life Sciences, Teesside University,
Middlesbrough, Tees Valley, TS1 3BX, UK

²Food and Agro-Industry Research Center,
King Mongkut's University of Technology North Bangkok,
1518 Pracharat 1 Road, Wongsawang, Bang Sue, 10800 Bangkok, Thailand

*e-mail: n.sumonsiri@tees.ac.uk

Abstract

Black jasmine rice is a pigmented rice variety that has gained popularity due to its high nutritive value, sensory characteristics, and health benefits. The purpose of this research was to investigate the physicochemical properties of chocolate brownies enhanced with black jasmine rice flour to raise the product's value and nutrition.

All-purpose flour was substituted for various concentrations of black jasmine flour (25, 50, 75, and 100% w/w) during the brownie preparation, whereas the control sample contained 28.19% sugar, 18.6% egg, 16.91% dark chocolate, 15.78% all-purpose flour, 14.09% butter, 6.20% cocoa powder, and 0.23% vanilla extract. Following preparation, the products were examined in terms of their volume, color, texture (hardness, chewiness, cohesiveness, and adhesiveness) (texture profile analysis using a texture analyzer), and water activity (by Aqualab water activity meter). Then, the sensory acceptance (using a 7-point hedonic scale), and proximate composition (according to AOAC, 2005) of selected samples were evaluated. All analyses were performed in triplicate. The data was analyzed using IBM SPSS Statistics version 26. The analysis of variance (ANOVA) with Duncan's multiple range test (DMRT) was applied to indicate a significant difference at a 95% confidence level.

The result showed that the volume of brownies significantly increased ($p < 0.05$) as the concentration of black jasmine rice flour increased above 75%. When more black jasmine rice flour was added, the L^* and a^* values of the samples tended to decrease, but there was no significant difference in the b^* values of the samples ($p \geq 0.05$). Additionally, as black jasmine rice flour was added, the hardness, chewiness, cohesiveness, and adhesiveness of product samples tended to decrease, while no significant difference in water activity among samples was found. When compared to the control sample, the brownies enhanced with black jasmine rice flour received somewhat lower acceptance scores for odor, flavor, texture, and overall acceptability. There was, however, no statistically significant difference in appearance or color across the samples ($p \geq 0.05$). The brownies enriched with black jasmine rice flour contained higher moisture, protein, carbohydrate, and fat content than the control sample.

In conclusion, black jasmine rice flour can potentially be supplemented in brownies with minor effects on physicochemical properties while retaining acceptable sensory characteristics.

Key words: *Black rice, Brownies, Black jasmine rice flour, Pigmented rice.*