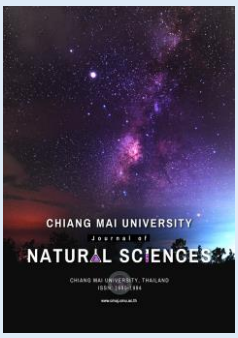

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Research article

Principal Component Analysis Application on Nutritional, Bioactive Compound and Antioxidant Activities of Pigmented Dough Grain

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Abstract The dough stage of rice plant is a critical stage during the grain development. The rice endosperm continues to expand and the color of the seed coat develops in accordance with rice variety, so it is called as dough grain. This research was carried out to examine nutritional value, bioactive compound and antioxidant activity of Thai dough grain. Ten varieties of pigmented dough grain including non-glutinous and glutinous rice were studied. Principal component analysis (PCA) was conducted to visualize the difference in nutrition amongst ten rice varieties. Hierarchical cluster analysis was used to identify the unique characteristics of each rice variety. Three principal components (PC1-PC3) showed 82.04% of the total variance and could divide pigmented dough grain varieties into 3 groups. Group 1 consisted of a red dough grain (Red Hom Mali). It had the highest total phenolic content as well as high protein and antioxidant activities. Group 2 consisted of two red dough grains (Thabthim Chumphae and Niao Daeng) and two black dough grains (Riceberry and Niaodum Kumbaikeaw), which had moderate antioxidant activities. Group 3 consisted of two green dough grains (Khao Dawk Mali 105 and Kor Khor 6) and three black dough grains (Black Hom Mali, Mali Black Sulin and Niaodum Kumnoiy), exhibiting high gamma oryzanol value but, low total phenolic content. Hence, red and black dough grains had higher nutritional value, total phenolic content, total anthocyanin and antioxidant activities than green dough grains. In addition, dough grains from non-glutinous rice had higher protein and lower fat than those from glutinous rice. Therefore, the data from this research could benefit the utilization of these pigmented dough grain as functional food ingredients and healthy food product.

Keywords: Antioxidant activity, Bioactive compound, Nutrition, Pigmented dough grain, Principal component analysis

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