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Changes in rice bran antioxidants and their antioxidant activity with fermentation by *Rhizopus oryzae*

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Rice bran, which has been identified as a rich source of bioactive compounds, is an underutilized agro-industrial residue for human consumption. Solid-state fermentation has been employed as an efficient processing technique to increase the content of functional components from agro-industrial residues. This study has been carried out to examine the effect of solid state fermentation by fungus *Rhizopusoryzae* on the bioactive content and antioxidant activity of 3 different varieties (BG 351, BW 367, and BG 406) of rice bran commonly available in Sri Lanka. Methanolic extracts of rice brans were analyzed for total phenolic, flavonoid, carotenoid, and monomeric anthocyanin content. The antioxidant activity of the extracts was evaluated using total antioxidant capacity, reducing power and DPPH radical scavenging assays. The results indicated that the total phenolic content of fermented BW 367, BG 351 and BG 406 were 8.816 ± 0.021, 7.704 ± 0.014, and 8.821 ± 0.028 mg gallic acid equivalents (GAE) / g of fresh weight (FW) of rice bran, respectively, whereas the total phenolic content of unfermented BW 367, BG 351 and BG 406 was 5.391 ± 0.023, 4.431 ± 0.025, and 4.182 ± 0.03 mg GAE/ g of FW respectively. Similarly the total flavonoid content and total carotenoid content of rice brans significantly increased with fermentation ($P \leq 0.05$). The total anthocyanin content of BW 367 and BG 351 increased by 92% and 69.84%, respectively.However there was no significant difference in the total anthocyanin content of unfermented BG 406 (9.535 ± 0.021mg cyanidin-3-glucoside/g) and fermented BG 406 (9.831 ± 0.012mg cyanidin-3-glucoside/g). The total antioxidant capacity of all 3 rice bran varieties was also increased significantly with fermentation ($P \leq 0.05$). Accordingly the total antioxidant capacity of unfermented rice brans were within the range 2.212 – 5.615 mg ascorbic acid equivalents (AAE) / g of FW, whereas the total antioxidant capacity of fermented rice brans was within the range of 6.742–7.569 mg AAE / g of FW. Results from DPPH assay indicated that IC_{50} ranged from 1.02–137.39 mg/L for unfermented rice brans, and for fermented rice brans it ranged from 3.69–7.18 mg/L. Thus these results indicated that rice bran is a potential source of antioxidant compounds and their content and antioxidant activity can be effectively increased by solid state fermentation.

Keywords: Rice bran, antioxidant, *Rhizopusoryzae*

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