

Comparative Analysis of the Antioxidant Capacities of Pre-Germinated and Germinated Pigmented Rice (*Oryza sativa* L. Cv. Superjami and Superhongmi)

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Abstract : Rice (*Oryza sativa* L.) is one of the most widely consumed grains. Due to the growing number of demand as a potential functional food and nutraceutical source and the increasing awareness of people towards healthy diet and good quality of living, more researches dwell upon the development of new rice cultivars for population consumption. However, studies on the antioxidant capacities of newly developed rice were limited as well as the effects of germination in these rice cultivars. Therefore, this study aimed to focus on analysis of the antioxidant potential of pre-germinated and germinated pigmented rice cultivars in South Korea such as purple cultivar Superjami (SJ) and red cultivar Super hongmi (SH) in comparison with the non-pigmented Normal Brown (NB) Rice. The powdered rice grain samples were extracted with 80% methanol and their antioxidant activities were determined. The Results showed that pre-germinated pigmented rice cultivars have higher Fe²⁺ Chelating Ability (Fe²⁺), Reducing Power (RP), 2,2'-azinobis[3-ethylbenzthiazoline]-6-sulfonic acid (ABTS) radical scavenging and Superoxide Dismutase activity than the control NB rice. Moreover, it is revealed that germination process induced a significant increased in the antioxidant activities of all the rice samples regardless of their strains. Purple rice SJ showed greater Fe²⁺ (88.82 + 0.53%), RP (0.82 + 0.01), ABTS (143.63 + 2.38 mg VCEAC/100 g) and SOD (59.31 + 0.48%) activities than the red grain SH and the control NB having the lowest antioxidant potential among the three (3) rice samples examined. The Effective concentration at 50% (EC50) of 1, 1-Diphenyl-2-picrylhydrazyl (DPPH) and Hydroxyradical (-OH) Scavenging activity for the rice samples were also obtained. SJ showed lower EC50 in terms of its DPPH (3.81 + 0.15 mg/mL) and -OH (5.19 + 0.08 mg/mL) radical scavenging activities than the red grain SH and control NB rice indicating that at lower concentrations, it can readily exhibit antioxidant effects against reactive oxygen species (ROS). These results clearly suggest the higher antioxidant potential of pigmented rice varieties as compared with the widely consumed NB rice. Also, it is revealed in the study that even at lower concentrations, pigmented rice varieties can exhibit their antioxidant activities. Germination process further enhanced the antioxidant capacities of the rice samples regardless of their types. With these results at hand, these new rice varieties can be further developed as a good source of bio functional elements that can help alleviate the growing number of cases of metabolic disorders.

Keywords : antioxidant capacity, germinated rice, pigmented rice, super hongmi, superjami

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