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Differences in Functional Materials between White and Black Rice Varieties

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ABSTRACT

Rice is the world's three major crops that is the staple food of Asian. Japonica type rice is consumed in Korea. Rice cultivation area decreases steadily. That is affected by decrease of the farm income with the inventory of 1.7 million tons, which is 2 to 3 times more than the optimal amount due to the decrease in the consumption of rice per person and cultivate high yield varieties.

In recent years, as income level has improved, interest in health has been high and consumption for health food has been steadily increasing. For health food, rice is added by adding grains such as millet, sorghum, oats, beans and colored rice rather than white rice.

In 1997, RDA(Rural Development Administration) developed black rice 'Heuknambyeo', and then 20 varieties were bred until 2017. In CBARES(Chungbuk Agricultural Research and Extension Services), we have developed new rice varieties 'Cheongpungheukchal' in 2010, 'Cheongpungheukhyangchal' in 2014, 'Cheongpungheukchal' is high in farming preference because of high yield.

Black rice has high content of GABA and water-soluble phenol, DPPH radical scavenging activity, and consumers are interested in the function in the body. Therefore, functional and antioxidant activities(anthocyanin, total polyphenol, α-glucosidase inhibition) and antioxidant activities(ABTs, DPPH) were analyzed by comparing white and black rice. Testing varieties are 'Chucheongbyeo', best quality cultivars 'Daebo' and 'Samgwang' as white rice which are cultivated much in Chungbuk area, and black rice are 10 varieties including 'Cheongpungheukchal', 'Cheongpungheukhyangchal', 'Josaengheukchal' and so on. It has transplanted on 25th May, at CBARES research paddy by 100% fertilizer recommendation rate. Harvesting time was 50 days after heading by varieties, and has researched growth properties, yield and yield components, functional and antioxidant activities.

Anthocyanin content was not measured because there was no pigmented in white rice, the highest value of anthocyanin content was 'Shintoheukmi' and in the range of 125.6~249.6mg/100g by black rice varieties. Total polyphenol content was high 'Cheongpungheukchal' and 'Shintoheukmi' and in the range of 96.68~244.34 mg/100g in black rice, white rice lower than blackish rice at 19.84~22.51mg/100g. α -glucosidase inhibition was high 'Cheongpungheukchal', 'Cheongpungheukhyangchal' and 'Shintoheukmi' in the rage of 75.87~98.85% by black rice varieties, especially 'Samgwang' was 80.75% and the other white rice was higher than 58~68%.

Keywords: rice, functional materials, black rice, white rice

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