

PB-39

Characterization of Different Seed Parts of Adzuki Bean Genetic Resources Based on Antioxidant Index

Kebede Taye Desta¹, Hyemyeong Yoon¹, MyoungJae Shin¹, SuKyeong Lee², YuMi Choi¹, Young Ah Jeon¹, Wang XiaoHan¹, JungYoon Yi^{1*}

¹National Agrobiodiversity Center, National Institute of Agricultural Sciences, RDA, Jeonju 54874, Korea

²International Technology Cooperation Center, RDA, Jeonju 54874, Korea

[Introduction]

Adzuki beans are becoming a research focus due to their high metabolite content and health benefits. Several researchers have used phenotypic and genotypic traits to characterize adzuki bean genetic resources. In recent years, the antioxidant index (AI) has become a popular method for determining the overall antioxidant activities of plant genetic materials, and no studies on adzuki beans have been conducted in this regard. In this study, 88 adzuki beans were characterized using the antioxidant index, which was determined using the total saponin content (TSC), total phenolic content (TPC), DPPH-radical scavenging activity, ABTS-scavenging capacity, and FRAP in their whole seeds, seed coats, and dehulled seeds.

[Materials and method]

The adzuki beans were cultivated on experimental farm under uniform growth conditions. Matured seeds were hand-harvested, samples were separated (seed coats, whole seeds, and dehulled seeds), freeze dried, powdered, and extracted by sonication using 80% methanol. Colorimetric assays were used to determine TPC, TSC, and antioxidant activities. The average relative percentage values obtained from these five different assays were used to calculate the AI. The highest value in each assay was considered 100, and the remaining lower values were converted using a numerical scale. The AI values were used to categorize the adzuki bean genotypes as very low (0-19%), low (20-39%), medium (40-59%), high (60-79%), and very high (80-100%) AI genetic materials.

[Results and discussion]

Significant variation was found not only between adzuki bean genetic materials, but also between seed parts ($p < 0.05$). The antioxidant index decreased in the order of seed coats < whole seed < dehulled seeds indicating a significant high level of TPC, and DPPH and ABTS capacities in the seed coats regardless of genotype. According to their AI, principal component analysis clearly separated the adzuki beans in each seed part. Except for the dehulled seeds, correlation analysis revealed significant and positive associations between TPC, TSC, and antioxidant activities at various levels. In general, five adzuki beans including IT104748, IT103952, IT104016, IT103450, and IT103042 were chosen for their high antioxidant index (> 80%) and thus could be ideal candidates for breeding and distribution to farmers for cultivation and consumption.

[Acknowledgement]

This research was funded by the Research Program for Agricultural Science and Technology Development (Project No. PJ015788) of the National Institute of Agricultural Sciences, Rural Development Administration (Jeonju, Korea).

*Corresponding author: E-mail, naeskr@korea.kr Tell, 063-238-4911