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Verification of Usefulness for Antioxidant Activity in Soybean crossing Population

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[Introduction]

Soybeans not only contain high amounts of oil and protein, but are also a major source of secondary metabolites such as soya saponins and isoflavone. Recently, as the consumption of soybean and soy products increases, antioxidant activity such as ABTS, DDPH, and polyphenol are being considered, and these reduce chronic inflammatory disease, atherosclerosis and coronary heart disease. Hence, the aim of this study is to verify the usefulness of antioxidant activity with an established genomic population for breeding functional soybean varieties.

[Materials and methods]

F₂ cross population was established through generational progress by crossing resources with a high content of soyasaponin (SCEL-1 and Socheong No. 2) and resources with a low content (Wonheuk, Aram and Daepung), and the antioxidant activity of ABTS, DPPH, polyphenols was investigated. Genome structure of the crossed group were analyzed using ADMIXTURE with k segments set to 4, and the neighbor joining tree was analyzed using MEGA X.

[Results and discussion]

As a result of the genome structure and neighbor joining tree for the crossing population, the recipient population using SCEL-1 as a donor was largely classified into four groups: **1)** Socheong No. 2, **2)** Wonheuk, **3)** Daepung, **4)** Aram. ABTS, DPPH, and polyphenol in SCEL-1 X Socheong No. 2 showed the highest antioxidant activity with 48.1, 79.04, and 201.08%, respectively, and SCEL-1 X Wonheuk's ABTS, DPPH, and polyphenol showed the next highest activity with 45.6 and 62.01, 170.99%, respectively. As correlation analysis results on the antioxidant activity of ABTS, DPPH, and polyphenol in each crossing population, there are strong positive correlations at $p < .001$ levels among ABTS, DPPH and polyphenol. These results can be utilized staple research data for the development of molecular markers for soybean saponin content and antioxidant activity in the future, and is expected to help develop functional soybean varieties.

[Acknowledgement]

This work was supported by a grant from AGENDA Program (No.: PJ015711), Rural Development Administration, Republic of Korea.

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