

Variation of Anthocyanin and Protein Contents in *Glycine max* L. (Merr) (Soybean) Germplasms from Korea

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Soybean (*Glycine max* L. (Merr)) is commonly consumed and found in major foods including soymilk, soy sauce, tofu, and soy sprout in Korea and east Asia. In addition, it is common to cook the whole seeds with rice. Soybean is known to have ranges of health benefits including antiaging, anticancer, neuroprotective and antidiabetic taken either as supplement or dietary food. Anthocyanins and flavonoids in *G. max* are found to be the main contributors to such wide arrays of health benefits. Due to increasing economic values of soybean, development of specialty soybean cultivars is becoming an area of interest worldwide. In this study, 746 black soybean accessions from National Agrobiodiversity Center were characterized as part of an attempt to identify important germplasms of *G. max*. Seed coats of each accession were analyzed for their total anthocyanin, cyanidin 3-*O*-Glucoside (C-3-*O*-G), delphinidin 3-*O*-glucoside (D-3-*O*-G), petunidin-3-*O*-glucoside (Pt-3-*O*-G), and their whole seeds for crude protein contents. HPLC was used to determine and quantify the anthocyanin compositions while crude protein was determined using Kjeldahl method by Kjeltex auto-analyzer (Kjeltex 8400, Foss, Sweden). Accessions were grouped according to their anthocyanins and protein contents; the mean content of which were correlated to agronomic traits including maturity date, one hundred seed weight, cotyledon color and seed lust color. The results indicated that the total anthocyanin content (TAC) ranged from 273.77 to 6250.52 mg/100 g, with mean value of 1853.03 mg/100 g while the crude protein content (CPC) being between 33.43 and 47.51%, with mean value of 40.81%. The highest number of accessions (45.97%) showed TAC between 1000~1900 mg/100 g while 30.96% of accessions showed CPC between 41~43%. Among the 746 accessions considered, 11 (IT142935, 175818, 175855, 177191, 177209, 177211, 177214, 177216, 177218, 177220, 177274) of them showed TAC above 4000 mg/100 g. C-3-*O*-G was found to be the major contributor to TAC showing strong correlation. Accessions with green cotyledon color showed high mean TAC compared to those having yellow cotyledon color, and accessions with dull seed lust color showed high mean TAC than those having shiny seed lust color. One hundred seeds weight and maturity date showed positive correlation with all anthocyanin contents, except for Pt-3-*O*-G in the latter case. The overall result of the present study could be used as background for developing new black soybean cultivars and breeds with high anthocyanin and protein contents. The result depicted that many of the accessions could be used as potential parental lines.

Key words: Anthocyanin, Black soybean, *Glycine max*, Protein