

Variation of Major Isoflavone Contents in Soybeans (*Glycine max* (L.) Merrill.) of Collection Area, Diversity, and Seed Coat Color

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Soybean seeds are important sources of non-nutritive health promoting metabolites. The contents of these metabolites are affected by both genetic and environmental factors. In the present study, the contents of five common isoflavones including daidzin, genistin, glycitin, malonyldaidzin, and malonylgenistin were analyzed in 72 soybeans of different seed coat colors, diversity, and of different origins including China (22), Japan (9), USA (12), India (4), and Korea (25). The average total isoflavone content (TIC) was maximum in Indian soybeans (3302.36 $\mu\text{g/g}$) and minimum in Chinese landraces (1214.95 $\mu\text{g/g}$). The Korean landraces had higher average TIC (2148.05 $\mu\text{g/g}$) than the USA genetic materials (1580.23 $\mu\text{g/g}$) and Japanese landraces (1485.99 $\mu\text{g/g}$). The content of malonylgenistin was in the range of 54.31 – 2385.68 $\mu\text{g/g}$ in the entire population, and was the most abundant isoflavone irrespective of origin although there was content variation among individual soybeans. Besides, glycitin was the least concentrated isoflavone, and its content ranged from 0.00 to 79.79 $\mu\text{g/g}$. With respect to seed coat color, green soybeans from all countries displayed the maximum malonylgenistin and TIC contents. Exceptions were those of Korean and Indian origins where black and yellowish-green soybeans presented the highest malonylgenistin and TIC contents, respectively. In multivariate analysis, 92.72% of the variance was explained by the first two principal components, and the soybeans were grouped in to three clusters based on isoflavone contents. Overall, our findings signify the importance of seed coat color and origin as discriminant parameters, and provide wide spectrum of routes for breeding soybean cultivars.

Key words: *Glycine max*, Isoflavones, Seed coat color. Soybeans

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