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Antioxidant Potentials and Quantification of Flavonoids in Mungbean (*Vigna radiata* L.) Seeds

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Objectives

The objectives of this study was to isolate and identify flavonoids from mungbean (*Vigna radiata* (L.) Wilczek) seeds, and to select cultivar or germplasm containing higher flavonoid content. The research would be useful to seek genetic resources that contain a great quantity of flavonoids for breeding program.

Materials and Methods

The ground grains were extracted by boiling under reflux with 80% methanol for 12 h. The extract was defatted with methylene chloride, and fractioned with ethyl acetate. The collected filtrate was evaporated to dryness under vacuum at 40 ℃ using a rotary evaporator. The crude extract was chromatographed through Sephadex LH-20 column eluted with methanol. As a result of the DPPH test, higher antioxidant activity was found from two fractions. By means of HPLC analysis we identified flavonol glycoside including vitexin and isovitexin which showed at a previous report. Mungbean germplasms including 6 cultivars, 26 breeding lines, and 163 landraces were grown at a field of Jeollanamdo Articultural Research and Extension Services, Naju, Korea, in 2002. Taxonomical identifications were made by morphological measurement of morphological characteristics such as seed coat color, pod length, seed weight and other key characteristics.

Table 1. Composition of the ethanol extract of mungbean, as analyzed on an ODS column, with column conditions as listed.

Flavonoids	Ret. time	Conditions
Vitexin	6min	Mobile phase : MeOH:H_2O:EtOAc=34.6:60.0:5.4
		Flow rate : 1㎖/min
		Detector : photo diode array 254㎚
		Column : PHENOMENEX 00G-4337-E0, 250 × 4.60 ㎜, 4 ㎛
Isovitexin	7min	

Results and Discussion

Mungbean (*Vigna radiata* (L.) Wilczek) is an increasingly important human food source, as well as a new functional agent, mainly due to its potent antioxidant activity. This study was conducted to determine antioxidant activity of fractions from mungbean seeds through measuring radical scavenging activity by using DPPH and to quantify of the flavonoids by means of HPLC analysis vitexin and isovitexin were present in both ethanol and water extracts as the highest amount. Flavonoids, vitexin and isovitexin were quantified from 195 germplasms of mungbeans and showed a 4.7 fold range in

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their content. Especially, the breeding line KM99004-4B-2 (Suwon28/KM94004, '03 yield trial No. 6), which has grown in Jeollanamdo Agricultural Research and Extension Services, showed highest amount (15.88 ㎎/g) of total flavonoids. Of two flavonoids, the vitexin portion was averaged 70.73±1.38%. High positive correlation (r=0.96***) between vitexin and isovitexin contents exhibited. Correlation, however, between flavonoid content and the 24 physiological and ecological characteristics was very low. Seed coats of mungbeans had the highest flavonoid amount, and contained flavonoids about 50 ~ 70 times more than cotyledon. Flavonoid contents in the seed, the cotyledon, and the seed coat were decreased as the seed imbibition time increased.

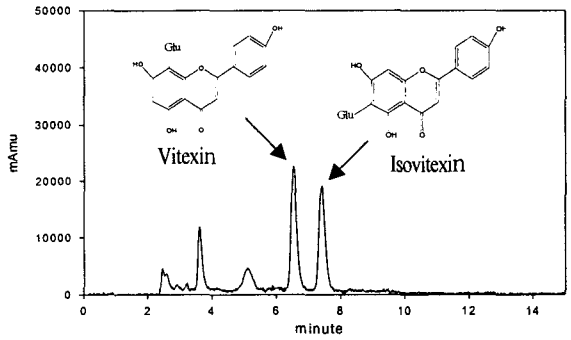

Fig. 1. The HPLC chromatogram of vitexine and isovitexine from the mungbean.

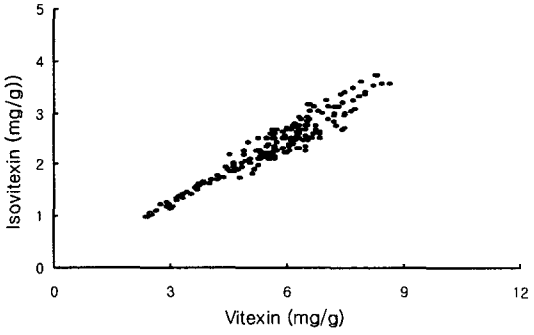

Fig. 2. Correlation of vitexin content and isovitexin content contained in the mungbean(r=0.96***).

Table 2. Distribution of vitexin and isovitexin content in seeds from 195 mungbean germplsms.

Flavonoids	Content (㎎/g)						
	~2.00	2.01~4.00	4.01~6.00	6.01~8.00	8.01~10.00	10.01~	Mean±SD
	Distribution (%)						
Vitexin	0	17.4	37.5	41.5	3.1	0.5	5.63±1.50
Isovitexin	26.7	72.8	0.5	0	0	0	2.33±0.63

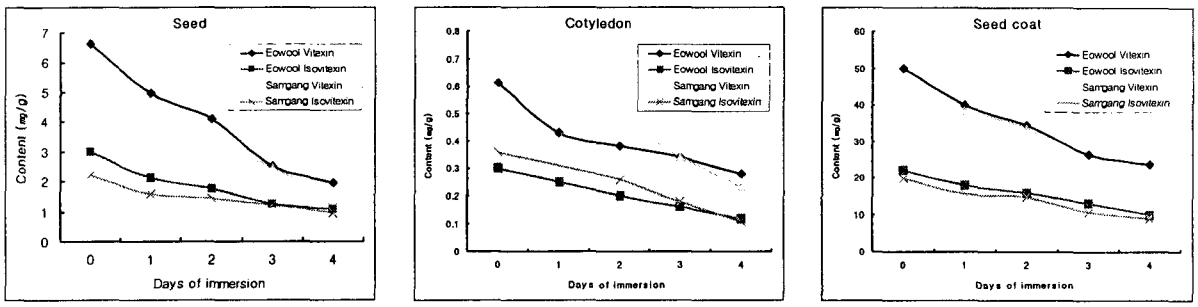

Fig. 3. Changes in the flavonoid content in each part of the mungbean according to the immersion period.