

2. Isoflavones Analysis and Test of Antioxidative Activity on Recommended Soybean (*Glycine max* L.) Cultivars During Storage Time

Konkuk Univ. : I.M. Chung · J.K. Ahn · S.J. Lee* · S.H. Kim

저장기간에 따른 콩 장려품종에서의 Isoflavones 분석과 항산화활성 검정

건국대학교 : 정일민 · 안종국 · 이선주* · 김승현

Objectives

- To evaluate of isoflavone contents and antioxidative activity on 10 soybean cultivars for three years storage.

Materials and Methods

- 10 soybean cultivars including Taekwang
- **Isoflavones Analysis(HPLC)**
Mobile phase : solvent A(0.1% glacial acetic acid in distilled water)
 : solvent B(0.1% glacial acetic acid in a ACN)
Injection : 20 μ L of sample
Flow rate : 1 mL/min
UV detector : 254 nm
Column : YMC-AM 303 (ODS 4.5 \times 250 mm)
- **Test of Antioxidative Activity**
SOD (superoxide dismutase), DPPH (1,1-diphenyl-2-picrylhydrazyl)
TBA (thiobarbituric acid), ESR (electron spin resonance)
- **Germination Tests**

Results and Discussion

- In HPLC analysis, the soybean cultivars of the highest total isoflavone contents among 3 years were shown by Pureunkong(1943.9 μ g/g), Jinpumkong2(1831.7 μ g/g), Hannamkong(1805.4 μ g/g) in 1998 and Hannamkong(2019.0 μ g/g), Pureunkong(1996.1 μ g/g), Jinpumkong2(1986.8 μ g/g) in 1999 and also Jinpumkong2(2773.9 μ g/g), Pureunkong(2679.7 μ g/g), Myeongjunamul-kong(2546.7 μ g/g) in 2000.
- In SOD activity, the soybean cultivars of the highest activity among 3 years were exhibited by Hwaecomputkong(45.9%), Suwon157(44.3%) in 1998 and Daweonkong(39.4%), Muhankong(38.5%) in 1999 and Myeongjunamul-kong(43.2%), Daweonkong(42.1%) in 2000, respectively.

Table 1. Isoflavone Contents($\mu\text{g/g}$) of Korean Recommended Soybean Cultivars in 1998, 1999 and 2000.

Varieties	1998				1999				2000			
	TDein	TGein	TGlein	TIso	TDein	TGein	TGlein	TIso	TDein	TGein	TGlein	TIso
Taekwang	681.0	714.7	281.9	1677.5	892.6	962.8	108.5	1963.9	1091.7	1162.2	185.0	2438.9
Myeongju	624.0	988.4	121.1	1733.5	816.2	1044.4	90.3	1950.9	1142.5	1290.1	114.2	2546.7
Daweon	786.5	679.3	305.6	1771.4	654.8	1114.8	45.5	1815.1	916.8	1255.5	71.5	2243.8
Muhan	712.0	771.9	230.0	1713.8	689.7	1122.9	59.1	1871.7	953.5	1306.8	143.8	2404.1
Hwaeom	434.1	834.3	-	1268.4	644.0	1007.8	-	1651.8	836.0	1039.7	255.2	2130.8
Pureun	784.7	811.9	347.3	1943.9	908.5	920.7	166.9	1996.1	1272.0	1142.0	265.8	2679.7
Hannam	922.4	723.4	159.7	1805.4	948.9	955.5	114.6	2019.0	1194.4	1163.6	165.4	2523.4
Geomjeong1	699.1	586.6	160.0	1445.6	771.6	990.0	-	1761.6	1058.0	987.6	236.5	2282.1
Jinpum2	689.7	676.4	465.6	1831.7	852.4	872.5	262.0	1986.8	1253.4	1230.2	290.4	2773.9
Suwon157	619.7	923.9	-	1543.5	548.6	1013.3	-	1561.8	874.7	1270.8	156.4	2302.0
CV(%)	9.7	7.7	10.1	6.6	7.1	3.4	21.9	2.0	6.6	5.5	14.9	4.5
LSD(0.05)	149.5	131.5	46.8	244.9	121.4	75.3	41.2	81.8	155.3	145.5	62.5	246.1

Abbreviations:

TDein(=daidzin+acetyldaizin+malonyldaizin+daidzein), TGein(=genistin+acetylgenistin+malonylgenistin+genistein), TGlein(=glycitin+acetylglycitin+malonylglycitin+glycitein), TIso(=TDein+TGein+TGlein)

Table 2. Twelve Isomers on Soybean Cultivars of The Highest Total Isoflavone Contents($\mu\text{g/g}$).

Varieties	Glucoside			Malonyl			Acetyl			Aglycon		
	Din	Gin	Glin	Din	Gin	Glin	Din	Gin	Glin	Dein	Gein	Glein
Pureun	256.5	279.2	127.1	727.4	676.4	132.9	-	-	-	4.5	2.7	-
Hannam	261.9	248.1	64.2	754.0	696.3	82.4	-	-	-	6.0	3.1	-
Jinpum2	196.0	221.3	150.1	729.8	702.0	185.5	-	-	-	6.0	3.1	3.6
CV(%)	30.5	31.2	68.1	36.8	34.8	79.6	-	-	-	185.6	162.7	388.5
LSD(0.05)	73.5	97.7	57.6	268.5	287.6	79.7	-	-	-	11.5	5.8	3.5

Table 3. The SOD Activities(%) of Korean Recommended Soybean Cultivars in 1998, 1999 and 2000.

Varieties	Year	1998	1999	2000	LSD (0.05)
		----- Activity (%) -----			
Taekwang		33.5	31.9	36.9	16.7
Myeongju		35.2	35.9	43.2	2.8
Daweon		32.8	39.4	42.1	8.4
Muhan		39.1	38.5	33.3	13.0
Hwaeom		45.9	35.5	33.0	27.1
Pureun		28.2	33.4	36.2	14.5
Hannam		41.8	35.9	32.1	8.9
Geomjeong1		30.7	29.4	32.5	10.6
Jinpum2		30.4	20.7	19.8	5.5
Suwon157		44.3	33.2	34.4	12.9
CV (%)		14.3	20.4	23.8	
LSD (0.05)		8.8	11.6	13.9	