

Contents of Isoflavone and Amino Acids in Soybean according to Growth Stage

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Objectives

The isoflavone content in soybean seeds varies depending on the variety and environmental conditions. To better understand the observed variation, we conducted the current study. Namely, We intend to identify change of isoflavone and isoflavone glucosides amount in parts of soybean according to growth period. We also investigated the amino acid content, cultivated in the paddy field.

Materials and Methods

1. Materials : Pungsannamulkong

2. Methods

- Extraction method : Isoflavone - Methanol/water(80:20 v/v), 80 °C, 15 hr.
- HPLC Analysis : Isoflavone - photodiode array(PDA) detector(210~400nm) and RP column(4.6×250mm, 5- μ m particle size), 254nm
Amino Acid-UV/Vis detector, waters AccQ-tag column, 254nm
- Mobil phase : Isoflavone - (A) glacial acetic acid : DW (52.6 : 900)
(B) acetonitril : solution A (80 : 20).
Amino Acid - (A) AccQ fluor-Tag eluent A: D.W(200ml:2 l)
(B) 0.1% acetic acid in 60% acetonitril

Results and Discussion

To analyze the isoflavone and amino acid content according to growth stage. the samples were taken at R1(July 31), R3(August 19), R5(September 2) and R7(September 23) stage, respectively. The content of isoflavones in Pungsannamulkong by parts and growth were shown in table 1. Total isoflavone content was the highest in root of R7. and According to growth, from R1 to R3, total isoflavone content was increased and then decreased a little and increased again at R7. Also, stem and leaf of soybean plants were showed similar trend. In case of amino acid, total amino acid content was the highest in leaf of R1. From R1 to R7, according to growth, total amino acid content was decreased. Also, stem of soybean were showed similar trend. But, it showed different trend in root. Therefore, from R1 to R5, total amino acid content was increased and showed the highest content at R5, and then decreased a little.

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Table 1. Isoflavones content of soybean at different growth stages

Isoflavones	Root				Stem				Leaf			
	R1	R3	R5	R7	R1	R3	R5	R7	R1	R3	R5	R7
Daidzin	594.9	423.6	690.1	1074.6	64.2	182.1	154.1	296.4	85.2	104.8	80.7	275.1
Glycitin	43.1	22.8	24.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Genistin	24.4	18.1	28.7	72.2	0.0	0.0	8.9	4.3	27.0	61.0	47.1	126.9
M.Glycitin	174.6	107.4	166.5	267.9	29.9	73.8	55.7	102.4	55.2	109.6	55.1	266.4
A.Daidzin	380.8	373.3	394.5	1180.6	14.2	116.9	71.8	168.6	77.8	201.6	172.4	505.0
A.Glycitin	84.8	116.5	128.5	64.8	0.0	26.8	22.0	37.2	78.9	284.8	330.1	521.7
M.Genistin	0.0	0.0	0.0	0.0	0.0	0.0	6.6	7.8	7.0	16.5	7.8	12.1
A.Genistin	143.8	168.8	109.6	476.1	37.6	63.9	47.7	297.5	70.4	133.3	121.3	403.1
Glycitein	119.1	161.2	127.1	0.0	80.5	65.8	87.9	236.6	120.3	176.6	184.4	268.6
Daidzein	815.9	1832.3	994.5	702.4	37.1	68.9	90.7	173.7	47.3	64.9	64.9	238.8
Genistein	124.4	342.9	155.0	364.1	63.4	51.0	39.1	179.3	68.6	72.8	110.3	223.9
Total	2505.8	3566.9	2818.9	4202.8	326.8	649.2	584.7	1503.8	637.7	1225.9	1174.4	2841.7

unit: $\mu\text{g/g}$ D.B

Table 2. Amino acid content of soybean at different growth stages

unit : mg/g D.B

Isoflavones	Root				Stem				Leaf			
	R1	R3	R5	R7	R1	R3	R5	R7	R1	R3	R5	R7
ASP	7.1	6.9	11.3	9.6	12.0	9.7	10.6	6.3	31.5	27.5	23.8	20.4
SER	5.5	4.8	6.4	5.3	5.6	4.4	3.7	3.5	15.3	13.4	9.8	10.3
GLU	6.6	7.3	10.5	9.8	10.6	8.4	6.6	6.4	36.8	31.6	22.1	23.2
GLY	4.2	4.3	6.0	5.1	5.0	4.3	3.7	3.4	18.7	15.3	10.5	10.8
HIS	2.9	2.7	3.3	2.8	3.0	2.4	2.2	2.1	7.9	6.5	4.9	4.0
ARG	4.1	4.2	5.6	4.5	6.0	4.2	3.9	2.7	21.6	17.2	12.9	10.1
THR	4.0	4.1	5.4	4.5	4.8	4.3	3.4	3.0	17.9	14.6	10.4	10.1
ALA	5.2	5.0	8.0	6.8	7.3	6.7	5.6	4.3	23.0	19.5	12.8	12.9
PRO	5.7	6.0	7.6	7.0	6.2	5.3	5.3	4.2	20.1	17.1	11.1	11.4
CYS	2.4	2.9	4.1	3.5	1.3	1.5	2.0	1.0	2.2	3.0	2.1	2.5
TYR	4.4	4.4	5.2	3.8	3.8	2.9	2.7	2.7	12.5	13.1	8.7	9.0
VAL	4.5	4.8	6.9	5.7	6.0	4.8	4.0	3.3	22.6	17.0	12.8	12.3
MET	2.9	3.0	3.3	3.0	3.3	3.0	2.8	2.7	8.3	6.6	5.5	5.3
LYS	8.2	6.8	11.0	7.4	8.0	6.7	6.8	3.1	28.6	23.0	13.6	8.8
ILE	3.7	3.9	5.2	4.3	4.9	3.9	3.3	2.8	17.2	12.6	9.7	9.2
LEU	6.2	6.6	9.0	7.6	8.1	6.5	5.4	4.8	35.1	28.3	19.9	19.5
PHE	4.3	4.4	5.3	4.3	4.6	3.7	3.2	2.9	19.7	16.7	12.5	11.6
Total	82.1	82.3	113.9	94.9	100.4	82.7	75.1	59.1	339.1	283.0	203.2	191.5

Reference

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