LT066

GL Sciences Inc.

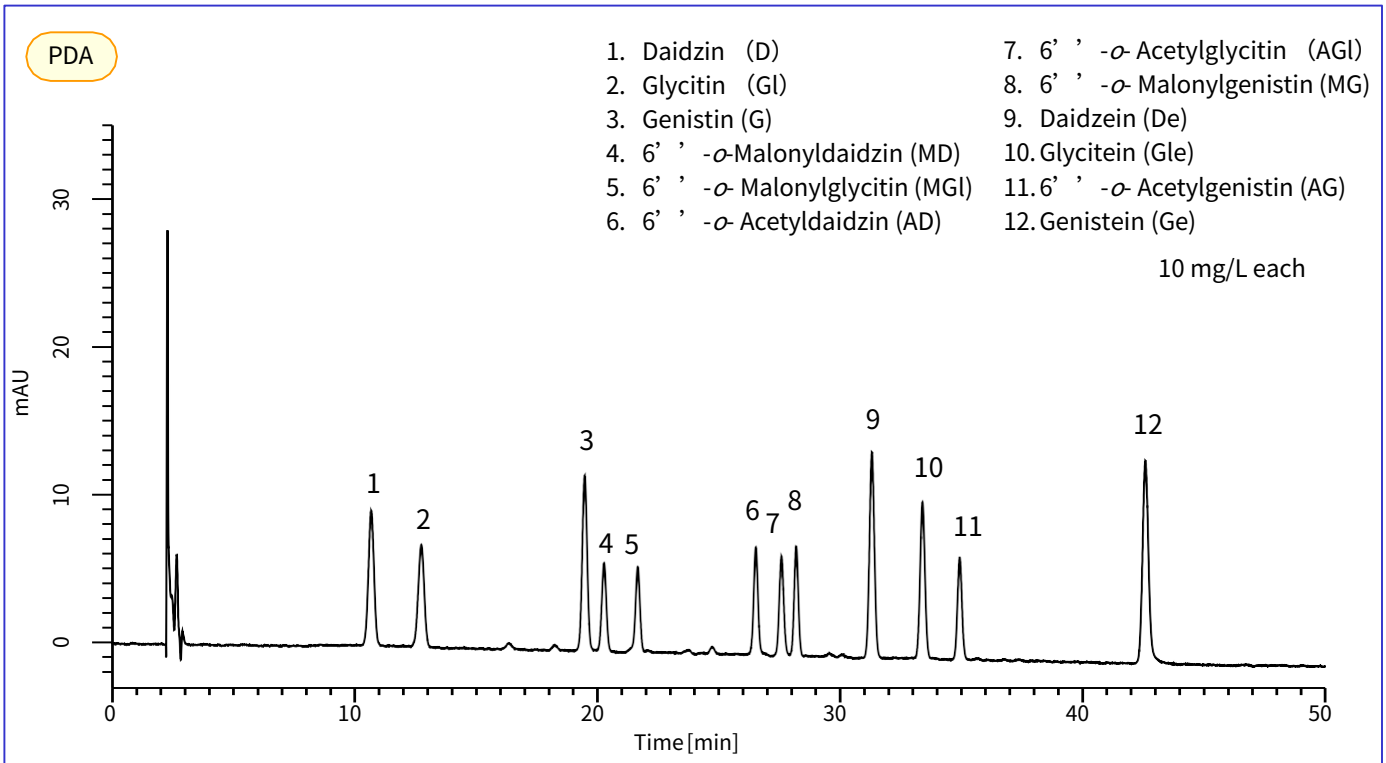
Analysis of Isoflavones in Food by HPLC

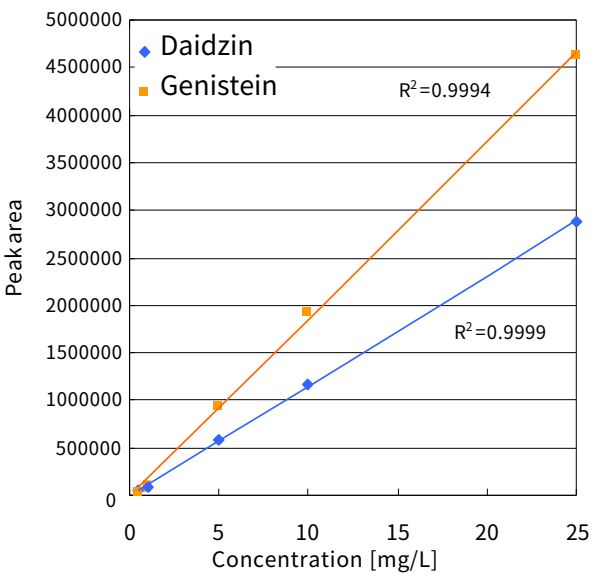
Isoflavones are a type of flavonoid and found in a number of legumes, grains, and, vegetables. Among them, soybean is by far the most concentrated source of isoflavones. As their chemical structures are very similar to those of endogenous estrogens, isoflavones are known to have estrogen-like effect and provide several health benefits.

In this note, a simultaneous determination method for 12 major isoflavones (daidzein, genistein, glycitein, and their glycosides) in soy foods is described. The HPLC separation of isoflavones was achieved by using Inertsil ODS-SP as a separation column.

(K.Suzuki)

A Chromatogram Obtained from Standard Solution





	R²
1. D	0.9994
2. Gl	1.000
3. G	1.000
4. MD	1.000
5. MGl	1.000
6. AD	0.9999
7. AGl	0.9999
8. MG	1.000
9. De	0.9999
10. Gle	1.000
11. AG	1.000
12. Ge	0.9999

Calibration curves and their correlation coefficients

Conditions

Column : Inertsil ODS-SP (5 µm, 250 x 4.6 mm I.D.) Cat.No. 5020-02746

Eluent : A) 0.1 % acetic acid in CH_3CN
B) 0.1 % acetic acid in H_2O
A/B = 15/85 — 8 min — 15/85 — 42 min — 35/65 equilibration 10 min), v/v Mixed by a gradient mixer)

Flow rate : 1.5 mL/min

Col. Temp. : 35 °C

Detection : PDA 254 nm

Inj. Vol. : 10 µL

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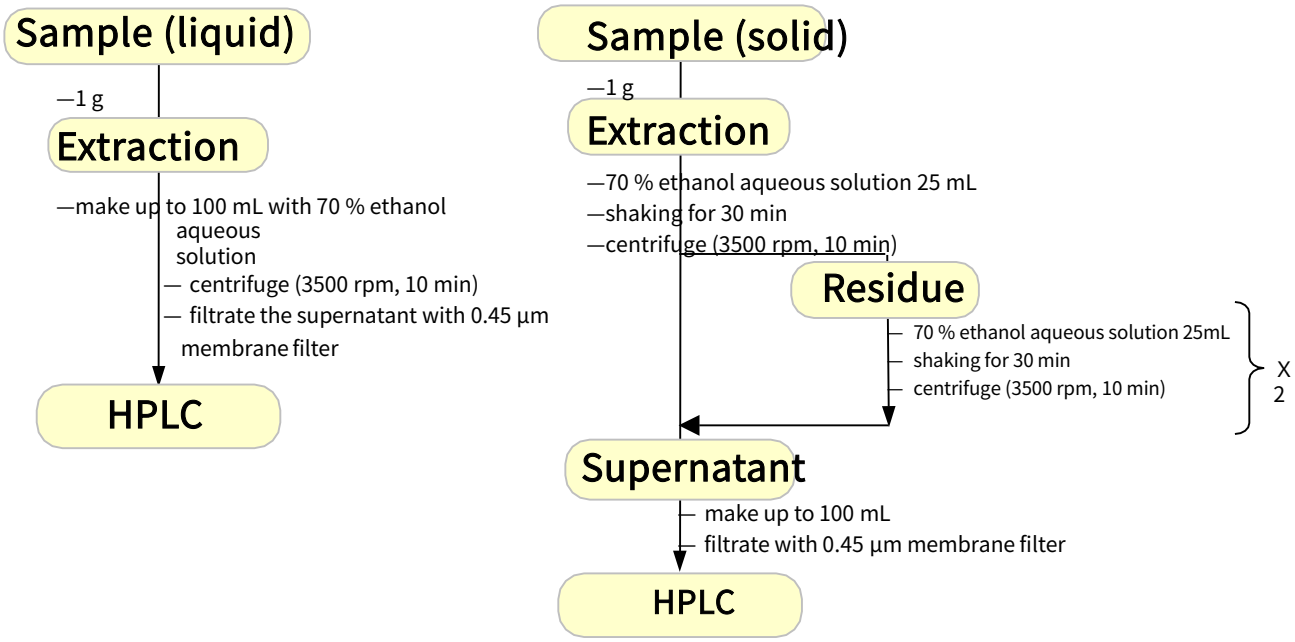
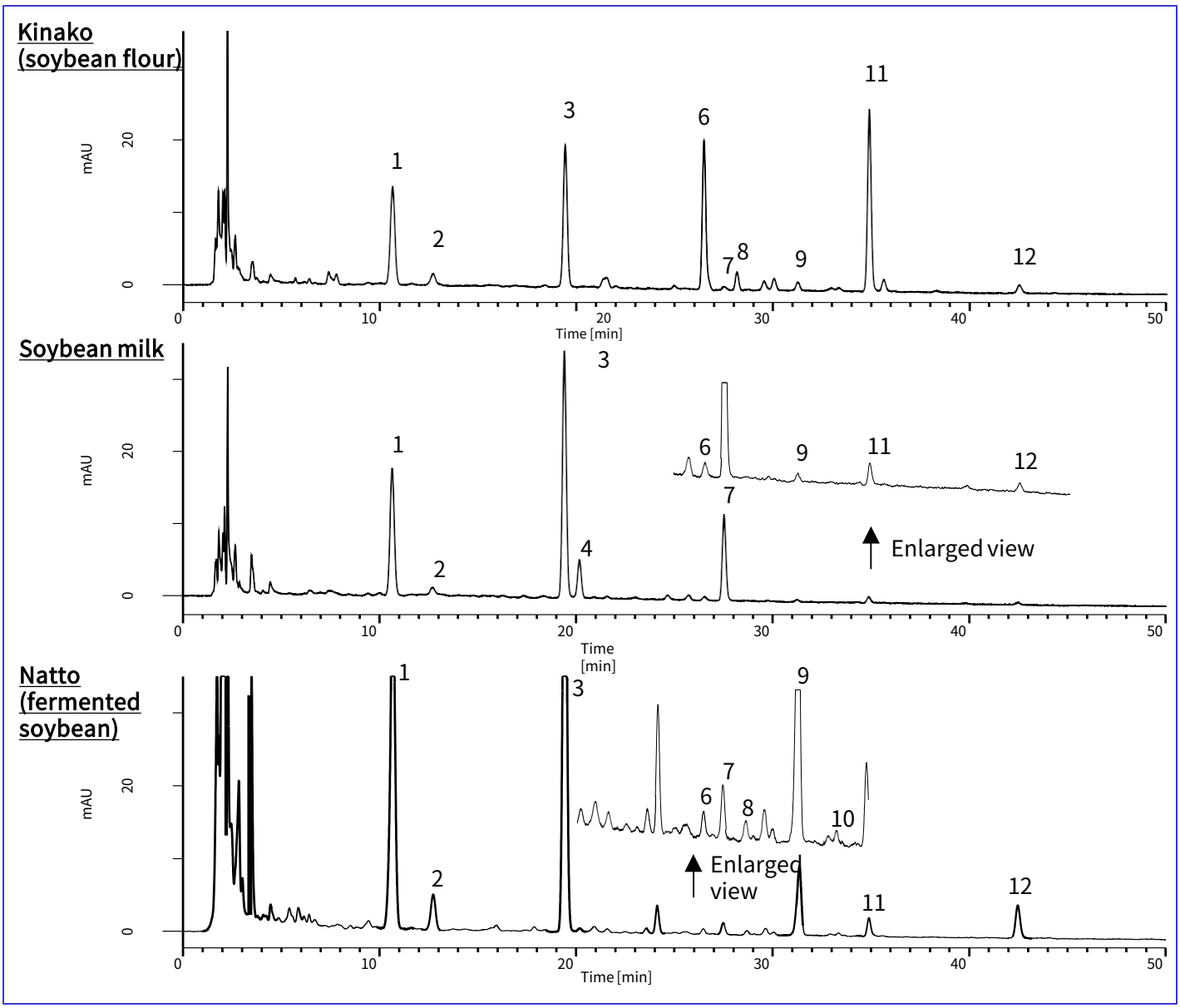
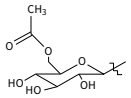
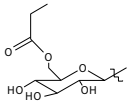


Chromatograms obtained from soy food samples

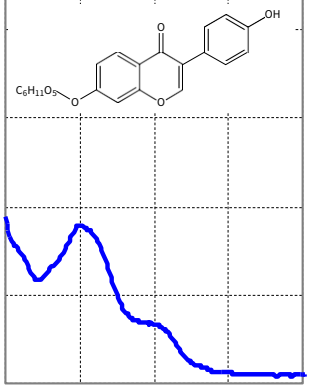


The chemical structures and the absorption spectra

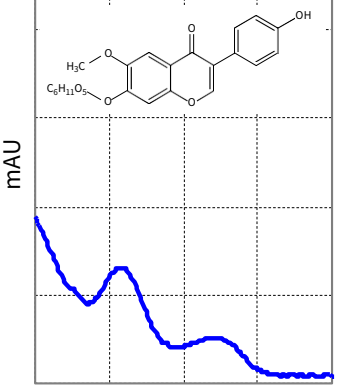
R_1 : 

R_2 : 

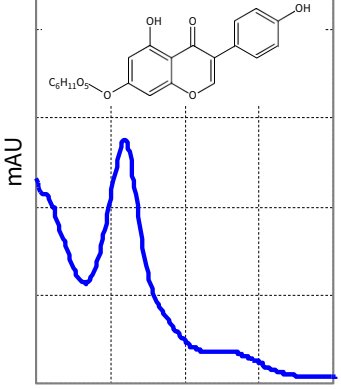
1. daidzin



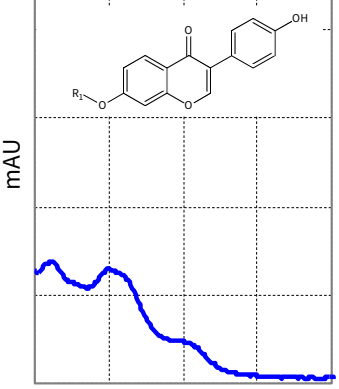
2. glycitin



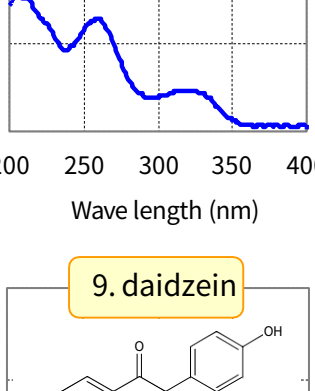
3. genistin



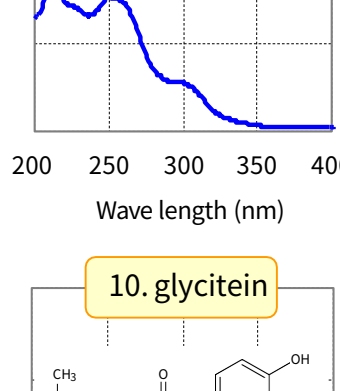
4. malonyldaidzin



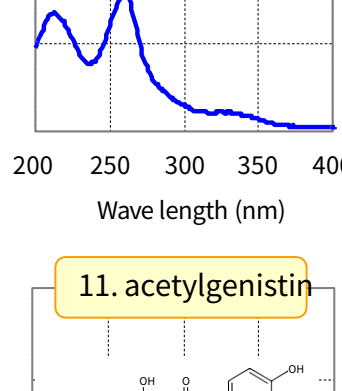
5. malonylglycitin



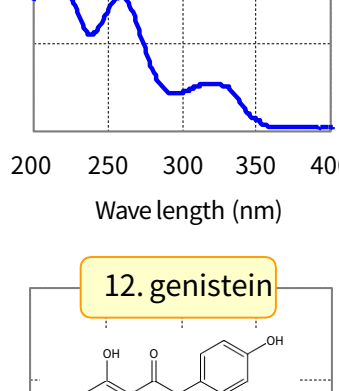
6. acetyldaidzin



7. acetylglycitin



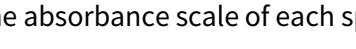
8. malonylgenistin



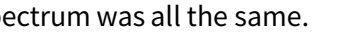
9. daidzein

10. glycitein

11. acetylgenistin



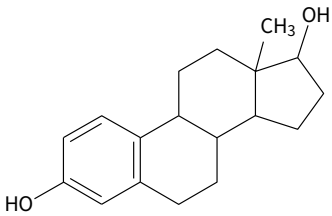
12. genistein



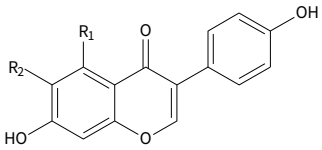
* The absorbance scale of each spectrum was all the same.

Coffee Break

Since isoflavones are similar to estrogens (e.g. estradiol shown on the right) in chemical structure, isoflavones are also classified as phytoestrogen. It is suggested that isofalvones attenuate some estrogen-deficiency diseases such as osteoporosis due to their estrogen-like effect.

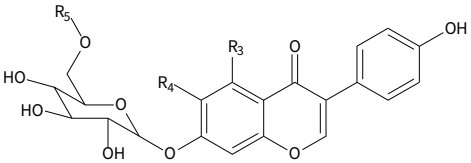


Estradiol



Isoflavones

	R1	R2
Daidzein	H	H
Genistein	OH	H
Glycitein	H	OCH_3



Isoflavone glycosides

	R3	R4	R5
Daidzin Genistin Glycitin	H	H	H
6'' -O-Acetyldaidzin	OH	H	H
6'' -O-Acetylgenistin	H	OCH_3	H
6'' -O-Acetylglycitin	H	H	$COCH_3$
6'' -O-Malonyldaidzin	OH	H	$COCH_3$
6'' -O-Malonylgenistin	H	OCH_3	$COCH_3$
6'' -O-Malonylglycitin	H	H	$COCH_2COOH$
6'' -O-Succinyldaidzin	OH	H	$COCH_2COOH$
6'' -O-Succinylgenistin	H	OCH_3	$COCH_2COOH$
	H	H	COC_2H_4COOH
	OH	H	COC_2H_4COOH

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