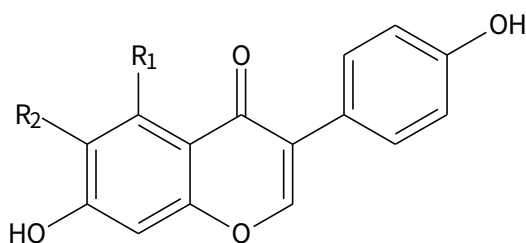


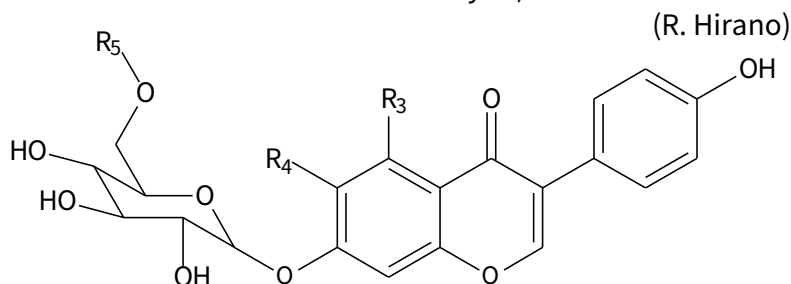
Simultaneous Analysis of 12 Soybean Isoflavones

Isoflavones are contained in several products made of soybeans. They are known to be functional compounds with antioxidant properties and for their metabolites for having estrogenic properties. Soybean isoflavones contain 15 types of isoflavones: 3 types of isoflavones (daidzein, glycitein and genistein) called Aglycone (non-glycoside), 3 types of glycosides (daidzin, glycitin, genistin), 3 types of acetylated glycosides, 3 types of malonylated glycosides and 3 types of succinylated isoflavone glycosides.

In this note InertSustainSwift C18 column was used to analyze 12 types of soybean isoflavones (the 3 types of succinylated isoflavone glycosides are not been considered in this analysis).



Isoflavone
e



Soybean Isoflavone
Glycosides
(R. Hirano)

HPLC Conditions

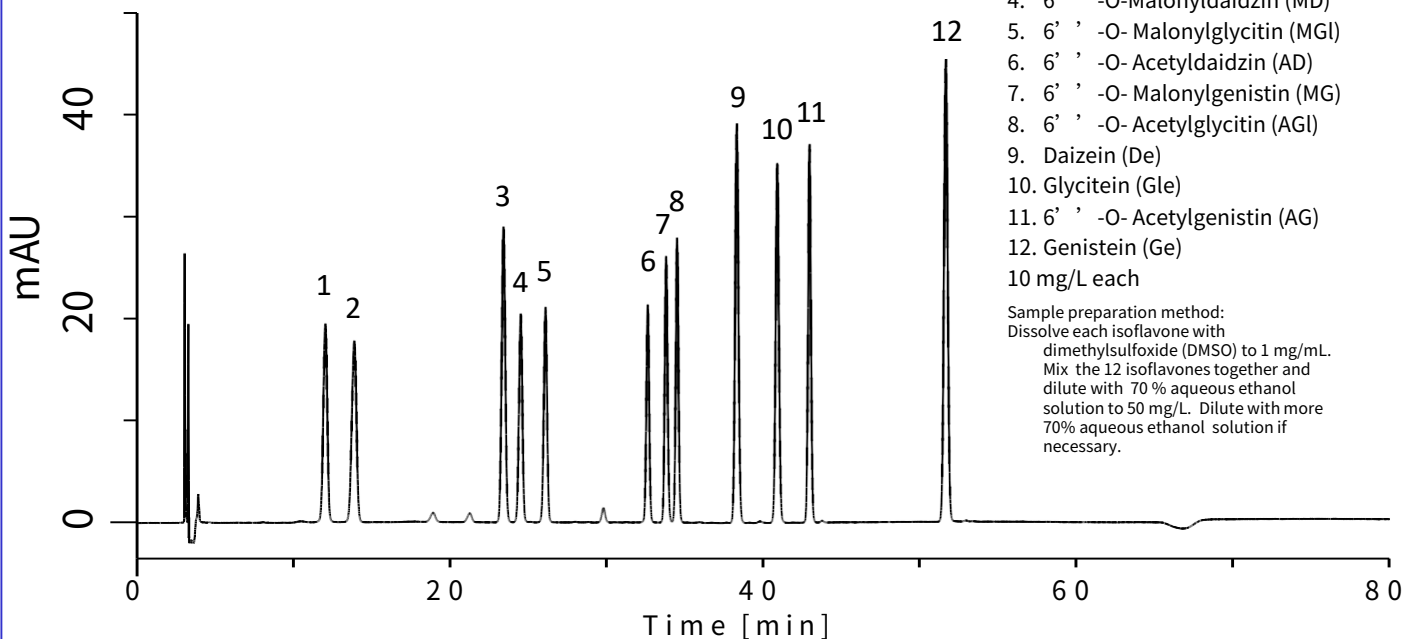
Column : InertSustainSwift C18
(5 μ m, 250 x 4.6 mm I.D.)
Flow rate : 1.0 mL/min
Column temp. : 35 $^{\circ}$ C
Detection : PDA 254 nm (PD7752 PDA Detector)
Injection Vol. : 10 μ L

Eluent : A) $\text{CH}_3\text{CN}/\text{H}_2\text{O}/\text{CH}_3\text{COOH} = 150/850/1, \text{v/v/v}$ B)
 $\text{CH}_3\text{CN}/\text{H}_2\text{O}/\text{CH}_3\text{COOH} = 350/650/1, \text{v/v/v}$

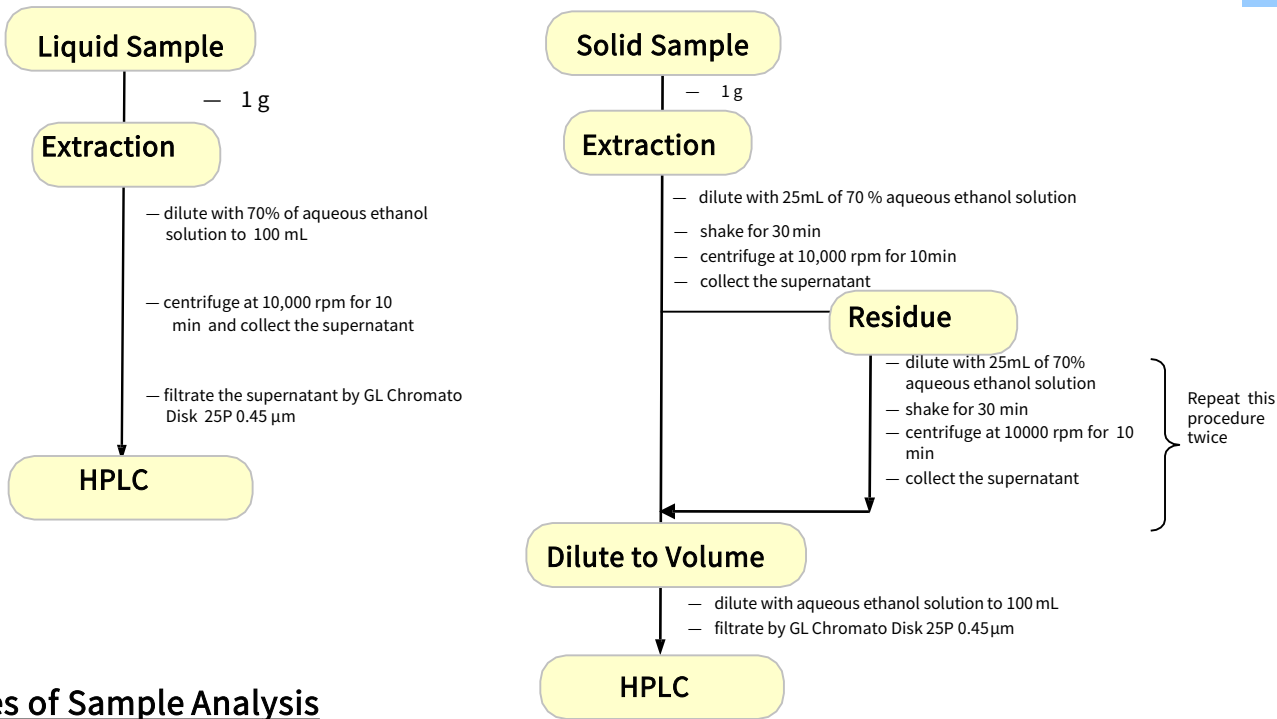
Time (min.)	Eluent A (%)	Eluent B (%)
0	100	0
10	100	0
60	0	100
61	100	0
80	100	0

Standard Solution

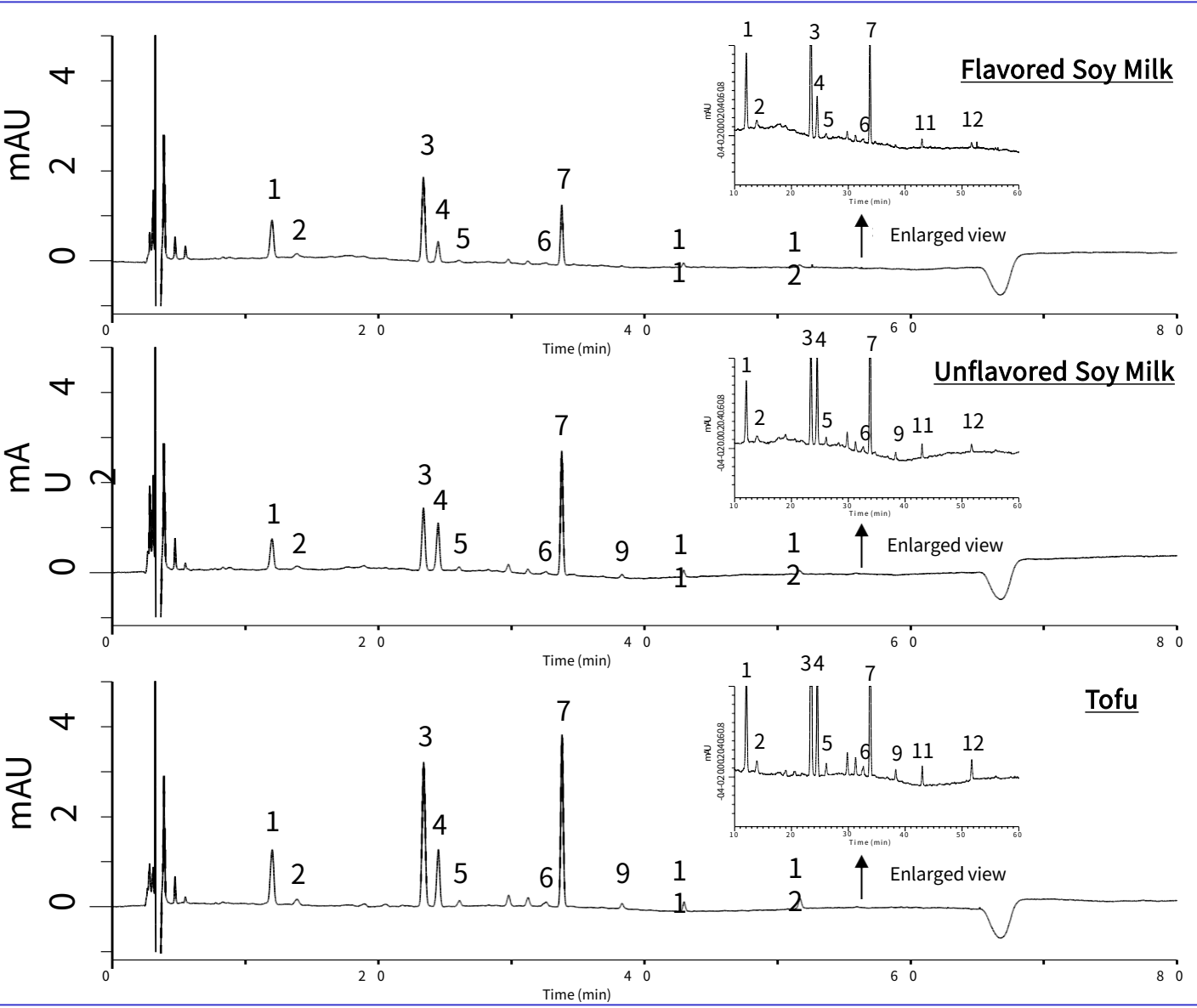
PDA



Example of Pretreatment M

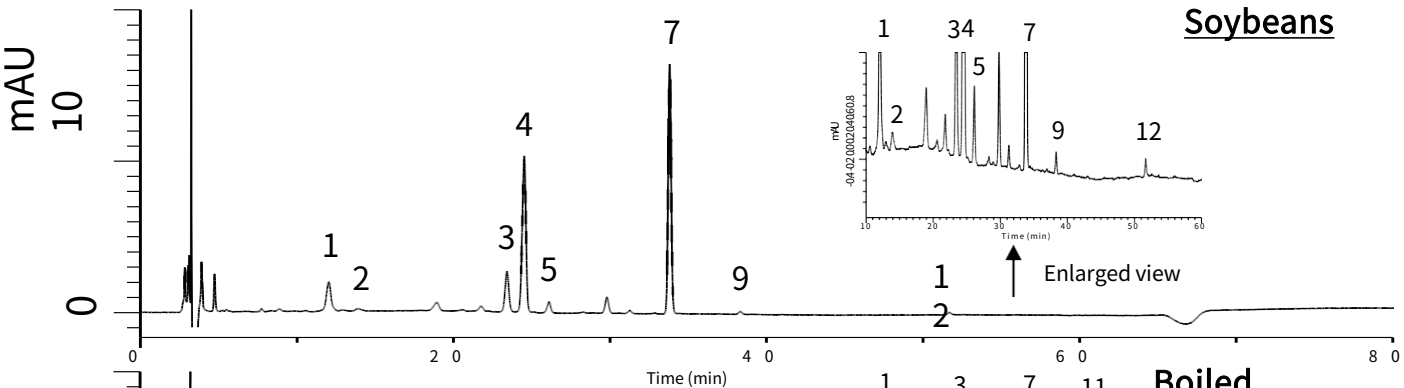


Examples of Sample Analysis

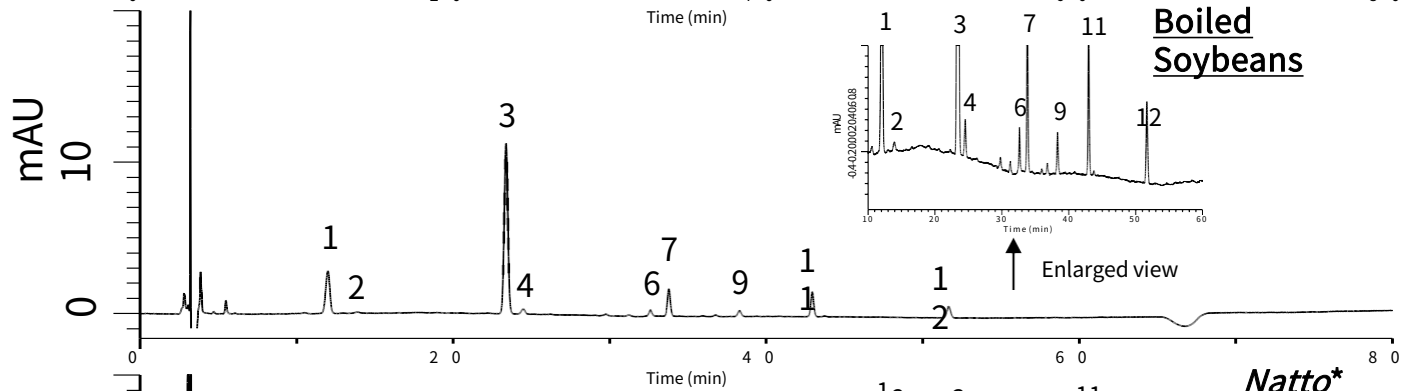


Examples of Sample Analysis

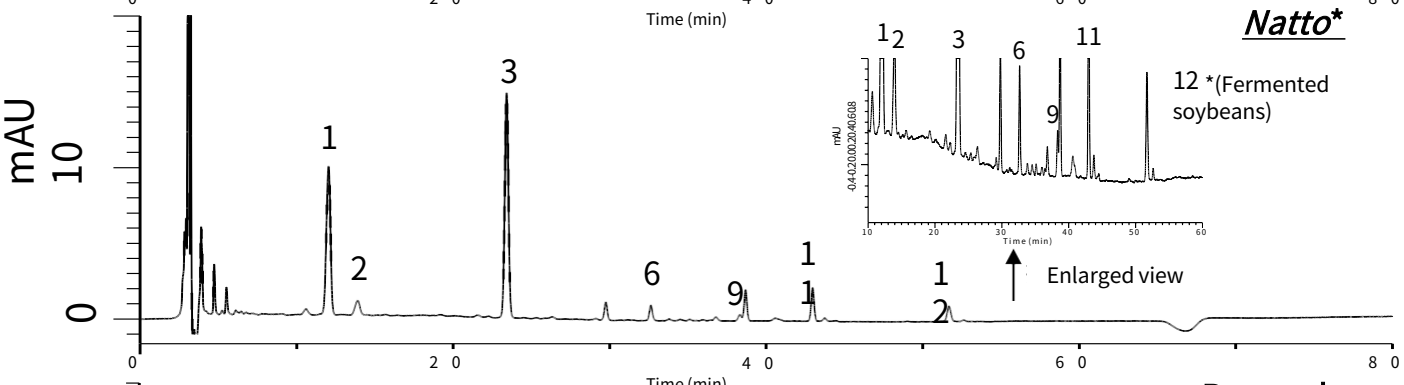
Soybeans



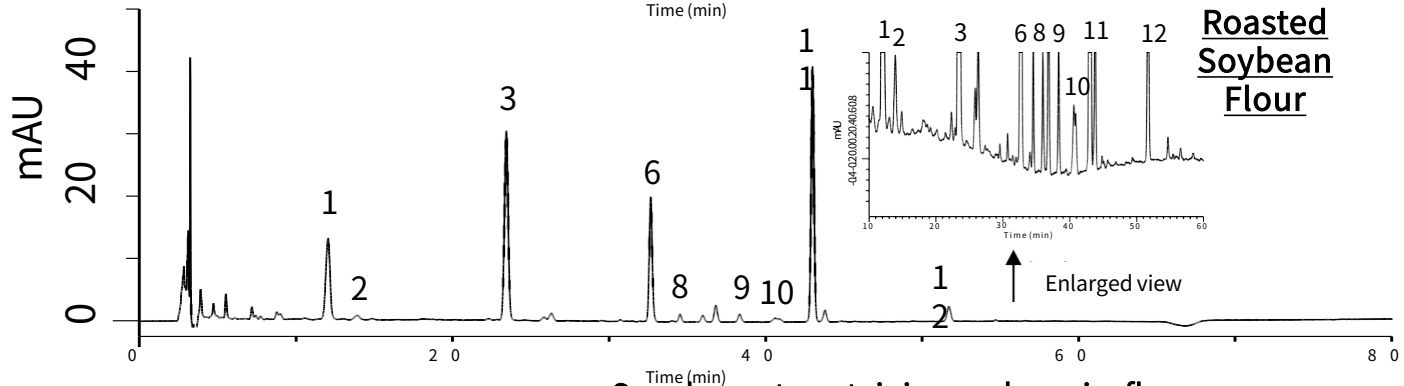
Boiled Soybeans



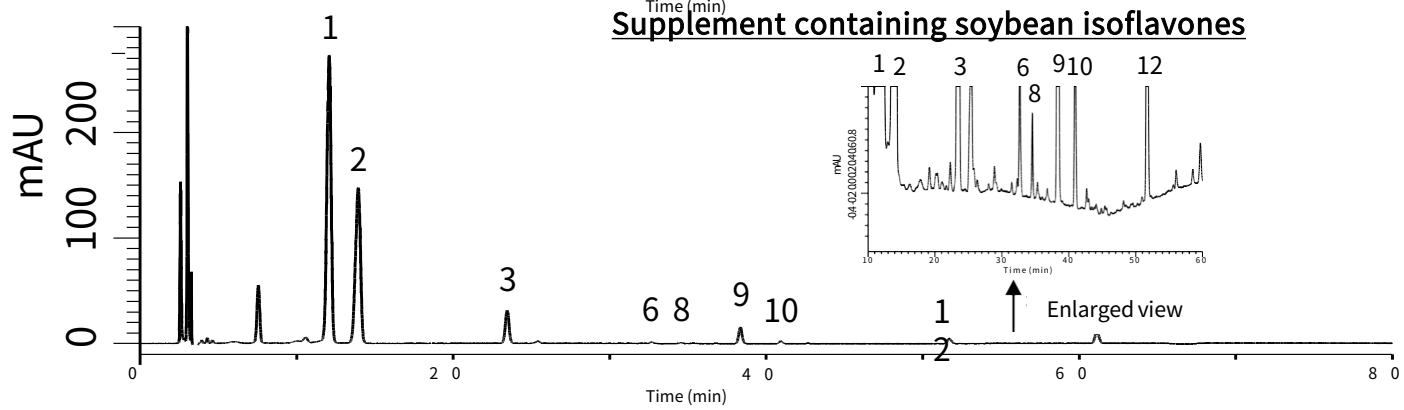
Natto*



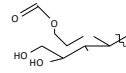
Roasted Soybean Flour



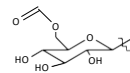
Supplement containing soybean isoflavones



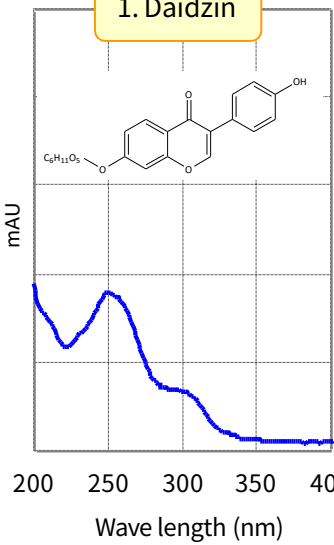
Chemical Structure and UV Spectrum



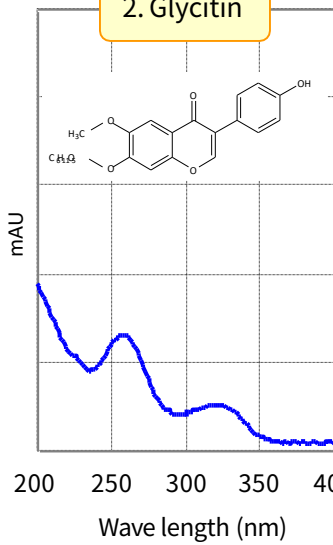
R₂ :



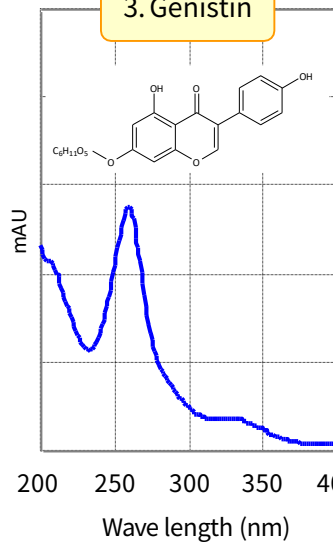
1. Daidzin



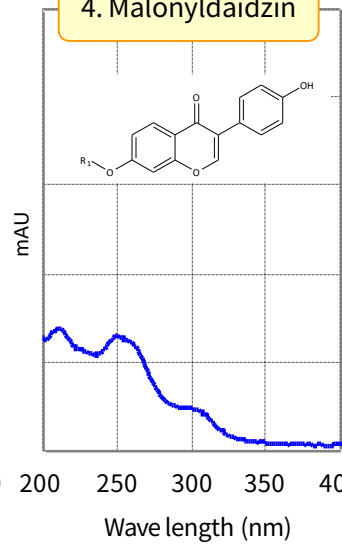
2. Glycitin



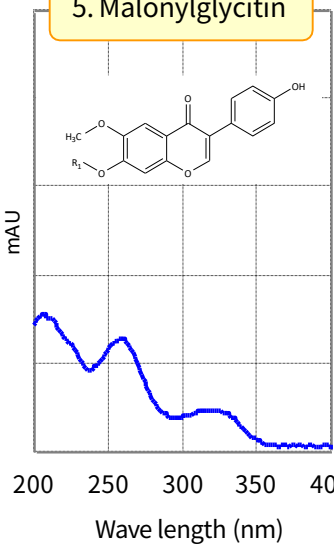
3. Genistin



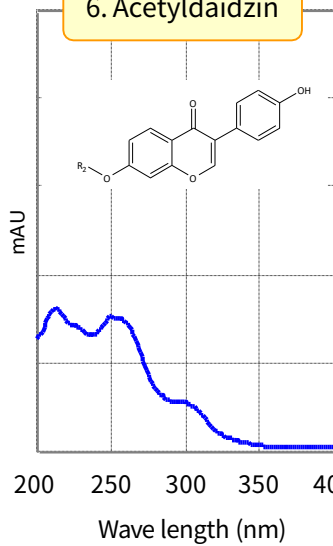
4. Malonyldaidzin



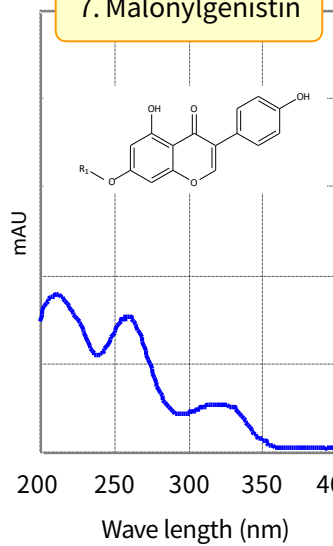
5. Malonylglycitin



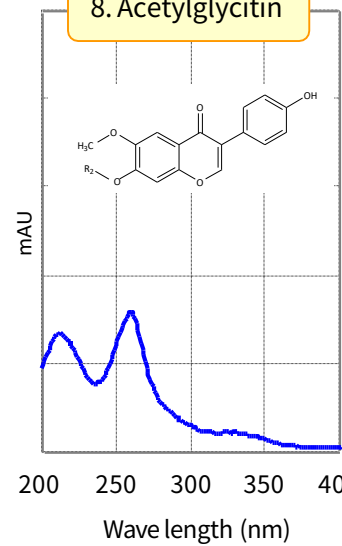
6. Acetyldaidzin



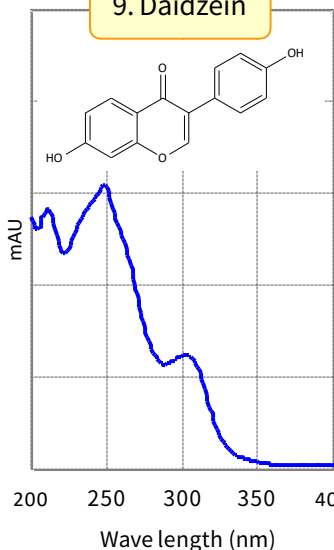
7. Malonylgenistin



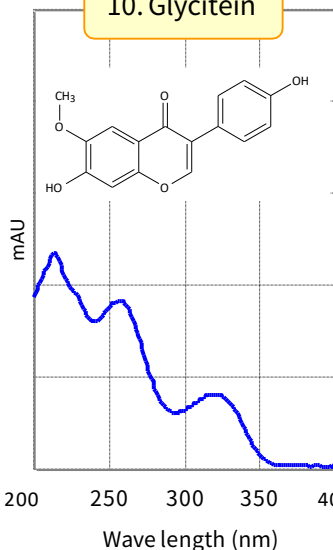
8. Acetylglycitin



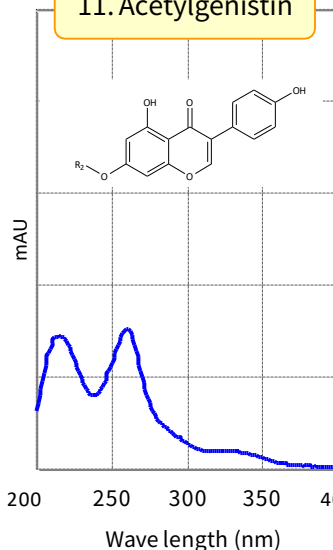
9. Daidzein



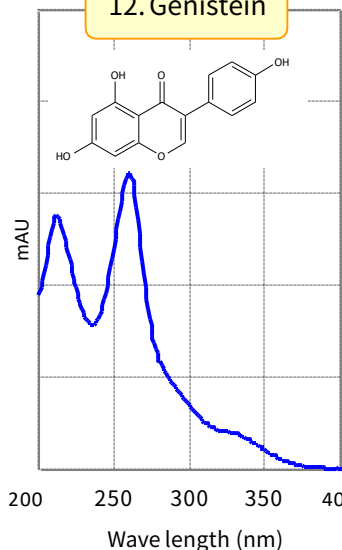
10. Glycitein



11. Acetylgenistin



12. Genistein



※ The absorbance scale (Y axis) is the same in every UV spectrum.

HPLC Column

InertSustainSwift C18 5 µm, 250 x 4.6 mm I.D.
Cat.No. 5020-88027



GL Chromato Disk

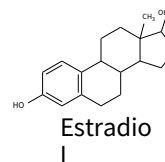
For both hydrophilic and hydrophobic samples
25P 0.45 µm
Cat.No. 5040-28542



Coffee Break

The soybean isoflavones are one type of Polyphenols. They are also known as estrogen-like since the chemical structure of the isoflavones metabolites is similar to female hormones one (estrogens: e.g. estradiol) and some researches has also reported that their behavior is similar to that of female hormones. For this reason, among their applications they can also be used in the human body as substitutes of female hormones in case of deficiency.

	R1	R2
Daidzein	: H	: H
Genistein	: OH	: H
Glycitein	: H	: OCH ₃



	R3	R4	R5
Daidzin	: H	: H	: H
Genistin	: OH	: H	: H
Glycitin	: H	: OCH ₃	: H
6''-O-Acetyldaidzin	: H	: H	: COCH ₃
6''-O-Acetylgenistin	: OH	: H	: COCH ₃
6''-O-Acetylglycitin	: H	: OCH ₃	: COCH ₃
6''-O-Malonyldaidzin	: H	: H	: COCH ₂ COOH
6''-O-Malonylgenistin	: OH	: H	: COCH ₂ COOH
6''-O-Malonylglycitin	: H	: OCH ₃	: COCH ₂ COOH
6''-O-Succinyldaidzin	: H	: H	: COC ₂ H ₄ COOH
6''-O-Succinylgenistin	: OH	: H	: COC ₂ H ₄ COOH
6''-O-Succinylglycitin	: H	: OCH ₃	: COC ₂ H ₄ COOH

GL Sciences disclaims any and all responsibility for any injury or damage which may be caused by this data directly or indirectly. We reserve the right to amend this information or data at any time and without any prior announcement.

GL Sciences Inc. Japan

22-1 Nishishinjuku 6-chome
Shinjuku-ku, Tokyo
163-1130, Japan

Phone: +81-3-5323-6620
Fax: +81-3-5323-6621
Email: world@glsc.co.jp
Web: www.glsciences.com

GL Sciences Inc. USA

4733 Torrance Blvd. Suite 255
Torrance, CA 90503
USA

Phone: +1-310-265-4424
Fax: +1-310-265-4425
Email: info@glsciencesinc.com
Web: www.glsciencesinc.com

GL Sciences B.V.

Dillenburgstraat 7C
5652AM, Eindhoven
The Netherlands

Phone: +31-40-254-9531
Email: info@glsciences.eu
Web: www.glsciences.eu

GL Sciences (Shanghai) Limited

Tower B, Room 2003
Far East International Plaza
No.317 Xianxia Road, Changning District
Shanghai, China 200051

Phone: +86-21-62782272
Email: contact@glsciences.com.cn
Web: www.glsciences.com.cn



International Distributors

Visit our Website at www.glsciences.com/distributors