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- **The Three Glycosides**
- **The Three Acetylglycosides**
- **The Three Malonylglycosides**
- **Metabolite/Analog Standards**
 - *(R,S)*-2,3-Dihydrodaidzein
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General Comments About Soybean Isoflavone Products

The Twelve-Member Soybean Isoflavone Family

The presence in soybeans of genistein and its glucoside, genistin, has been recognized for many decades. For much of that time it was believed that the primary form of this isoflavone in unprocessed soybeans was the glycoside form, genistin. Similarly, daidzin and its aglycone daidzein have long been known as soy constituents.

There is now a large literature describing the biological properties of genistein in particular, because of its activity as a tyrosine kinase inhibitor, possible anti-oxidant and potential anti-cancer compound, among other notable discoveries. Over the years much has also been published regarding the interesting and potentially useful activities of daidzein and daidzin.

More recently, another glucoside/aglycone pair, namely glycitin and glycitein respectively, were identified in soy extracts. Because of the rather low levels of glycitin and glycitein in soy products and attendant lack of affordable material for experimental use, their biological properties have remained largely a mystery in spite of their potential importance.

LC Laboratories® is pleased to make available all six of these glucosides and aglycones at very reasonable prices.

The story does not stop here, however. Research in the last decade has turned up the surprising fact that a large, and often the predominant, fraction of the isoflavones found in soybeans and soybean extracts, especially in unprocessed or mildly processed soybean products, occurs not as the glucoside forms but rather as their 6"-O-malonyl esters. Chemically, these compounds consist of the glucoside form esterified with a single malonate half-ester, located at the primary (6"-) hydroxy group of the sugar moiety (chemical structures appear in the product list on pages 4-7).

This remarkable development has introduced some new uncertainties as to the pharmacologically active components of soy products. Moreover, further complicating matters, the malonyl esters are thermally and chemically unstable and are easily converted during soy product processing, especially via heating, toasting and/or high pH, to either the free glucoside form or to yet another type of isoflavone derivative, namely the 6"-O-acetyl esters, which are somewhat more stable than the malonyl forms.

As a result, the isoflavone fractions of soy products typically contain, in varying proportions, the entire twelve-compound isoflavone ensemble – the malonyl glucosides of genistein, daidzein and glycitein; their acetyl glucosides, their free glucosides and the free aglycones. Wang and Murphy [J. Agric. Food Chem. 42: 1666-1673 (1994)] have published an analytical HPLC method for the simultaneous analysis of all twelve compounds along with extensive data on their levels in a wide variety of soy-based products.

With these new developments, soy isoflavone research is entering a new era, and LC Laboratories® is pleased to offer all twelve members of this biologically, nutritionally and medically important family of compounds. (Please see individual catalog entries on pages 4-7; bulk quantities are available for all twelve products.)

Because the malonyl and acetyl glycosides have only recently been found in soybean products, their specific biological, pharmacological and nutritional properties are largely unknown at the present time. Given the increasing use of soy products and the many beneficial nutritional properties attributed to the isoflavone components of those soy products, it appears that further studies of the biological role of these novel soy isoflavones are of substantial scientific and medical interest, especially as discussed in the following section.

Potential Problems with Some Soy Isoflavone-Based Nutritional Supplements Presently Sold in Health Food Stores

It now appears that some nutritional supplements, containing certain proportions of the soybean isoflavones and intended for human use, may be of low activity or may even have adverse effects, for the following reasons.

Epidemiological studies comparing Asian and Caucasian diets and disease rates, and dietary trials using soybean products, isoflavones or isoflavone concentrates, have established with a reasonable degree of certainty that "soy isoflavones" have several useful biological activities in humans.

The vast majority of these studies over the years involved bulk forms of soy or soy extracts containing the typical natural ratios of genistein/daidzein/glycitein-based components of approximately 1.3/1.0/0.2 (expressed here and below as the aglycone equivalent). Indeed, much attention has focused on genistein alone, and daidzein has been found to be nearly inactive in many in vitro assays.

However, some companies now sell soy isoflavone supplements containing dramatically different ratios of the individual isoflavone equivalents. For example, the Solgar company has sold "Super Concentrated Isoflavones" having a genistein/daidzein/glycitein ratio of 0.33/1.2/1.0 in a recent lot (5 mg, 18 mg and 15 mg/capsule, resp.), and the Source Naturals company has sold a product it calls "Genistein" with a ratio of 0.4/1.7/1.0 in a recent lot (8 mg genistein, 34 mg daidzein and 20 mg glycitein per capsule). These products have genistein/glycitein ratios differing respectively by 20- and 16-fold from the natural ratios in bulk dietary soybean products and extracts upon which most of the human nutritional science to date has been based.

Such products contain very little genistein equivalent but have large amounts of daidzein equivalent, thought to be largely inactive, and glycitein equivalent, whose effects in humans at these high, unnatural doses are presently unknown. Thus it appears that these products may be largely ineffective at inducing their intended biological activities and may even be harmful. This depends on the as-yet-untested effects in humans of high doses of glycitein when ingested in the absence of the 6.5-fold larger amounts of genistein normally consumed along with glycitein in bulk soy foods.

Soy-based nutritional supplements such as the Solgar, Source Naturals and other products constitute a large, growing and heavily promoted component of the nutritional supplement industry. With such widespread use, research directed at obtaining a better understanding of the properties of their constituents appears to be of considerable importance.

Alphabetical Listing of Products and Prices

Novel Acetylated Forms of the Soybean Isoflavones

Only in recent years has it been recognized that large and variable portions of the daidzein, genistein and glycitein found in certain soy products, especially those processed with heating, toasting and/or high pH, occur in the 6"-O-acetyl forms, not as the free glycosides or aglycones.

Because these compounds have only recently been found in soybean products, their specific biological, pharmacological and nutritional properties have not been extensively investigated. Given the increasing use of soy products and the many beneficial nutritional properties attributed to the isoflavone components of those soy products, it appears that further studies of the biological role of these novel soy isoflavones are of substantial scientific and medical importance.

LC Laboratories® offers the three acetylated isoflavones from soybeans: 6"-O-Acetyldaidzin (Cat. No. A-6900), 6"-O-Acetylgenistin (Cat. No. A-3000) and 6"-O-Acetylglycitin (Cat. No. A-7860).

A-6900 6"-O-Acetyldaidzin, >98%

Size	US\$	€	£	¥
1 mg	66	55	36	7,900
5 mg	185	154	102	22,200
10 mg	315	261	173	37,800
25 mg	550	456	302	66,000

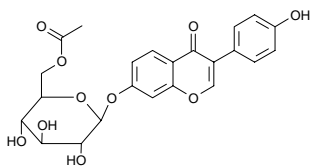
M.W. 458.42 C₂₃H₂₂O₁₀ [71385-83-6]

Storage: Store desiccated at or below -20 °C.

Solubility: Soluble in DMSO, methanol or ethanol.

Disposal: A

- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42**: 1666-1673 (1994).
- See the extensive comments on page 6 before the listing for Genistein, Cat. No. G-6055.
- **STABILITY:** Very little information about the stability of this compound is available at present. In our experience, when stored in the dry state, frozen and desiccated, this compound has retained its original purity for several years. We have been informed that aqueous or alcoholic solutions can undergo substantial decomposition less than a day after being prepared, particularly if they are held at room temperature. We recommend that this product be stored in bulk in the dry state, with a desiccant, at the coldest available temperature. Small working quantities of solutions should be made up just prior to use.
- Aqueous solutions of this compound are somewhat unstable, particularly at room temperature; several percent decomposition can occur in 12-24 hours. For quantitative work, standard solutions should be made fresh daily.
- The 1 mg size (\pm ca. 2-3%) consists of a film adhering to the walls of the ampule and cannot be easily subdivided by weighing. The larger sizes contain a weighable powder.
- The 98% purity figure may include small amounts of acetyl monoesters other than the 6"-isomer.
- See also these related products:
 - D-2946 Daidzein, page 5.
 - D-7878 Daidzin, page 4.
 - M-6730 6"-O-Malonyldaidzin, page 8.



A-3000 6"-O-Acetylgenistin, >98%

Size	US\$	€	£	¥
1 mg	59	49	32	7,100
5 mg	168	139	92	20,200
10 mg	280	232	154	33,600
25 mg	525	436	289	63,000

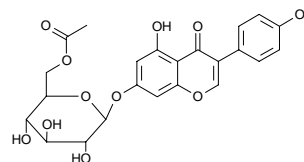
M.W. 474.42 C₂₃H₂₂O₁₁ [73566-30-0]

Storage: Store desiccated at or below

-20° C. **Solubility:** Soluble in DMSO, methanol or

ethanol. **Disposal:** A

- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42**: 1666-1673 (1994).
- See the extensive comments on page 6 before the listing for Genistein, Cat. No. G-6055.
- **STABILITY:** Very little information about the stability of this compound is available at present. In our experience, when stored in the dry state, frozen and desiccated, this compound has retained its original purity for several years. We have been informed that aqueous or alcoholic solutions can undergo substantial decomposition less than a day after being prepared, particularly if they are held at room temperature. We recommend that this product be stored in bulk in the dry state, with a desiccant, at the coldest available temperature. Small working quantities of solutions should be made up just prior to use.
- Aqueous solutions of this compound are somewhat unstable, particularly at room temperature; several percent decomposition can occur in 12-24 hours. For quantitative work, standard solutions should be made fresh daily.
- The 1 mg size (\pm ca. 2-3%) consists of a film adhering to the walls of the ampule and cannot be easily subdivided by weighing. The larger sizes contain a weighable powder.
- See additional comments about acetyl isoflavones above the entry for 6"-O-Acetyldaidzin, Cat. No. A-6900.
- The 98% purity figure may include small amounts of acetyl monoesters other than the 6"-isomer.
- See also these related products:
 - G-6055 Genistein, page 6.
 - G-5200 Genistin, page 7.
 - M-8090 6"-O-Malonylgenistin, page 8.



A-7860 6"-O-Acetylglycitin, >98%

Size	US\$	€	£	¥
1 mg	74	61	41	8,900
5 mg	195	162	107	23,400
10 mg	330	274	182	39,600
25 mg	585	486	322	70,200

M.W. 488.45 C₂₄H₂₄O₁₁

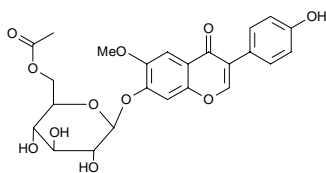
Storage: Store desiccated at or below

-20 °C. **Solubility:** Soluble in DMSO, methanol or

ethanol. **Disposal:** A

- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42**: 1666-1673 (1994).

- See the extensive comments on page 6 before the listing for Genistein, Cat. No. G-6055.
- **STABILITY:** Very little information about the stability of this compound is available at present. In our experience, when stored in the dry state, frozen and desiccated, this compound has retained its original purity for several years. We have been informed that aqueous or alcoholic solutions can undergo substantial decomposition less than a day after being prepared, particularly if they are held at room temperature. We recommend that this product be stored in bulk in the dry state, with a desiccant, at the coldest available temperature. Small working quantities of solutions should be made up just prior to use.
- Aqueous solutions of this compound are somewhat unstable, particularly at room temperature; several percent decomposition can occur in 12-24 hours. For quantitative work, standard solutions should be made fresh daily.
- The 1 mg size (\pm ca. 2-3%) consists of a film adhering to the walls of the ampule and cannot be easily subdivided by weighing. The larger sizes contain a weighable powder.
- See additional comments about acetyl isoflavones above the entry for 6''-O-Acetyldaidzin, Cat. No. A-6900.
- The 98% purity figure may include small amounts of acetyl monoesters other than the 6''-isomer.
- See also these related products:
 - G-1152 Glycitein, page 7.
 - G-2822 Glycitin, page 7.
 - M-4620 6''-O-Malonylglycitin, page 9.



D-2946 Daidzein, >99%
[4',7-Dihydroxyisoflavone]

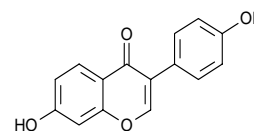
Size	US\$	€	£	¥
1 g	59	49	32	7,100
10 g	245	203	135	29,400
25 g	490	407	270	58,800
100 g	1330	1104	732	159,600

M.W. 254.24 C₁₅H₁₀O₄ [486-66-8]
RTECS: DJ3100040 M.I. 12: 2868

Storage: Store at or below -20 °C. **Solubility:** Soluble in DMSO; very poorly soluble in other solvents.
Disposal: A

- Negative control for genistein. Akiyama, T. *et al. J. Biol. Chem.* **262:** 5592-5595 (1987). Wijetunge, S. *et al. Biochem. Biophys. Res. Comm.* **189:** 1620-1623 (1992).
- Please request Technical Note #22 for additional information.
- Daidzein is also a cytostatic agent capable of arresting the cell cycle at G₁.
- Weak inhibitor of hamster mitochondrial alcohol dehydrogenase. Keung, W.M., Klyosov, A.A. and Vallee, B.L. *Proc. Natl. Acad. Sci. USA* **94:** 1675-1679 (1997).
- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42:** 1666-1673 (1994).
- See the extensive comments on page 6 before the listing for Genistein, Cat. No. G-6055.
- See also these related products:
 - A-6900 6''-O-Acetyldaidzin, page 4.
 - D-7878 Daidzin, page 5.

- D-9200 (*R,S*)-Dihydrodaidzein, page 5.
- E-5880 (*R,S*)-Equol, page 6.
- M-6730 6''-O-Malonyldaidzin, page 8.



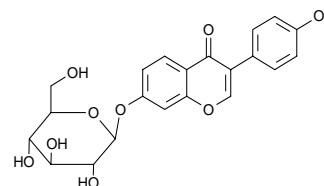
D-7878 Daidzin, >99%
[4',7-Dihydroxyisoflavone, 7-O-β-D-glucopyranoside]

Size	US\$	€	£	¥
25 mg	39	32	21	4,700
100 mg	100	83	55	12,000
300 mg	225	187	124	27,000
1 g	370	307	204	44,400

M.W. 416.38 C₂₁H₂₀O₉ [552-66-9]
RTECS: DJ3094000 M.I. 12: 2868

Storage: Store desiccated at or below -20 °C. **Solubility:** Soluble in DMSO. **Disposal:** A

- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42:** 1666-1673 (1994).
- See the extensive comments on page 6 before the listing for Genistein, Cat. No. G-6055.
- Inhibits ethanol intake of Syrian golden hamsters and rats, and inhibits human mitochondrial alcohol dehydrogenase (ADH) but not hamster cytosolic ADH; further evidence suggests that the mechanism for reducing alcohol consumption is different from ADH inhibition typical of antabuse-type drugs. Keung, W.M., *et al., Proc. Natl. Acad. Sci. USA* **94:** 1675-1679 (1997).
- See also these related products:
 - A-6900 6''-O-Acetyldaidzin, page 4.
 - D-2946 Daidzein, page 5.
 - M-6730 6''-O-Malonyldaidzin, page 8.



D-9200 (*R,S*)-2,3-Dihydrodaidzein, >99%

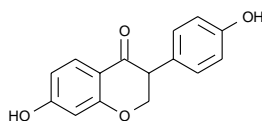
Size	US\$	€	£	¥
50 mg	73	61	40	8,800
100 mg	129	107	71	15,500
500 mg	495	411	272	59,400

M.W. 256.26 C₁₅H₁₂O₄
Storage: Store at or below -20 °C. **Solubility:** Soluble in DMSO, methanol or ethanol. **Disposal:** A

- Human urinary metabolite of daidzein. Heinonen, S. *et al., "Identification of isoflavone metabolites dihydrodaidzein, dihydrogenistein, 6'-OH-O-dma, and cis-4-OH-equol in human urine by gas chromatography-mass spectrometry using authentic reference compounds." Anal. Biochem.* **274:** 211-219 (1999).
- This product is a racemic mixture of the *R*- and *S*-enantiomers. As of this writing, we are not aware of any studies establishing the stereochemistry of the human urinary metabolite form of

dihydrodaidzein. This is an important point; the natural metabolite is likely to be a single stereoisomer with different biological properties from the racemic mixture.

- The Heinonen *et al.* article makes many references to the “enol tautomer” of dihydrodaidzein. Although it is not always obvious from the wording in their descriptions, a careful reading indicates that all references in this article to the “enol tautomer” of dihydrodaidzein refer to a *silylated* derivative of this compound. The trimethylsilyl ether of the enol is indeed an isolatable compound, whereas the free, unsilylated enol form is in dynamic equilibrium with the keto form and cannot be isolated separately.
- We have found that dihydrodaidzein is somewhat unstable in air; it partially oxidizes to form daidzein if left at room temperature for a few days, even if kept in the dark as a dry powder. Storage in solid form at -20 °C under nitrogen is recommended. Solutions are expected to be even more susceptible to oxidation than the solid, so they should be freshly prepared and used as quickly as possible.**
- NOTE: Although there are one or two exceptions, we generally do not carry products that are unstable and not easily maintained at 98-99+% purity under ordinary handling conditions. At present, dihydrodaidzein is not in stock, and we are working to solve production problems for this compound related to its stability.**



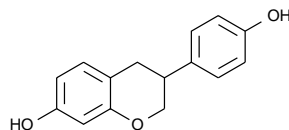
E-5880 (R,S)-Equol, >99%

Size	US\$	€	£	¥
100 mg	99	82	54	11,900
500 mg	325	270	179	39,000
1 g	560	465	308	67,200
5 g	1470	1220	809	176,400

M.W. 242.27 C₁₅H₁₄O₃ [531-95-3]
 M.I. 13: 3673

Storage: Store at or below -20°C. **Solubility:** Soluble in DMSO, methanol, or ethanol. **Disposal:** A

- Urinary metabolite of daidzein, produced by humans and horses. Heinonen, S. *et al.*, “Identification of isoflavone metabolites dihydrodaidzein, dihydrogenistein, 6'-OH-dma, and *cis*-4-OH-equol in human urine by gas chromatography-mass spectrometry using authentic reference compounds.” *Anal. Biochem.* **274**: 211-219 (1999).
- This product is a racemic mixture of the *R*- and *S*-enantiomers. However, the naturally-occurring form or equol from horse urine consists of a single stereoisomer. While the *chemical* properties of the single isomer form are essentially identical to those of the racemic mixture (except for rotation of plane polarized light, melting point, etc.), the *biological* properties of the single-isomer, naturally-occurring form are quite likely to be somewhat different from those of the racemic mixture. In the future, LC Labs will offer, at attractive prices, the pure single-isomer form of equol corresponding to the naturally occurring urinary metabolite.
- For research use only; not for human use.**



A Major Advance in Soybean Isoflavone Research: The Soybean Isoflavone Family Now Numbers Twelve Members!

The presence in soybeans of genistein and its glucoside, genistin, has been recognized for many decades. For much of that time it was believed that the primary form of this isoflavone in unprocessed soybeans was the glucoside form, genistin. Similarly, daidzin and its aglycone daidzein have long been known as soy constituents.

There is now a large literature describing the biological properties of genistein in particular, because of its activity as a tyrosine kinase inhibitor, as a possible anti-oxidant and as a potential anti-cancer compound, among other notable discoveries. Over the years much has also been published regarding the interesting and potentially useful activities of daidzein and daidzin.

More recently, another glucoside/aglycone pair, namely glycitin and glycitein respectively, were identified in soy extracts. Because of the relatively low levels of glycitin and glycitein in soy products and attendant lack of affordable material for experimental use, their biological properties have remained largely a mystery in spite of their potential importance.

LC Laboratories® is pleased to make available all six of these glucosides and aglycones at reasonable prices.

The story does not stop here, however. Research in the last few years has turned up the surprising fact that a large, and often the predominant, fraction of the isoflavones found in soybeans occurs not as the glucoside forms but rather as their 6''-*O*-malonyl esters. Chemically, these compounds consist of the glucoside form esterified with a single malonate half-ester, located at the primary (6''-) hydroxy group of the sugar moiety.

This remarkable development has introduced major new uncertainties as to the pharmacologically active components of soy products. Moreover, further complicating matters, the malonyl esters are thermally and chemically unstable and are easily converted during soy product processing to either the free glucoside form or to yet another type of isoflavone derivative, namely the 6''-*O*-acetyl esters, which are much more stable.

As a result, the isoflavone fractions of soy products typically contain, in varying proportions, the entire twelve-compound isoflavone ensemble – the malonyl glucosides of genistein, daidzein and glycitein; their acetyl glucosides, their free glucosides and the free aglycones. Wang and Murphy [*J. Agric. Food Chem.* **42**: 1666-1673 (1994)] have published an analytical method for the simultaneous analysis of all twelve compounds and extensive data on their levels in a wide variety of soy-based products.

With these new developments, soy isoflavone research is entering a new era, and LC Laboratories® is pleased to be able to offer all twelve members of this biologically, nutritionally and medically important family of compounds. (Please see individual catalog entries; bulk quantities are available for all twelve products.)

G-6055 Genistein, >99%

[4',5,7-Trihydroxyisoflavone]

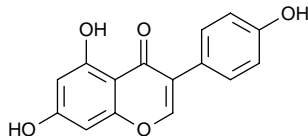
Size	US\$	€	£	¥
1 g	59	49	32	7,100
10 g	245	203	135	29,400
25 g	490	407	270	58,800
100 g	1330	1104	732	159,600

M.W. 270.23 C₁₅H₁₀O₅ [446-72-0]
 RTECS: NR2392000 M.I. 12: 4395

Storage: Store at or below -20°C.
Solubility: Soluble in DMSO. **Disposal:** A

- Tyrosine kinase inhibitor. Akiyama, T. *et al. J. Biol. Chem.* **262**: 5592-5595 (1987).
- See the extensive comments on page 6 before the listing for Genistein, Cat. No. G-6055.

- Please request Technical Note #22 for additional information.
- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42**: 1666-1673 (1994).
- See also these related products:
 - A-6900 6"-O-Acetyldaidzin, page 4.
 - A-3000 6"-O-Acetylgenistin, page 4.
 - A-7860 6"-O-Acetylglycitin, page 4.
 - D-2946 Daidzein, page 5.
 - D-7878 Daidzin, page 5.
 - D-9200 (R,S)-Dihydrodaidzein, page 5.
 - E-5880 (R,S)-Equol, page 6.
 - G-5200 Genistin, page 7.
 - G-1152 Glycitein, page 7.
 - G-2822 Glycitin, page 7.
 - M-6730 6"-O-Malonyldaidzin, page 8.
 - M-8090 6"-O-Malonylgenistin, page 8.
 - M-4620 6"-O-Malonylglycitin, page 9.
- A catalog containing just these 14 products can be viewed and printed from our website, www.lclabs.com.
- Shipping charges for the 100 g size are slightly higher than our normal rates.



G-5200 Genistin, >99%

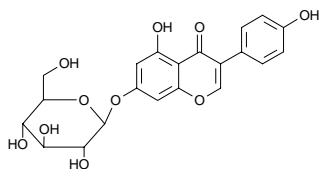
[Genistein, 7-O-β-D-glucopyranoside]

Size	US\$	€	£	¥
25 mg	45	37	25	5,400
100 mg	122	101	67	14,600
300 mg	245	203	135	29,400
1 g	390	324	215	46,800

M.W. 432.38 C₂₁H₂₀O₁₀ [529-59-9]
 RTECS: DJ3093000 M.I. 12: 4395

Storage: Store desiccated at or below -20°C. **Solubility:** Soluble in DMSO. **Disposal:** A

- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42**: 1666-1673 (1994).
- See the extensive comments on page 6 before the listing for Genistein, Cat. No. G-6055.
- See also these related products:
 - A-3000 6"-O-Acetylgenistin, page 4.
 - G-6055 Genistein, page 6.
 - M-8090 6"-O-Malonylgenistin, page 8.



G-1152 Glycitein, >99%

[4',7-Dihydroxy-6-methoxyisoflavone]

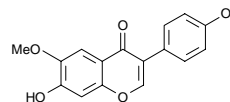
Size	US\$	€	£	¥
5 mg	70	58	38	8,400
10 mg	110	91	61	13,200
25 mg	230	191	127	27,600
100 mg	765	635	421	91,800

M.W. 284.27 C₁₆H₁₂O₅ [40957-83-0]

Storage: Store at or below -20°C. **Solubility:** Very insoluble (less than 100 mg/ml) in methanol, ethanol, or water; soluble in DMSO. **Disposal:** A

NOTE: This highly purified glycitein is very insoluble in aqueous alcohol or aqueous acetonitrile; with heating, a solution of 100 µg/mL can be made, but upon cooling most of the glycitein crystallizes out, leaving approximately 10 µg/mL or less in solution.

- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42**: 1666-1673 (1994).
- See the extensive comments on page 6 before the entry for Genistein, Cat. No. G-6055.
- LC Laboratories® is pleased to be the first source of glycitein at prices low enough for routine study of this important dietary soy constituent.
- See also these related products:
 - A-7860 6"-O-Acetylglycitin, page 4.
 - G-2822 Glycitin, page 7.
 - M-4620 6"-O-Malonylglycitin, page 9.



G-2822 Glycitin, >99%

[Glycitein, 7-O-β-D-glucopyranoside]

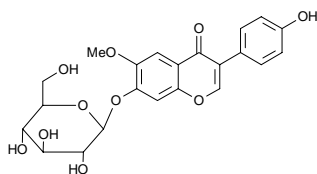
Size	US\$	€	£	¥
5 mg	59	49	32	7,100
10 mg	88	73	48	10,600
25 mg	185	154	102	22,200
100 mg	590	490	324	70,800

M.W. 446.41 C₂₂H₂₂O₁₀ [40246-10-4]

Storage: Store desiccated at or below -20 °C.

Solubility: Soluble in DMSO; poorly insoluble on other solvents. **Disposal:** A

- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42**: 1666-1673 (1994).
- See the extensive comments on page 6 before the listing for Genistein, Cat. No. G-6055.
- LC Laboratories® is pleased to be the first source of glycitin at prices low enough for routine study of this important dietary soy constituent.
- See also these related products:
 - A-7860 6"-O-Acetylglycitin, page 4.
 - G-1152 Glycitein, page 7.
 - M-4620 6"-O-Malonylglycitin, page 9.



Novel Malonyl Forms of the Soybean Isoflavones

Only in recent years has it been recognized that large and often predominant fractions of the daidzein, genistein and glycitein in unprocessed or mildly processed soybean products occur in the 6''-O-malonyl forms, not as the free glycosides or aglycones.

Because these compounds have only recently been found in soybean products, their specific biological, pharmacological and nutritional properties are essentially unknown at the present time. Given the increasing use of soy products and the many beneficial nutritional properties attributed to the isoflavone components of those products, it appears that further studies of the biological role of these novel soy isoflavones are of substantial scientific and medical importance.

LC Laboratories® now offers the three malonyl isoflavones from soybeans: 6''-O-Malonyldaidzin (Cat. No. M-6730), 6''-O-Malonylgenistin (Cat. No. M-8090) and 6''-O-Malonylglycitin (Cat. No. M-4620).

M-6730 6''-O-Malonyldaidzin, >98%

Size	US\$	€	£	¥
1 mg	59	49	32	7,100
5 mg	165	137	91	19,800
10 mg	270	224	148	32,400
25 mg	490	407	270	58,800

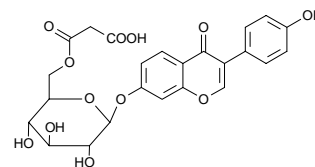
M.W. 502.43 C₂₄H₂₂O₁₂

Storage: Store desiccated at or below -20 °C.

Solubility: Soluble in DMSO, methanol, ethanol, or mixtures of acetonitrile/water. **Disposal:** A

- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42**: 1666-1673 (1994).
- See the extensive comments on page 6 before the listing for Genistein, Cat. No. G-6055.
- Typical purity at time of shipment is >99%; this figure may include small amounts of monomalonyl hemiesters other than the 6''-isomer.
- The 1 mg size (accuracy is ± ca. 2-3%) consists of a film adhering to the walls of the ampule and cannot be easily subdivided by weighing. The larger sizes contain a weighable powder.
- **STABILITY:** Very little information about the stability of this compound is available at present. In our experience, when stored in the dry state, frozen and desiccated, this compound has retained its original purity for several years. Our manufacturing process results in a highly crystalline, stable form of this product; *thus, it does not need to be shipped on ice.* Our thermal stability tests show that heating our dry product at 85 °C for 10 hours causes only ca. 1% decomposition. However, we have been informed that aqueous or alcoholic solutions at various pH's can undergo substantial decomposition less than a day after being prepared, particularly when held at room temperature. We recommend that this product be stored in bulk in the dry state, very tightly sealed, thoroughly desiccated, at the coldest available temperature. Small working quantities of solutions should be made freshly each day, just prior to use, and should be discarded at the end of the day. Thaw containers to room temperature prior to opening, and minimize exposure to air during handling to keep moisture levels low.
- See additional comments about malonyl isoflavones directly above this product entry.

- **SHIPMENT:** Shipped at ambient temperature.
- See also these related products:
 - A-6900 6''-O-Acetyldaidzin, page 4.
 - D-2946 Daidzein, page 5.
 - D-7878 Daidzin, page 4.



M-8090 6''-O-Malonylgenistin, >98%

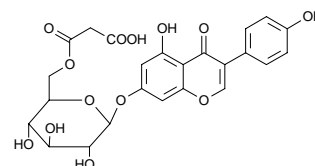
Size	US\$	€	£	¥
1 mg	53	44	29	6,400
5 mg	149	124	82	17,900
10 mg	255	212	140	30,600
25 mg	465	386	256	55,800

M.W. 518.43 C₂₄H₂₂O₁₃

Storage: Store desiccated at or below -20 °C.

Solubility: Soluble in DMSO, methanol, ethanol, or mixtures of acetonitrile/water. **Disposal:** A

- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42**: 1666-1673 (1994).
- See the extensive comments on page 6 before the listing for Genistein, Cat. No. G-6055.
- See additional comments about malonyl isoflavones above the entry for 6''-O-Malonyldaidzin, Cat. No. M-6730, page 8.
- Typical purity at time of shipment is >99%; this figure may include small amounts of monomalonyl hemiesters other than the 6''-isomer.
- The 1 mg size (accuracy is ± ca. 2-3%) consists of a film adhering to the walls of the ampule and cannot be easily subdivided by weighing. The larger sizes contain a weighable powder.
- **STABILITY:** Very little information about the stability of this compound is available at present. In our experience, when stored in the dry state, frozen and desiccated, this compound has retained its original purity for several years. Our manufacturing process results in a highly crystalline, stable form of this product; *thus, it does not need to be shipped on ice.* Our thermal stability tests show that heating our dry product at 85 °C for 10 hours causes only ca. 1% decomposition. However, we have been informed that aqueous or alcoholic solutions at various pH's can undergo substantial decomposition less than a day after being prepared, particularly when held at room temperature. We recommend that this product be stored in bulk in the dry state, very tightly sealed, thoroughly desiccated, at the coldest available temperature. Small working quantities of solutions should be made freshly each day, just prior to use, and should be discarded at the end of the day. Thaw containers to room temperature prior to opening, and minimize exposure to air during handling to keep moisture levels low.
- **SHIPMENT:** Shipped at ambient temperature.
- See also these related products:
 - A-3000 6''-O-Acetylgenistin, page 4.
 - G-6055 Genistein, page 6.
 - G-5200 Genistin, page 7.



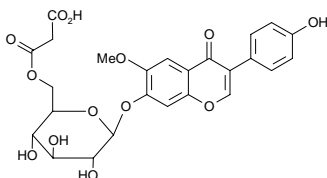
M-4620 6"-O-Malonylglycitin, >98%

Size	US\$	€	£	¥
1 mg	65	54	36	7,800
5 mg	178	148	98	21,400
10 mg	310	257	170	37,200
25 mg	510	423	280	61,200

M.W. 532.46 C₂₅H₂₄O₁₃

Storage: Store desiccated at or below -20 °C. **Solubility:** Soluble in DMSO, methanol, ethanol, or mixtures of acetonitrile/water. **Disposal:** A

- Isoflavone derivative found in soy-based food products. Wang, H. and Murphy, P.A. "Isoflavone content in commercial soybean foods." *J. Agric. Food Chem.* **42:** 1666-1673 (1994).
- See the extensive comments on page 6 before the listing for Genistein, Cat. No. G-6055.
- See additional comments about malonyl isoflavones above the entry for 6"-O-Malonyldaidzin, Cat. No. M-6730, page 8.
- Typical purity at time of shipment is >99%; this figure may include small amounts of monomalonyl hemiesters other than the 6"-isomer.
- The 1 mg size (accuracy is ± ca. 2-3%) consists of a film adhering to the walls of the ampule and cannot be easily subdivided by weighing. The larger sizes contain a weighable powder.
- **STABILITY:** Very little information about the stability of this compound is available at present. In our experience, when stored in the dry state, frozen and desiccated, this compound has retained its original purity for several years. Our manufacturing process results in a highly crystalline, stable form of this product; *thus, it does not need to be shipped on ice.* Our thermal stability tests show that heating our dry product at 85 °C for 10 hours causes only ca. 1% decomposition. However, we have been informed that aqueous or alcoholic solutions at various pH's can undergo substantial decomposition less than a day after being prepared, particularly when held at room temperature. We recommend that this product be stored in bulk in the dry state, very tightly sealed, thoroughly desiccated, at the coldest available temperature. Small working quantities of solutions should be made freshly each day, just prior to use, and should be discarded at the end of the day. Thaw containers to room temperature prior to opening, and minimize exposure to air during handling to keep moisture levels low.
- **SHIPMENT:** Shipped at ambient temperature.
- See also these related products:
 - A-7860 6"-O-Acetylglycitin, page 4.
 - G-1152 Glycitein, page 7.
 - G-2822 Glycitin, page 7.



Disposal Codes

- A. Suspend or dissolve the compound with a flammable solvent and incinerate in a chemical incinerator with an afterburner and scrubber.

General Information and Conditions of Sale

To Order, Contact:

LCLABORATORIES®
165 New Boston Street
Woburn, MA 01801 USA
Tel: (800) 937-3720
Fax: (781) 938-5420
www.LCLabs.com
E-mail: custserv@LCLabs.com

For each product you wish to order, please specify name, catalog number, unit size and number of vials desired. Our order department is available for telephone and fax orders Monday through Friday, 9:00 a.m. to 5:00 p.m. EST/EDT. **We prefer not to receive written confirmation of telephone orders.** We are unable to ship our products to individuals not affiliated with an institution or firm.

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LC Laboratories® products are no longer sold through Alexis® Corporation. Please place all orders directly with our offices in Woburn, MA, using the above contact information.

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We Accept Mastercard, Visa, American Express, Discover and JCB.

In-Stock Orders Shipped within 24 Hours

Subject to credit requirements and delays related to communications such as pro forma invoices or other paperwork needing to be confirmed or resolved, orders for in-stock products are shipped within 24 hours after we receive the order.

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Place orders directly to our U.S. headquarters in Woburn, MA, USA from any country in the world, in any of four currencies: US Dollars, Euros, Pounds Sterling and Japanese Yen, as shown in the price list. Orders from most countries (other than Japan and most members of the European Union) must be paid by credit card at the time of ordering or in advance by check or wire in U.S. Dollars. Because of the extra work and costs for shipping and preparations for customs transit, we must add additional handling charges for international shipments. *These charges do not include the cost of shipment by our choice of TNT, UPS or Federal Express.* If you choose a different carrier, additional charges may apply. Please clearly specify your choice of carrier when your order is placed. We will choose an appropriate

customs broker for import clearance unless you specify your preferred choice at the time your order is placed.

Stability During Shipping

Although many of our products require storage at -20 °C for optimal long-term storage, all of our products are stable for several weeks at ambient temperatures. Thus, all products are shipped at ambient temperature without risk of degradation; there is no need for blue ice or dry ice during shipment of any of our products.

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There is no minimum order; all requests for our products are welcomed.

Quantity Discounts

Larger quantities of listed compounds are usually available at significant discounts. Please contact us for more information.

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Please inspect all shipments immediately upon arrival. In the event of any damage or discrepancy, please inform us immediately. Goods may not be returned for credit except with our authorization and in compliance with our return shipment instructions. If the reason for return is not our fault, a 25% restocking charge will apply.

Material Safety Data Sheets

Material Safety Data Sheets for the compounds that LC Laboratories® offers for sale are available upon request.

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The compounds are for research use only, and are not for food, household, or medical use. These products may be covered by composition-of-matter, use, or process patents. No license under any patent is granted or implied. We assume no liability for damages or penalties resulting from use of the information or products provided herein, nor should a listing of any product or description of use be construed as a license to operate under, or a recommendation to infringe, any patent.

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