



REFERENCE SUBSTANCES FOR HERBAL PRODUCTS

As one of the leading manufacturers internationally, PhytoLab offers over 1,500 extensively documented herbal reference substances of all classes of natural compounds. Our portfolio currently includes a total of 25 glucosinolates and one glucosinolate-derived goitrogenic degradation product. Most of our glucosinolates and related compounds are certified as primary reference standards.

Plant Origin

Glucosinolates are secondary plant metabolites that occur in a wide variety of plants mainly from the families of the Brassicaceae (e.g. horseradish (*Armoracia rusticana*), radish (*Raphanus sativus*), wasabi (*Eutrema japonicum*), black mustard (*Brassica nigra*), white mustard (*Sinapis alba*), broccoli (*Brassica oleracea* var. *italica*), rapeseed (*Brassica napus*), maca (*Lepidium meyenii*), crambe (*Crambe abyssinica*), stonecrop (*Alyssum argenteum*), false flax (*Camelina sativa*), winter cress (*Barbarea vulgaris*), water cress (*Nasturtium officinale*), hoary alyssum (*Berteroa incana*), wallflower (*Cheiranthus cheiri*), rocket (*Eruca sativa*), dame's violet (*Hesperis matronalis*), bitter candytuft (*Iberis amara*) and woad (*Isatis tinctoria*)), the Capparaceae (e.g. capers (*Capparis spinosa*)) and the Caricaceae (e.g. papaya (*Carica papaya*)), but also from the Euphorbiaceae, the Tropaeolaceae (e.g. garden nasturtium (*Tropaeolum majus*)), the Cleomaceae (e.g. spiny spider flower (*Cleome spinosa*)), the Limnanthaceae (e.g. Douglas' meadowfoam (*Limnanthes douglasii*)) and the Moringaceae (e.g. drumstick tree (*Moringa oleifera*)).

Medicinal use

Besides being responsible for the pungent and bitter taste of these plants, the glucosinolates and their hydrolysis products also protect plants against herbivores and **have been shown to have antimicrobial, antiviral, antifungal and anticarcinogenic properties**. Due to their antimicrobial properties, herbal medicinal products containing nasturtium herb and horseradish root are used in the treatment of sinusitis, bronchitis and urinary tract infections.

Currently available phyproof® glucosinolates and goitrogens

Reference Substance	Product #
Epiprogoitrin	89657
Glucoalyssin	85742
Glucoarabin	85743
Glucobarbarin	89684
Glucoberteroin	83241
Glucobrassicinapin	83242
Glucobrassicin	80593
Glucocamelinin	85744
Glucocapparin	85745
Glucocheirolin	89685
Glucoerucin	89686
Glucohesperin	85746
Glucoiberin	89687
Glucolimnanthin	85747
Glucomoringin	85748
Gluconapin	89688
Gluconasturtiin	89689
Glucoraphanin	89215
Glucoraphasatin	84216
Glucoraphenin	89690
Glucotropaeolin	89216
DL-Goitrin	85696
11-Methylsulfinylundecylglucosinolate	85758
Progoitrin	89765
Sinalbin	89793
Sinigrin	89279

phyproof® Reference Substances

PhytoLab GmbH & Co. KG / Dutendorfer Str. 5-7 / 91487 Vestenbergsgreuth / GERMANY
 Phone: +49 9163 88-395 / Fax: +49 9163 88-456
 ref-substances@phytolab.de / phyproof.phytolab.com





Structural properties

All glucosinolates are composed of a central carbon that is bound via a sulfur atom to a glucose, and via a nitrogen atom to a sulfate group. Furthermore, a substance-specific side chain (its structure depending on the amino acid involved in the initial phase of the glucosinolate biosynthesis) is bound to the central carbon atom. **As the sulfate group is negatively charged, glucosinolates are most often isolated in the form of their potassium salts.** Biosynthesis of glucosinolates that bear an alkyl or a sulfur-containing side starts most frequently from methionine. The biosynthesis of glucosinolates with a phenyl or benzyl ring in the core structure starts from either phenylalanine or, while indolyl-containing side chains originate from the amino acid tryptophane.

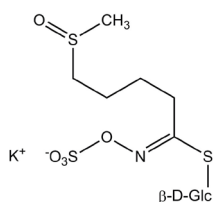
Degradation products

Upon contact with the enzyme myrosinase and water (myrosinase is kept in a separate compartment in the cell, but can be released e.g. during cutting or chewing), the glucose moiety is cleaved. The remaining molecule can then undergo various spontaneous reactions, usually resulting in the corresponding isothiocyanate. Depending on the reaction conditions also thiocyanates, nitriles or oxazolidine 2-thiones such as **the goitrin can be formed**.

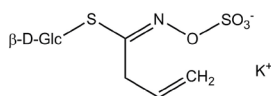
Reference Substances

For a reliable quantitative analysis of glucosinolates and their degradation products well characterized reference substances are essential. Currently we offer 25 glucosinolates plus DL-goitrin, all of them supplied together with a comprehensive certificate of analysis. Due to the negative charge of the glucosinolate core structure the counter ion has to be taken into account. For all phyproof glucosinolates characterized as primary reference standard, potassium we determine potassium quantitatively and consider it as an impurity in the calculation of the absolute content, which therefore refers to the pure glucosinolate only. For up-to-date information on prices and specifications please contact us or visit our webshop at **phyproof.phytolab.com**.

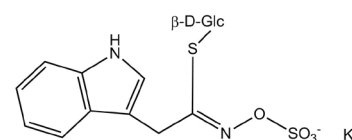
Selected most requested glucosinolates



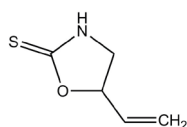
Glucoraphanin potassium salt
(product # 89215)



Sinigrin potassium salt
(product # 89279)



Glucobrassicin potassium salt
(product # 80593)



DL-Goitrin
(product # 85969)

