Phytochemical Standards

Analytical standards and certified reference materials for constituents of medicinal plants

The life science business of Merck operates as MilliporeSigma in the U.S. and Canada.

Analytical Products

Contents

Phytochemical Standards

Analytical standards and certified reference materials for constituents of phytochemicals

Long before the advent of modern medicine and synthetically produced pharmaceuticals, herbal medicines have been used for the treatment and prevention of diseases and afflictions. Based on the empirical knowledge of generations, rich traditions of natural medicine have evolved independently in different regions of the globe.

Nowadays, herbal medicinal products continue to play an important role in global health care. Traditional Indian medicine (Ayurveda) and traditional Chinese medicine (TCM) are increasingly popular in the Western world. Also, plants play a substantial role in dietary supplements.

Due to the complexity of plant derived materials, and the fact that herbal medicinal products have supposedly been safely used for ages, until a few years ago, no significant quality control had been demanded for these products by the authorities (quite the opposite of synthetically produced pharmaceuticals). However, in the last two decades, the perception has changed, and it is agreed that herbal medicinal products do, in fact, need effective quality control in order to ensure that the products are safe and meet established quality standards. The composition of a plant may vary dramatically depending on season or location of harvest. Therefore, active or potentially harmful toxic components may vary in concentration and need to be controlled.

We offer a substantial portfolio of analytical standards and reference materials for key ingredients of the most widely used medicinal herbs. The portfolio is comprised of more than 600 products and continues to grow. If you don't find the product that you require in this brochure, please browse the up-to-date portfolio on **SigmaAldrich.com/phytochemicals** or contact us.

While all analytical standards are tested thoroughly for identity and chromatographic purity, we also offer an expanding portfolio of primary pharmaceutical standards for herbal medicinal product analysis, as well as an increasing number of *Trace***CERT**® Certified Reference Materials (CRM).

This brochure is focusing on the natural plant constituents. However, as shown on page 59, we also offer other standards and reference materials that are required for the testing of herbal medicines such as pesticides, mycotoxins, inorganic standards and microbiological CRMs.

Primary Pharmaceutical Standards

Our selection of analytical standards for active substances and marker compounds of herbal medicinal products includes a growing range of primary pharmaceutical standards. These standards are manufactured and qualified by HWI-Analytik in Rülzheim (Germany) and exclusively distributed by Merck.

The absolute content determination of these products is performed by quantitative NMR (qNMR). qNMR is increasingly applied, not only for the content assignment of natural products,
but also by the pharmaceutical industry in general as an orthogonal method and alternative to the very common, but laborious “mass balance” approach. The Merck in-house produced organic *Trace***CERT**® certified reference materials also use qNMR for quantification (see page 8).

In addition to the quantitative value determined by qNMR, the certificates of the primary pharmaceutical standards from HWI also list a value for the chromatographic purity. These two values may differ since not all impurities are detected by chromatography. For quantitative calculations, the qNMR value should be used.

More detailed information about these products can be found in articles published in our Analytix magazine (issue 1/2010 pages 11 – 15) which can be downloaded at **SigmaAldrich.com/analytix**

The portfolio of primary pharmaceutical standards currently consists of over 100 products listed on the following pages. This selection is continuously growing, and an up-to-date listing can be found at: **SigmaAldrich.com/phytopharma**

Description	Package	Cat. No.
trans-Anethol	100 mg	**00130595**
p-Anisaldehyde	50 mg	**05320590**
Apigenin	10 mg	**01760595**
Apigenin-6,8-diglucoside (Vicenin 2)	10 mg	**03980585**
Apigenin 7-glucoside	10 mg	**00720585**
Apigenin 7-O-glucuronide	10 mg	**04490590**
Arbutin	50 mg	**00890590**
β-Asarone	25 mg	**02890590**
Asiaticoside	10 mg	**04560590**
Aspalathin	10 mg	**03520585**
Aucubin	25 mg	**00090590**
Bilobalide	10 mg	**00760595**
(−)-α-Bisabolol	100 mg	**00320188**
Bisabolol oxide A	25 mg	**00630590**
(−)-Bornyl acetate	50 mg	**00400585**
Camphene	100 mg	**01410590**
Camphor (dl)	100 mg	**02070595**
(+)-3-δ-Carene	100 mg	**00410590**
Carnosic acid	10 mg	**05330590**
Carvacrol	50 mg	**04270590**
(−)-Carvone	100 mg	**00290595**
Casticin	10 mg	**01940590**
(+)-Catechin	10 mg	**03910590**
Chlorogenic acid	25 mg	**00500590**
1,8-Cineole (Eucalyptol)	100 mg	**00020590**
p-Coumaric acid	50 mg	**03200595**
Coumarin	50 mg	**01260595**
Curcumin	10 mg	**00280590**
Daidzein	50 mg	**05340590**
Daidzin	10 mg	**05370590**
Echinacoside	10 mg	**01710580**
Ellagic acid	50 mg	**05350590**
Epicatechin	10 mg	**03940590**
(−)-Epicatechin 3-gallate	10 mg	**03950590**
Epigallocatechin	10 mg	**03960590**
Epigallocatechin gallate	10 mg	**03970590**
Eriocitrin	10 mg	**02660590**
Eucalyptol (1,8-Cineole)	100 mg	**00020590**
Eugenol	100 mg	**01050595**
(+)-Fenchone	100 mg	**00380590**
Genistein	50 mg	**05360590**
Genistin	25 mg	**05380590**

Description	Package	Cat. No.
Geranyl acetate	100 mg	**01290190**
Ginkgolic acid C15:1	10 mg	**02580185**
Ginkgolic acid C17:1	10 mg	**01390590**
Ginkgolide A	25 mg	**00770590**
Ginkgolide C	25 mg	**01490590**
Ginsenoside Rb1	10 mg	**00170580**
Ginsenoside Re	10 mg	**03000590**
Ginsenoside Rg1	10 mg	**00370580**
Glycyrrhizic acid ammonium salt	50 mg	**01250570**
Harpagoside	25 mg	**00420580**
Hederacoside C	10 mg	**00930585**
α-Hederin	10 mg	**01240585**
Herniarin	10 mg	**02250595**
Hesperidin	25 mg	**04650590**
Hulupinic acid	10 mg	**01090595**
Hypericin	10 mg	**00190585**
Hyperoside	25 mg	**00180585**
(1S,2R,5R)-(+)-Isomenthol	25 mg	**04280590**
Isoorientin	10 mg	**03820585**
(−)-Isopulegol	50 mg	**04570595**
IsoquercitrinA	25 mg	**00140585**
Isorhamnetin	10 mg	**04290585**
Isorhamnetin-3-O-β-D glucopyranosyl-(1➟2) -β-D glucopyranosyl-(1➟6)-β-D glucopyranoside	10 mg	**00960590**
Isovitexin	10 mg	**01120590**
Kaempferol	10 mg	**00550580**
Kaempferol-3-glucoside	10 mg	**04500585**
Larixylacetat	50 mg	**02730595**
(R)-(+)-Limonene	100 mg	**00590590**
Linalool	100 mg	**00350190**
Luteolin	25 mg	**03880590**
Luteolin 7-glucoside	10 mg	**03600585**
Luteolin-7-O-β-D-glucuronide	10 mg	**04480585**
Menthofuran	50 mg	**04580595**
(+)-Menthofuran	50 mg	**04580595**
(−)-Menthol	100 mg	**00580590**
(-)-Menthone	100 mg	**04660585**
Menthyl acetate	100 mg	**04590595**
Myrcene	50 mg	**04600585**
Myricetin	10 mg	**05390590**
Myricitrin	10 mg	**02180585**
trans-Nerolidol	50 mg	**04610590**

Description	Package	Cat. No.
Oleanolic acid	10 mg	**03920590**
Oleuropein	10 mg	**05400590**
Orientin	10 mg	**03810585**
Osthole	10 mg	**02150595**
(−)-β-Pinene	100 mg	**00080590**
α-Pinene	100 mg	**00040590**
Protocatechuic acid	50 mg	**03930590**
(+)-Pulegone	100 mg	**04620590**
Quercetin dihydrate	50 mg	**00200595**
Quercetin 3-glucuronide	25 mg	**00310590**
Quercitrin	25 mg	**00740580**
Rosmarinic acid	25 mg	**00390580**
Rutin trihydrate	50 mg	**00300590**
Sabinen hydrate	50 mg	**04630590**
Salidroside	10 mg	**05410590**
Sennoside A	25 mg	**01870575**

Description	Package	Cat. No.
Sennoside B	25 mg	**00530580**
β-Sitosterol	10 mg	**05410590**
Silybin	25 mg	**02000585**
Stevioside	25 mg	**05420590**
Taxifolin	10 mg	**03890585**
Terpinen 4-ol	50 mg	**03900590**
γ-Terpinene	100 mg	**04640590**
α-Terpineol	100 mg	**03420590**
Thymol	100 mg	**00670590**
Ursolic acid	10 mg	**03240595**
Valerenic acid	10 mg	**02010595**
Verbascoside	10 mg	**00820580**
Vitexin	10 mg	**00840595**
Vitexin 2-O-rhamnoside	10 mg	**00660585**
Xanthohumol	10 mg	**01130595**

Plant Extracts

For calibration, substance verification and plant authenticity testing we offer a series of extract reference materials of some of the most widely used medicinal plants. The extracts are qualified as secondary standards, providing quantitative values for one or several marker ingredients as well as identity confirmation and peak assignment for additional key constituents of the plant. The values are traceable to HWI primary pharmaceutical standards. The product is delivered with a leaflet containing chromatographic method and example chromatograms with peak assignment **(SigmaAldrich.com/plantextracts).**

Description	Quantitative Marker Ingredients	Qualitative Marker Ingredients	Product Number
Camellia sinensis extract	Epigallocatechin gallate	Catechin, Epicatechin, Epicatechin gallate, Epigallocatechin, Epigallocatechin gallate	05495001
Crataegus spp extract	Vitexin rhamnoside	Vitexin-2-O-rhamnoside, Chlorgenic acid, Hyperoside	05095001
Ginkgo Biloba extract	Blobalide, Ginkgolide A	Bilobalide, Ginkgolide A, Ginkgolide B, Ginkgolide C	05485001
Harpagophytum procumbens extract	Harpagoside	8-p-Coumaryl harpagide, Harpagoside	05125001
Hypericum perforatum extract	Hypericin	Hypericin, Pseudohypericin	05295001
Panax ginseng extract	Ginsenosides Rb1+Rg1	Ginsenosides Rg1, Rb1, Re, Rf, Rg2, Rc, Rb2, Rd	05115001
Passiflora incarnata extract	Isovitexin	Vitexin, Orientin, Homoorientin, Isovitexin	05085001
Senna extract	Sennoside B	Sennoside A, Sennoside B	05475001
Silybum marianum extract	Silybin A+B	Silicristin, Silidianin, Isosilbinin A, Isosilbinin B, Silybin A, Silybin B	05135001
Valeriana officinalis extract	Valerenic acid	Valerenic acid, Hydroxyvalerenic acid, Acetoxyvalerenic acid	05105001

*Trace*CERT® Certified Reference Materials

For ISO/IEC 17025 accredited labs, it is important to show traceability of all results to an internationally recognized standard, so for calibration, certified reference materials (CRMs) must be used. Our rapidly expanding *Trace***CERT**® product range includes an increasing number of certified reference materials for natural products.

*Trace***CERT**® products are manufactured under ISO/IEC 17025 and ISO Guide 34 double accreditation, which is the highest achievable quality level for reference material producers and which is also referred to as "the gold standard". All *Trace***CERT**® products are delivered with a comprehensive certificate according to ISO Guide 35 including properly calculated uncertainties taking into account homogeneity and stability of the material.

These neat CRMs are certified by quantitative NMR (qNMR) and traceable to NIST SRM.

The complete range of organic *Trace***CERT**® products can be found at:
SigmaAldrich.com/organiccrm

So far, the following natural products CRMs are available:

Description	Package	Cat. No.
p-Anisaldehyde	100 mg	**43621**
L-Ascorbic acid	100 mg	**57803**
Benzyl alcohol	100 mg	**39971**
Benzyl benzoate	1mL	**55177**
Betaine	50 mg	**30056**
Biotin	50 mg	**91827**
trans-Caffeic acid	50 mg	**51868**
Caffeine	100 mg	**56396**
Capsaicin	50 mg	**75049**
(+)-Carvone	100 mg	**79245**
Citric acid	100 mg	**94676**
Coumarin	100 mg	**72609**
p-Cymene	100 mg	**49679**
Digoxin	50 mg	**04599**
Eucalyptol	100 mg	**95656**
Eugenol	100 mg	**79891**
trans-Ferulic acid	50 mg	**52229**
Fumaric acid	100 mg	**76635**
Gallic acid	100 mg	**91215**
Glutaric acid	100 mg	**89147**
Glycolic acid	100 mg	**94815**

Description	Package	Cat. No.
Linalool	50 mg	**61706**
Magnesium L-lactate hydrate	100 mg	**40394**
L-(−)-Malic acid	100 mg	**09172**
Malonic acid	100 mg	**68714**
Quinine	50 mg	**69311**
Reserpine	50 mg	**06859**
Resorcinol	100 mg	**53363**
trans-Resveratrol	100 mg	**76511**
Safrole	100 mg	**08010**
Salicylic acid	50 mg	**52341**
Sodium propionate	100 mg	**49894**
Succinic acid	100 mg	**49893**
L-(+)-Tartaric acid	100 mg	**41447**
Vanillic acid	50 mg	**68654**
Vanillin	50 mg	**30304**

HPLC Methods for Separation of Medicinal Plants

To demonstrate the excellent separation capability and versatility of our Ascentis® Express columns and sample preparation products, examples of analytical applications for the separation of key ingredients of widely used herbal medicinal products are shown on the following pages.

Since the characteristic components of a plant are often structurally very similar, their separation can be challenging and requires both good skills and the best suited separation columns. The applications have usually been developed and optimized using a mixture of the available analytical standards, and are then applied to either plant extracts or commercially available herbal medicinal products. The four examples outlined in this document include various chemical compound classes such as Flavonoids (Silybum), Steroidal lactones (Withania) and Triterpenoids (Boswellia and Ginseng).

1. Separation of Silymarin Components

Introduction

Silymarin, derived from the milk thistle plant (*Silybum sp.*), has been used as a natural remedy for the treatment of a number of liver diseases as well as in the protection of the liver from potential toxins. More recently, silymarin has been connected to anti-tumor promoting activity[1]. It is therefore of interest to have analytical methods available for the analysis of silymarin components in various matrices.

The silymarin complex consists of several closely related, biologically active components. The objective of this study was to investigate several modern, stationary-phase chemistries for optimal selectivity towards the development of an efficient method for the analysis of silymarin. The method would optimally provide baseline resolution for nine of the known components of silymarin in less than 15 minutes.

Initial screening experiments were used to select a single combination of stationary phase and organic modifier that demonstrates the greatest potential for the separation. The information from subsequent optimization experiments was processed with simulation software to predict an optimized set of conditions. Finally, the predicted conditions were confirmed using the analysis of an herbal supplement obtained from a local drug store.

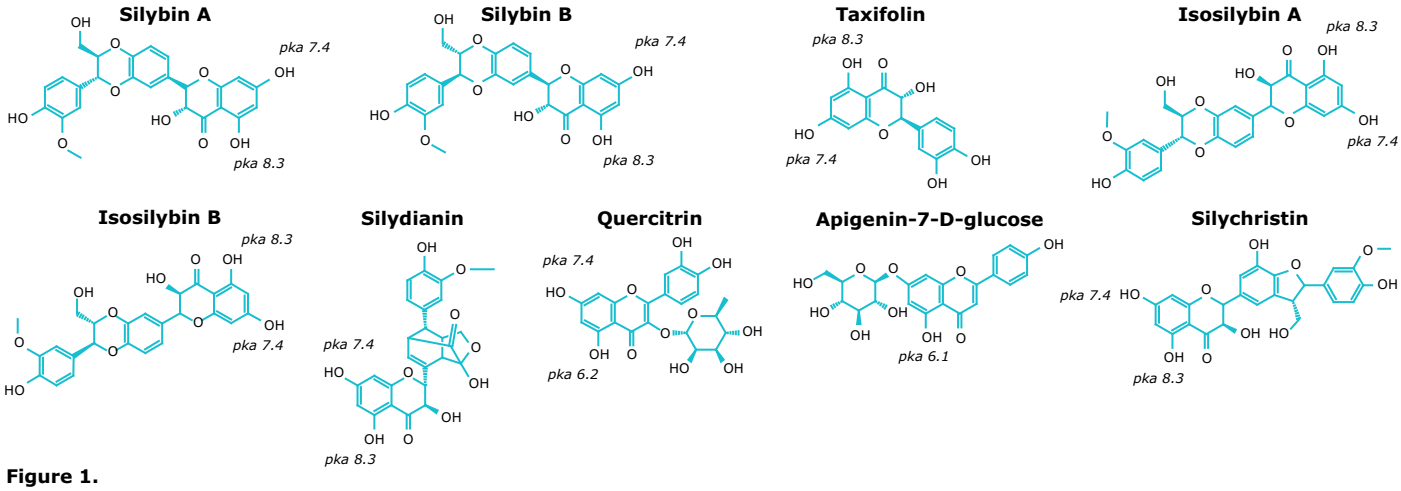


Figure 1.

Structures of known biologically active silymarin components.

Experimental

The screening protocol utilized five Ascentis® Express stationary phases including C18, C8, RP-Amide, Phenyl-Hexyl and pentafluorophenylpropyl (F5). Gradient elution with two distinct organic modifiers was performed. Injections of a standard containing nine of the known constituents of silymarin (Figure 1) were made under each condition.

The HPLC screening method employed gradient elution from 5%–95% of either methanol or acetonitrile. The aqueous component of the mobile phase was 0.1% formic acid (pH 2.6).

In order to optimize the separation, separate chromatographic analysis, at two different gradient slopes, and two temperatures were performed. These four runs were then processed using ACD LC-Simulator software (Toronto, ON, Canada) and a predictive model was used to develop conditions that would provide baseline resolution of all peaks in less than 15 minutes. The conditions were then confirmed, using both standards and a commercially available milk thistle herbal supplement.

Results and Discussion

Using a simple peak counting approach, the combination of the C18 stationary phase along with methanol as the organic modifier resulted in the highest number (nine) of visible peaks. A representative chromatogram is shown in Figure 2. Other combinations of stationary phase and organic modifier produced between six and eight peak responses.

Four separate chromatographic runs using the C18 stationary phase and methanol modifier were conducted, where the gradient slopes were varied (5% and 10% ramp) at two different temperatures (30 °C and 60 °C). The data was then analyzed using ACD LC-Simulator to predict the most suitable optimized conditions. Comparison to the experimental data shown in Figure 3 confirms good agreement between the predicted (not shown) and actual chromatography. Because the suggested conditions ran to just 45% organic, an additional step to 100% organic was included to elute potential hydrophobic components from a natural sample.

Finally, an herbal supplement labeled as containing milk thistle along with dandelion, fennel and licorice was extracted using water:ethanol 50:50, v/v and analyzed. As shown in Figure 4, all 9 of the targeted components could be observed in the herbal supplement material.

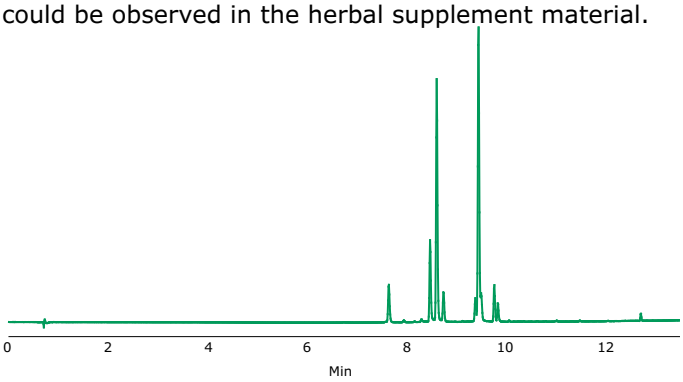


Figure 2.

Initial separation of silymarin components using C18 stationary phase and methanol as the organic modifier.

Column:	Ascentis® Express C18, 10 cm × 3.0 mm I.D., 2.7 µm particle size		
Mobile phase A:	water with 0.1% formic acid		
Mobile phase B:	methanol		
Gradient	min	%A	%B
	0	65	35
	3	65	35
	13	55	45
	15	55	45
Flow Rate:	0.6 mL/min		
Temp.:	35°C		
Det.:	UV, 254 nm		
Injection:	20 µL		
Sample:	9 milk thistle related 20 µg/µL in 86:14, water:methanol		

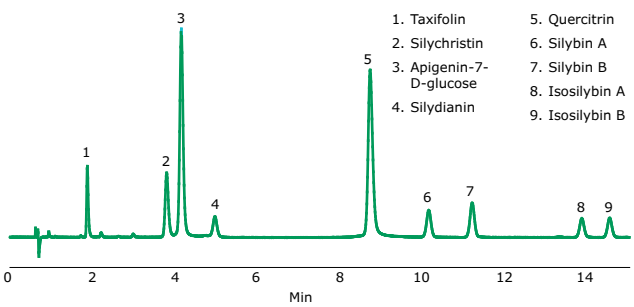


Figure 3.

Experimental confirmation of predicted optimized conditions.

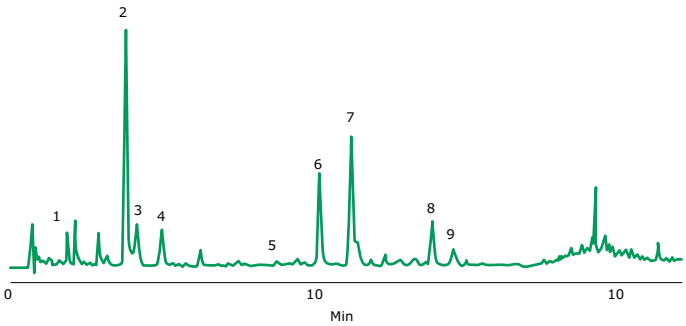


Figure 4.

Identification of silymarin components from a commercial natural supplement.

See Figure 3 for conditions and peak IDs. Sample extracted with 50:50 water:ethanol. Gradient extended to 100% methanol to elute potential hydrophobic sample components.

Conclusions

Stationary phase screening at the onset of method development, especially when dealing with a complex set of analytes, provides an easy means of analytical method development. As shown in the study, a few short experiments, coupled with powerful prediction software, provided chromatographic conditions suitable for the analysis of biologically active milk thistle components. The conditions that were developed should prove useful in natural supplement, raw material and/or biological monitoring of silymarin complex components. The analytical standards for the analytes described in this article are listed in the table below.

Description	Pack Size	Cat. No.
Apigenin-7-glucoside	10 mg	**00720585**
Isosilybin A	5 mg	**97326**
Isosilybin B	5 mg	**95684**
Quercitrin	25 mg	**00740580**
Silybin A, primary reference standard	10 mg	**02000585**
Silybin B	5 mg	**59527**
Silychristin	10 mg	**51681**
Silydianin	10 mg	**30494**
Taxifolin	25 mg	**78666**

Reference standards for active components of silymarin.

Reference

1. Lee, J. I.; Hsu, B. H.; Wu, D.; Barrett, J. S. Journal of Chromatography A 2006, 1116, 57–68.

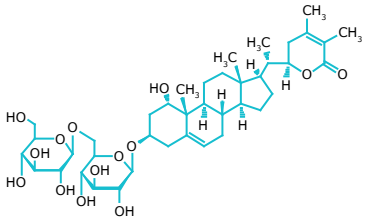
2. Separation of the Components of Withania somnifera (Ashwagandha)

The dried roots of Withania somnifera are the source for Ashwagandha, one of the most popular remedies in traditional Indian medicine (Ayurveda). Ayurvedic medicine is becoming increasingly popular in the western world, too, as reflected by the existence of a United States Pharmacopeia (USP) monograph for powdered Ashwagandha roots[2] and a British Pharmacopeia (BP) monograph for W. sominerfa root for use in Traditional Herbal Medicinal Products (THMP).[3]

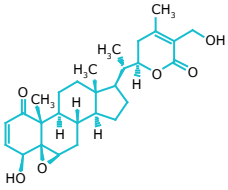
The traditionally benign health effects are very diverse and include aphrodisiac, rejuvenative and life-prolonging properties.[4] Beneficial effects are also supported by recent bioactivity studies: Withaferin A has been shown to have significant anticancer activity in animals.[5]

The characteristic constituents belong to a group of steroidal lactones consisting of a steroidal scaffold attached to a six-membered lactone ring. The structures are shown in Figure 1.

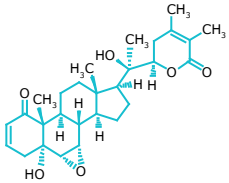
1. 12-Deoxywithastramonolide



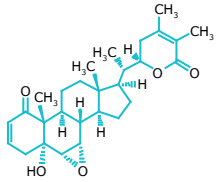
2. Withaferin A



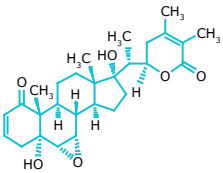
3. Withanolide A



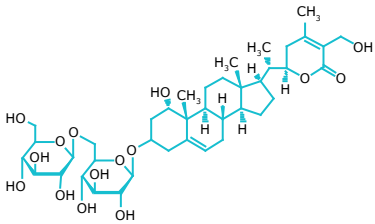
4. Withanolide B



5. Withanone



6. Withanoside IV



7. Withanoside V

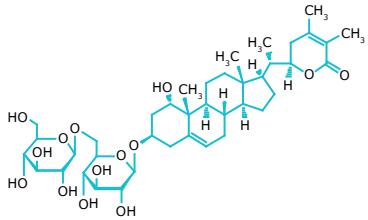
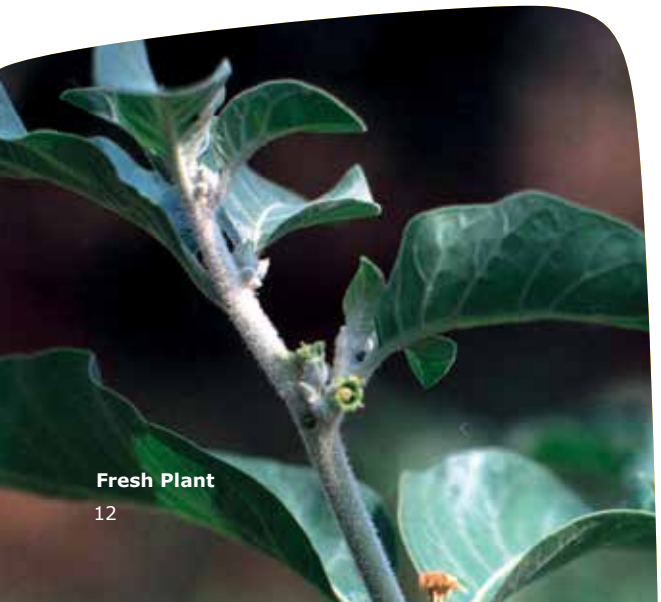


Figure 1.

Structures of Selected Withania Constituents.



Fresh Plant

Dried Root

HPLC Analysis of Withania Constituents Using Ascentis® Express Columns

As part of a large number of natural health product studies recently conducted, many of the main constituents of Withania were screened on several modern Fused-Core® stationary phases. The results from the screening effort showed that the Ascentis® Express F5 and the Ascentis® Express Phenyl-Hexyl phases provided improved selectivity over the C18 stationary phase. Both phases, presumably due to their intrinsic rigidity, are known to provide enhanced shape selectivity. The shape selectivity component is often found to be useful for the separation of closely related compounds with rigid structures.

Figure 2 shows a comparison of Withania standard constituents separated using the USP method to an optimized separation with Ascentis® Express Phenyl-Hexyl. The USP method calls for a long, 40-minute gradient and the use of a 25 cm × 4.6 mm C18 column. Even with this lengthy system, only marginal separation of Withanolide A and Withanone is obtained. Conversely, a 15-minute gradient utilizing a shorter 10 cm × 2.1 mm phenyl-hexyl phase provides baseline separation of all components.

Figure 3 shows the separation of Ashwagandha extract constituents using both systems. The use of the phenyl hexyl column is again shown to provide improved resolution in a shorter period of time and with approximately 3x greater sensitivity. Note that only those components that could be confidently identified are noted. Similar results were obtained utilizing the Ascentis® Express F5 stationary phase (data not shown).

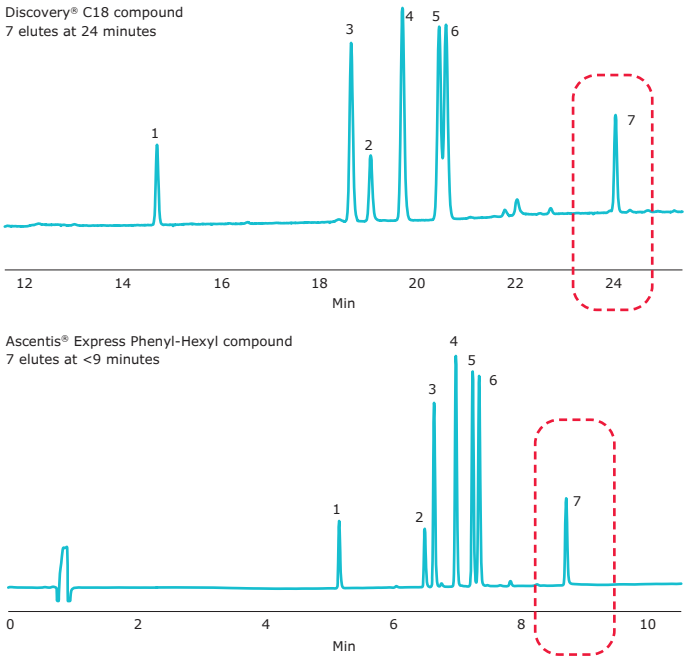


Figure 2.

Comparison of Withania Standard Separation Using a Standard C18 vs Optimized Ascentis® Express Phenyl-Hexyl Method.

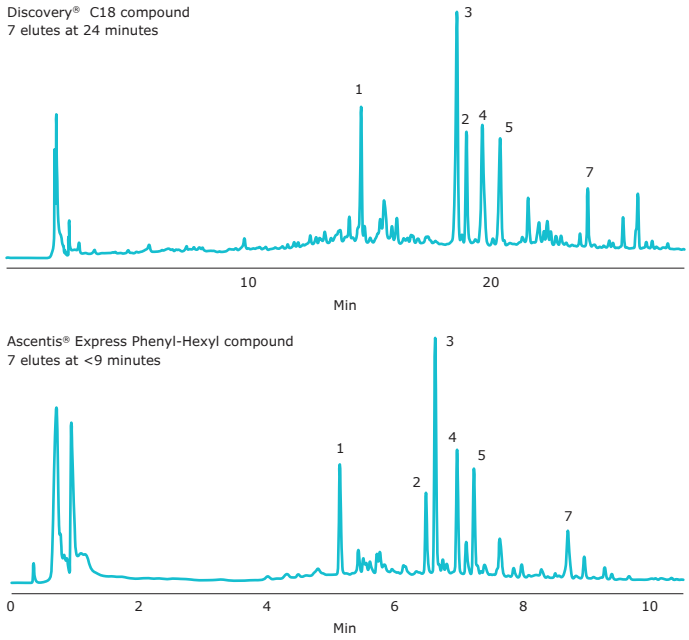


Figure 3.

Comparison of Ashwagandha Extract Component Separation Using a Standard C18 vs Optimized Ascentis® Express Phenyl-Hexyl.

Discovery® C18 Conditions for Figures 2 and 3

Column	Discovery® C18, 25 cm × 4.6 mm I.D., 5 µm (504971)		
Mobile phase A	phosphate buffer*		
Mobile phase B	acetonitrile		
Gradient	Min.	%A	%B
	0.0	95.0	5.0
	18.0	55.0	45.0
	25.0	20.0	80.0
	28.0	20.0	80.0
	30.0	95.0	5.0
	40.0	95.0	5.0
Flow rate	1.5 mL/min.		
Temp.	27°C		
Det.	227 nm		
Injection	20 µL		
Samples	Standard: 20 µg/mL each in 80:20 water:methanol		
Extract	As per USP (1)		

*Dissolve 0.14 g of potassium dihydrogen phosphate in 900 mL water, add 0.5 mL of phosphoric acid, dilute with water to 1000 mL, and mix.

Ascentis® Express Phenyl-Hexyl Conditions

Column	Ascentis® Express Phenyl-Hexyl, 10 cm × 2.1 mm I.D., 2.7 µm (53336-U)		
Mobile phase A	water		
Mobile phase B	acetonitrile		
Gradient	Min.	%A	%B
	0.0	80.0	20.0
	10.0	0.0	100.0
	10.5	0.0	100.0
	11.0	20.0	80.0
	15.0	20.0	80.0
Flow rate	0.3 mL/min.		
Temp.	35°C		
Det.	227 nm		
Injection	5 µL		
Samples	same as Discovery® C18		

Conclusion

A fast method with full resolution of 7 constituents from the Ashwagandha root was achieved on an Ascentis® Express Phenyl-Hexyl Fused-Core particle column.

Description	Pack Size	Cat. No.
12-Deoxywithastramonolide	10 mg	**94187**
Withaferin A	10 mg	**89910**
Withanolide A	10 mg	**74776**
Withanolide B	10 mg	**94284**
Withanone	10 mg	**90896**
Withanoside IV	10 mg	**94186**
Withanoside V	10 mg	**66042**
Ascentis® Express Phenyl-Hexyl Column 10 cm x 2.1 mm I.D., 2.7 µm	—	**53336-U**

Standards and columns used for this application.

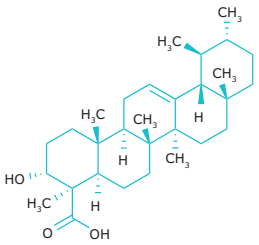
References

1. USP 34, Dietary Supplements, Ashwagandha 1079.
2. BP 2011, Withania somnifera roots for THMP, 3674.
3. Agarwal, A.; Murali, B.; "Quality Assessment of Selected Indian Medicinal Plants"; Volume 1.
4. Singh, G.; Sharma, P.K.; Dudhe, R.; Singh, S.; Annals of Biological Research, 1 (3); 56–63.

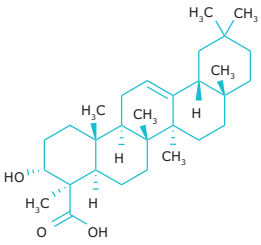
3. Separation of the Components of Boswellia (Frankincense)

The trees of the genus boswellia have been used in traditional medicine for thousands of years as an anti-inflammatory agent. Its resin is known as frankincense or olibanum and is still widely used in dietary supplements and in herbal medicinal products. The most characteristic components are a group of pentacyclic triterpene acids of which β-boswellic acids are the major biologically active constituents. We offer six boswellic acids as analytical standards and two neat standards of α+β mixtures for use in research and quality control.

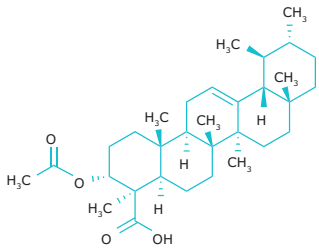
80342
β-boswellic acid



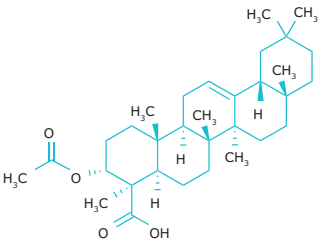
06813
α-boswellic acid



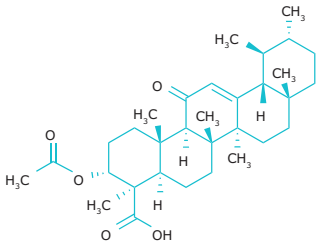
49873
3-O-Acetyl-β-boswellic acid



56208
3-O-Acetyl-α-boswellic acid



74607
3-O-Acetyl-11-keto-β-boswellic acid



78535
11-keto-β-boswellic acid

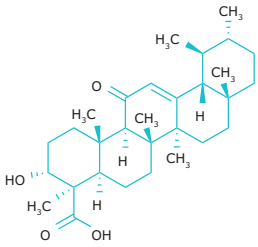


Figure 1.

Chemical Structures of the Boswellic Acids

Separation of Boswellic Acids

Several conditions, using a variety of solid phases, have been screened for their suitability to separate six boswellic acids. The shortest analysis time was achieved using an Ascentis® Express Phenyl Hexyl Column (2.7 µm particle size, L × I.D. 10 cm × 3.0 mm) and acetonitrile/phosphoric acid as eluents.

Figure 2 shows the chromatograms of the ethanolic extract of a boswellia herbal supplement as well as of a mixture of the six analytical standards.

Column	Ascentis® Express Phenyl-Hexyl, 10 cm × 3.0 mm I.D., 2.7 µm (53345-U)
Mobile phase	(A) 0.1% phosphoric acid; (B) acetonitrile
Gradient	50% B for 0.5 min; to 100% B in 4.5 min; held at 100% B for 5 min
Flow Rate	0.6 mL/min
Pressure	2390 psi (165 bar)
Column temp.	35°C
Detector	UV at 210 nm
Injection	5 µL
Sample(s)	6 Boswellic acids 50 µg/mL in 70:30, water:methanol extract in 50:50, water:ethanol
Extraction	1. Weigh 100 mg Bosewellia Herbal Supplement 2. Add 10 mL ethanol 3. Sonicate for 30 min at 40°C 4. Dilute: 100 µL extract in ethanol, 400 µL ethanol, 500 µL water

1. 11-Keto-β-boswellic-acid
2. 3-O-Acetyl-11-keto-β-boswellic-acid
3. α-boswellic-acid
4. β-boswellic-acid
5. 3-O-Acetyl-α-boswellic-acid
6. 3-O-Acetyl-β-boswellic-acid

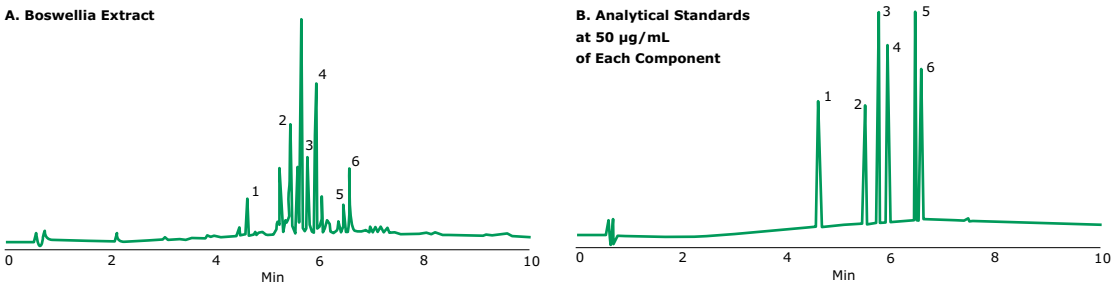


Figure 2.

Experimental Conditions and Chromatograms of the Separation of Boswellic Acids

Description	Pack Size	Cat. No.
3-O-Acetyl-11-keto-β-boswellic acid	5 mg	**74607**
3-O-Acetyl-α-boswellic acid	5 mg	**56208**
3-O-Acetyl-β-boswellic acid	5 mg	**49873**
3-O-Acetylboswellic acid, mixture of α and β	5 mg	**96729**
α-Boswellic acid	10 mg	**06813**
β-Boswellic acid	5 mg	**80342**
Boswellic acid, mixture of α and β	5 mg	**63850**
11-Keto-β-boswellic acid	5 mg	**78535**
Ascentis® Express Phenyl-Hexyl, 2.7 Micron HPLC Column	10 cm × 3.0 mm	**53345-U**

Analytical standards of boswellic acids and column used.

4. Separation of Ginsenosides

Belonging to the plant genus panax, ginseng is one of the most well-known herbal medicines. It has been used in traditional Chinese medicine for centuries, but has also become very popular in the Western world. Medicines derived from the ginseng root are used in the treatment or prevention of many health problems including anxiety, asthma, diabetes, headache, stress, depression and erectile dysfunction, among others.

The unique compounds of panax are saponin triterpenoid glycosides, called ginsenosides. Their potential effects in humans are being studied intensively.

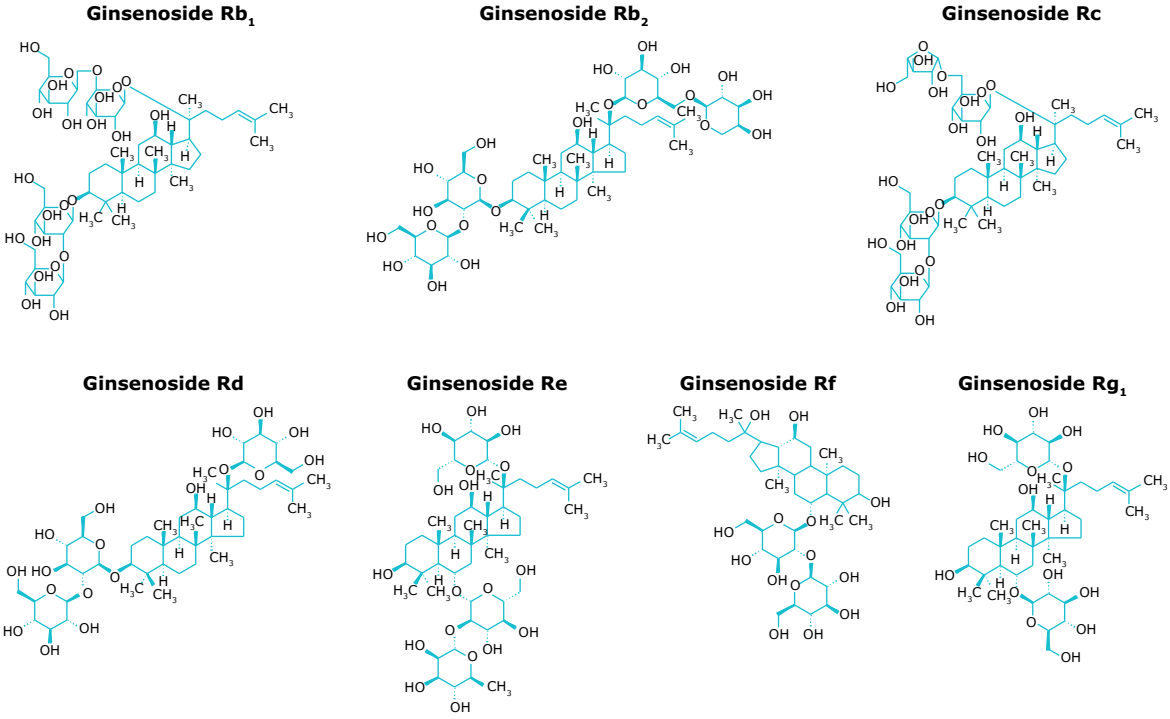


Figure 1.

Chemical structures of the analyzed ginsenosides.

Separation of Ginsenosides in Panax quinquefolius (American Ginseng)

We achieved a very good separation of seven different ginsenosides using an Ascentis® Express C18 column. The application was first optimized using a ginsenoside standard mixture (Figure 2) and was then applied to a sample of American ginseng root (Figure 3). The seven targeted analytes are ginsenosides Rb_1, Rb_2, Re, Rc, Rd, Rf and Rg_1 (structures shown in Figure 1). The experimental conditions and chromatograms are shown below.

Experimental Conditions			
Column	Ascentis® Express C18 15 cm × 4.6 mm, 2.7 µm particle size		
Mobile phase	(A) water		
Mobile phase	(B) acetonitrile		
Gradient	min	%A	%B
	0	75	25
	1.5	75	25
	13.5	15	85
	14.5	15	85
Flow Rate	1.5 mL/min		
Temp.	60°C		
Detector	205 nm		
Injection	10 µL		

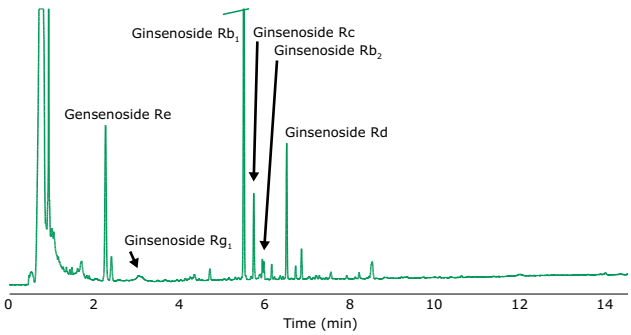


Figure 2.

Chromatogram of the standard mixture (50 µg/mL each component in 82:18, water:methanol).

Extraction method used for ginseng root:	
NSF International Ground Plant Material	320 mg (or 36 mg for XRM material)
Extraction Solvent	10 mL 50:50, water:ethanol
Sonication	30 min
Temp.	50°C

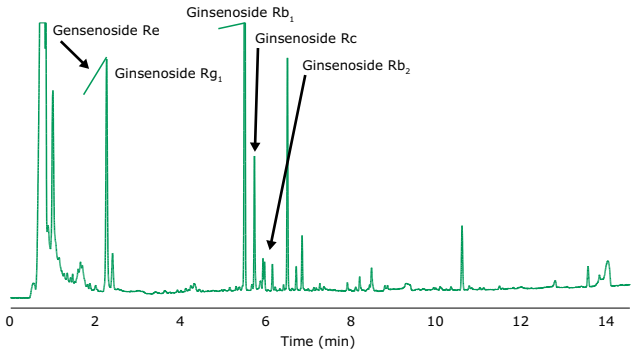


Figure 3.

Chromatogram of the American ginseng root extract.

Description	Pack Size	Cat. No.
Ginsenoside Rb_1 primary pharmaceutical reference standard	10 mg	**00170580**
Ginsenoside Rb_2 analytical standard	10 mg	**41868**
Ginsenoside Rc analytical standard	10 mg	**44987**
Ginsenoside Rd analytical standard	10 mg	**01518**
Ginsenoside Re primary pharmaceutical reference standard	10 mg	**03000590**
Ginsenoside Rf primary pharmaceutical reference standard	10 mg	**01580590**
Ginsenoside Rg_1 primary pharmaceutical reference standard	10 mg	**00370580**
Ginseng root from Panax quinquefolium (American ginseng)	5 mg	**G7253**
Ascentis® Express C18 15 cm x 4.6 mm, 2.7 µm particle size	1 EA	**53829-U**

Products Used.

High Performance Thin Layer Chromatography

HPTLC Fingerprint Applications for *Ginkgo Biloba*

Ginkgo-based products are one of the most commonly used over-the-counter (OTC) herbal preparations for treatment of deficits in memory, concentration and depression from organic brain disease[1]. The two main pharmacologically active groups of compounds present in the Ginkgo leaf are the flavonoids and the terpenoids[2]. Another category of constituents, found in the leaves and fruit pods, is called ginkgolic acid, which is toxic and therefore its presence in medicinal products should be avoided.

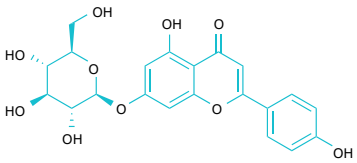
In the following, we present HPTLC methods suitable for these three compound groups using CAMAG equipment, Merck TLC plates, analytical standards and Ginkgo extract reference material 05485001. This extract reference is part of a product group of extract reference materials manufactured by HWI Analytik **(SigmaAldrich.com/plantextracts).**

Application Note 1: Flavonoids

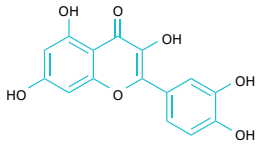
Numerous flavonol glycosides were identified in *Ginkgo Biloba* extracts as derivatives of the aglycones, and together they account for 24% of the Ginkgo compounds. Flavonols (quercetin, kaempferol and isorhamnetin) are usually found only in small amounts in the leaves[3]. Moreover, the flavonoid content in the leaf is known to vary between seasons, with greater amounts found in the fall than in the spring[4].

The quality of *Ginkgo Biloba* extracts is generally evaluated by determination of a minimum content of the terpene lactones and total flavonoids, expressed as the three flavonols (Q/K/I), after hydrolysis of the various flavonol glycosides with acid and heat[5]. Simplification of quality control methods might lead to economically driven adulteration with inexpensive synthetic compounds such as rutin, which, after hydrolysis, is converted into quercetin, or quercetin itself.

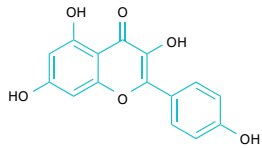
Apigenin 7-glucoside



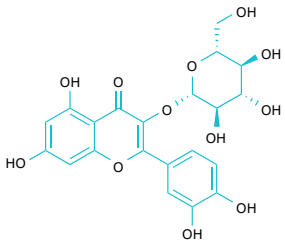
Quercetin



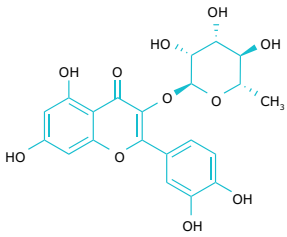
Kaempferol



Quercetin-3-glucoside



Quercitrin



Rutin

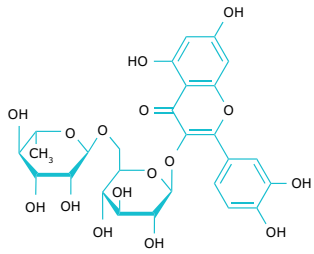


Figure 1.

Flavonoids Present in *Ginkgo Biloba*

Scope:

Identification of flavonoids in the HPTLC fingerprint of *Ginkgo Biloba* extracts and leaf obtained with the HPTLC method of the USP monograph on Ginkgo leaf[6] by comparison of the R_F values of the reference substances and the matching zones in the reference extract.

Recommended CAMAG Devices:

Automatic TLC Sampler 4 (ATS 4) or Linomat 5, Automatic Developing Chamber (ADC 2), TLC Visualizer, Chromatogram Immersion Device, TLC Plate Heater and visionCATS.

Sample:

Drug: In a 25 mL flask, 1 g powdered raw material is refluxed with 10 mL methanol for 10 min. After cooling, the mixture is centrifuged. Extract: 0.1 g of dry extract is sonicated with 10 mL methanol for 10 min and filtered. The supernatant is used as test solution.

Standards:

Standard solutions were prepared in a concentration of 0.25 mg/mL in methanol.

Derivatization Reagent:

Natural Products reagent (NP reagent): 1 g diphenylborinic acid aminoethylester is dissolved in 200 mL ethyl acetate. Polyethylene glycol (PEG reagent): 10 g polyethylene glycol 400 (macrogol) are dissolved in 200 mL dichloromethane.

Chromatography Following USP <203>[7]:

Stationary phase:
HPTLC Si 60 F_{254} 20×10 cm (Merck).

Sample application:
3 µL each of test solution and 2 µL of standards are applied as 8 mm bands, 8 mm from lower edge of plate and 20 mm from the left edge, using the ATS 4.

Developing solvent:
Ethyl acetate, glacial acetic acid, formic acid and water (100:11:11:26 v/v/v/v)

Development:
Development was performed with ADC 2, saturated for 20 min. with the mobile phase (filter paper). Prior to the development, the plate was exposed to a relative humidity of 33% (with a saturated solution of $MgCl_2$).

Developing distance:
70 mm from lower edge of the plate

Plate drying:
5 min in a stream of cold air

Detection:
The plate is heated at 100 °C for 3 min, then dipped (speed: 3, time: 0) while still hot in NP reagent, dried in a stream of cold air, then dipped (speed: 3, time: 0) in PEG reagent

Evaluation:
Documentation under UV 366 nm after derivatization

Results:

Under UV 366 nm after derivatization (Figure 2), the zones corresponding in color and position to the standards rutin, quercetin-3-glucoside, apigenin-7-O-glucoside and quercitrin are seen in all samples in different intensities. The standards quercetin and kaempferol are seen in all three extracts (track 7, our reference extract, track 8 and track 9); however, in different intensities. The extract on track 9 represents a characteristic fingerprint of a sample adulterated with quercetin, kaempferol and isorhamnetin due to the presence of an intense yellow/green zone at the position of quercetin and kaempferol (just below the solvent front). Ginkgo leaf (track 10) shows a fingerprint similar to the reference extract on track 7; however, due to the extraction processes and chlorophylls, the red zone at the solvent front is not seen in the reference extract. The fingerprint on track 11 is characteristic of golden fall ginkgo.

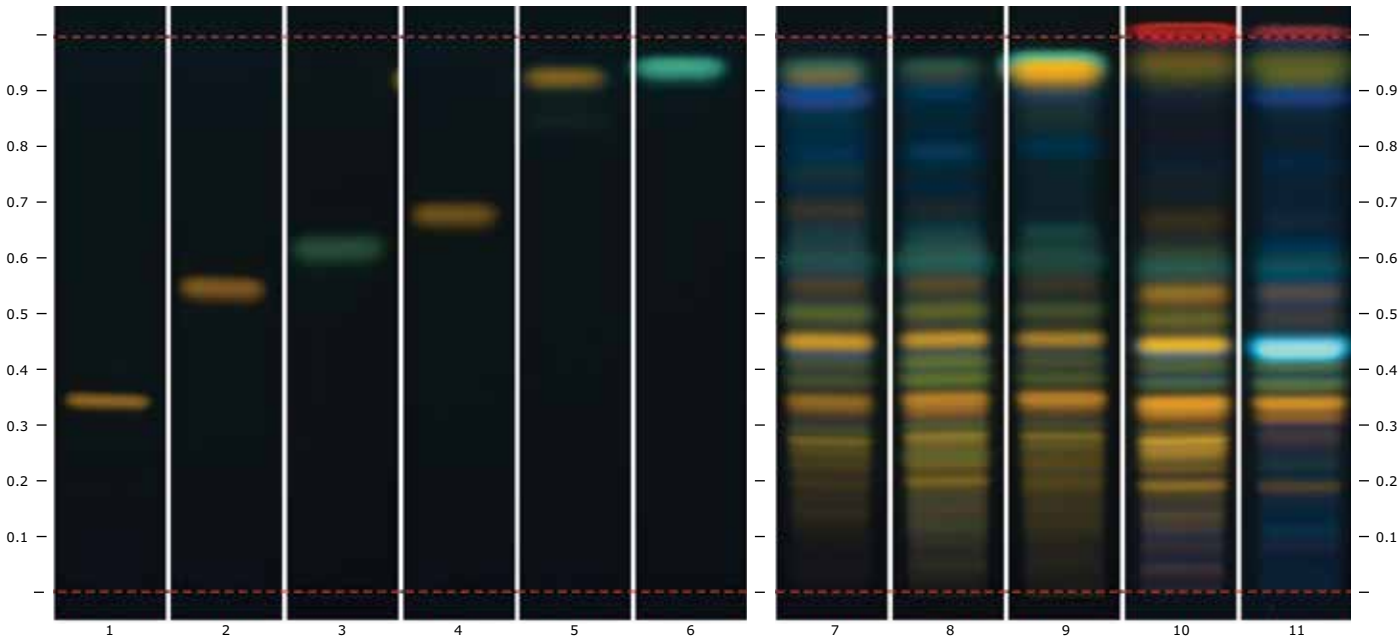


Figure 2.

Chromatogram under UV 366 nm after Derivatization. Track 1: Rutin; Track 2: Quercetin-3-glucoside; Track 3: Apigenine-7-O-glucoside; Track 4: Quercitrin; Track 5: Quercetin; Track 6: Kaempferol; Track 7: *G. Biloba* Leaf Powdered Extract 05485001; Track 8: *G. Biloba* Leaf Dry Extract; Track 9: *G. Biloba* Leaf Dry Extract Adulterated with Quercetin; Track 10: *G. Biloba* Powdered Leaf; Track 11: *G. Biloba* Powdered Leaf (Golden Ginkgo)

Application Note 2: Ginkgo Terpene Lactones

Two types of terpenoids are present in ginkgo as lactones: ginkgolides and bilobalides (see Figure 3). Together they account for 6% of the ginkgo compounds and are present only in this species[2, 8]. Due to the low UV absorption of the terpene lactones, HPLC analyses require special detectors[9]. For detection in HPTLC, only a simple derivatization step is required.

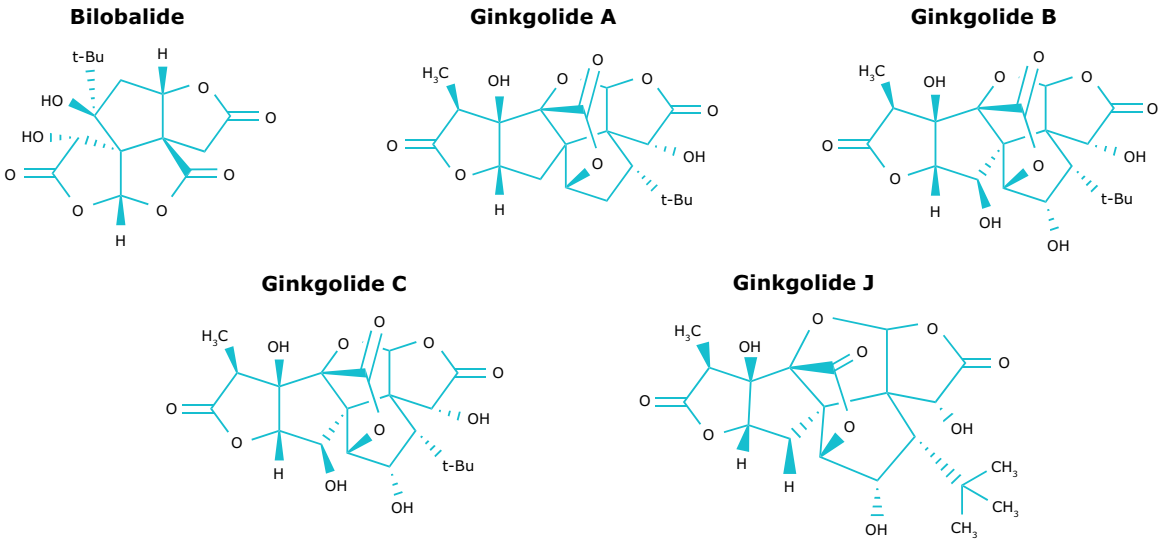


Figure 3.

Ginkgolide and Bilobalide Lactones Present in *Ginkgo Biloba*

Scope:

Identify the presence of ginkgolides (A, B, C and J) and bilobalide in the fingerprints of *Ginkgo Biloba* extracts and leaf obtained with the HPTLC method of the USP monograph for ginkgo leaf by comparison of the R_F values of the reference substances and the matching zones in the reference extract.

Required or Recommended CAMAG Devices:

Automatic TLC Sampler 4 (ATS 4) or Linomat 5, Automatic Developing Chamber (ADC 2), TLC Visualizer, TLC/HPTLC Sprayer or CAMAG Derivatizer, TLC Plate Heater and visionCATS.

Sample:

Drug: In a 25 mL flask, 1 g powdered raw material is refluxed with 10 mL methanol for 10 min. After cooling, the mixture is centrifuged. Extract: 0.1 g of dry extract is sonicated with 10 mL methanol for 10 min and filtered. The supernatant is used as test solution.

Standards:

Standard solutions were prepared in a concentration of 1.0 mg/mL in methanol.

Plate Impregnation with Sodium Acetate Solution:

8 g of sodium acetate are dissolved in 200 mL of ethanol, water (3:2 v/v). HPTLC plates are immersed into the solution for 2 seconds and allowed to dry at room temperature in the hood for 5 min. The plates are then heated at 90 °C for 30 min.

Derivatization Reagent:

Acetic anhydride is directly used for spraying.

Chromatography Following USP <203>[6]:

Stationary phase:
HPTLC Si 60 F_{254} 20×10 cm (Merck).

Sample application:
5 µL each of test solution and 3 µL of standards are applied as 8 mm bands, 8 mm from lower edge of plate and 20 mm from the left edge using the ATS 4.

Developing solvent:
Toluene, ethyl acetate, acetone, methanol (20:10:10:1.2 v/v/v/v).

Development:
Development is performed with ADC 2, saturated for 20 minutes with the mobile phase (filter paper). Prior to the development, the plate is exposed to a relative humidity of 33% (with a saturated solution of $MgCl_2$).

Developing distance:
70 mm from lower edge of the plate.

Plate drying:
5 min in a stream of cold air.

Detection:
The plate is sprayed evenly with acetic anhydride and heated at 180 °C for 10 min.

Evaluation: Documentation under UV 366 nm after derivatization.

Results:

In Figure 4, the zones, due to the standards Ginkgolides C, J, B, A and Bilobalide, are seen in both extracts (track 6, our reference extract from HWI Analytik, and track 7). These zones are barely seen in leaf (track 8) due to the presence of a matrix that disturbs the chromatogram.

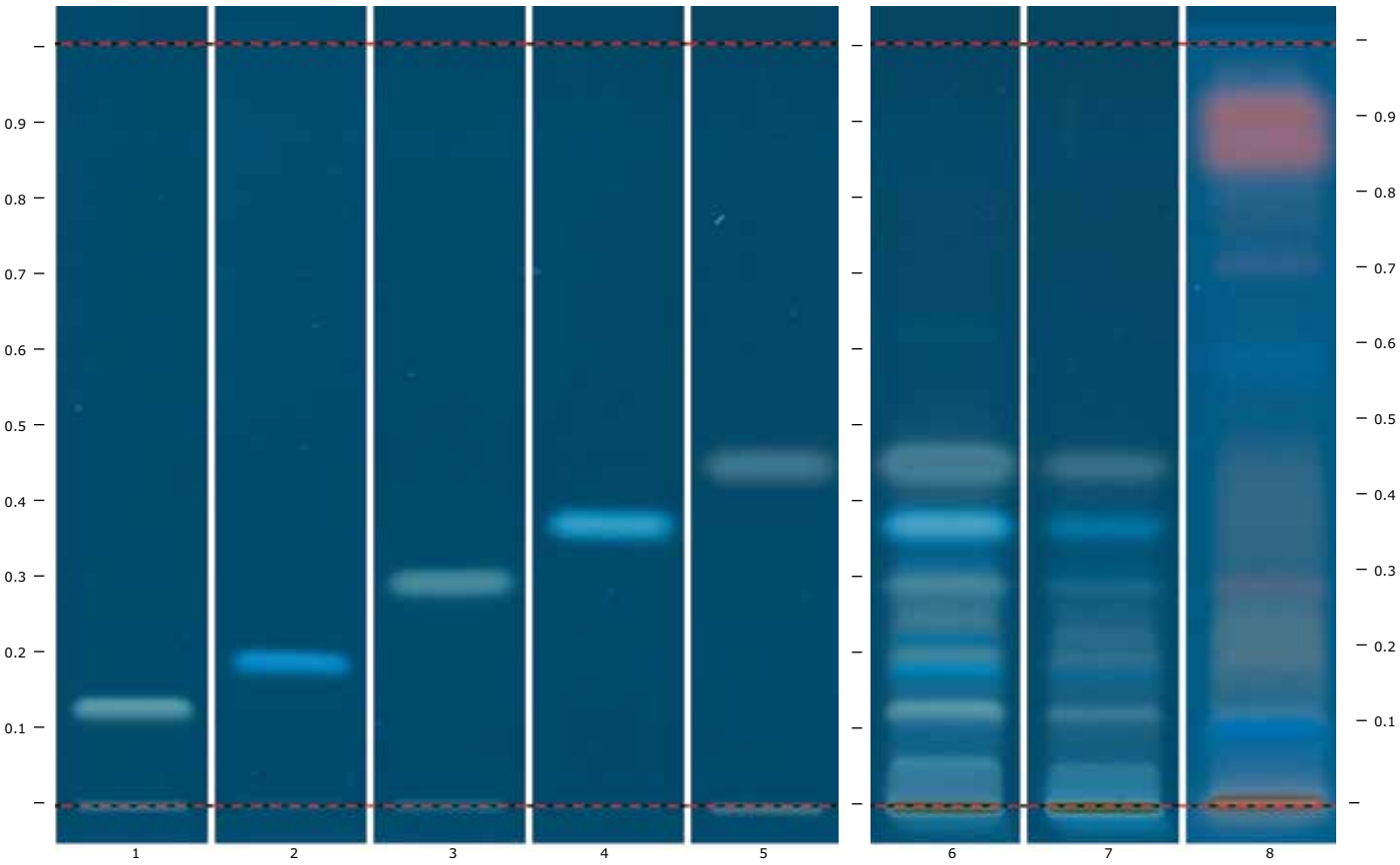


Figure 4.

Chromatogram under UV 366 nm after Derivatization. Track 1: Ginkgolide C; Track 2: Ginkgolide J; Track 3: Ginkgolide B; Track 4: Ginkgolide A; Track 5: Bilobalide; Track 6: *G. Biloba* Leaf Powdered Extract 05485001; Track 7: *G. Biloba* Leaf Dry Extract; Track 8: *G. Biloba* Powdered Leaf

Application Note 3: Ginkgolic Acids

The compound class of ginkgolic acids can have toxic effects such as allergies[10-11]; therefore, during the preparation of ginkgo-based products, except for the crude drug products, the undesired ginkgolic acids are usually eliminated[12].

Ginkgolic acid C13:0 **Ginkgolic acid C15:1** **Ginkgolic acid C17:1**

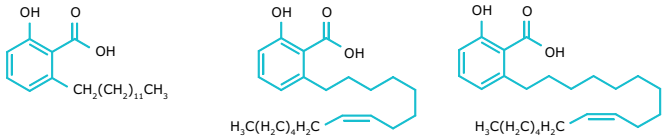


Figure 5.

Ginkgolic Acids Present in *Ginkgo Biloba*

Scope:

Identification of ginkgolic acids (C15:1, C13:0 and C17:1) in the HPTLC fingerprint of *Ginkgo Biloba* extracts and leaf obtained with the HPTLC method of the HPTLC Association[13] on ginkgo leaf by comparison of the R_F values of the reference substances and the matching zones in the reference extract.

Required or Recommended CAMAG Devices:

Automatic TLC Sampler 4 (ATS 4) or Linomat 5, Automatic Developing Chamber (ADC 2), TLC Visualizer and visionCATS.

Sample:

Drug: In a 25 mL flask, 1 g powdered raw material is refluxed with 10 mL methanol for 10 min. After cooling, the mixture is centrifuged. Extract: 0.1 g of dry extract is sonicated with 10 mL methanol for 10 min and filtered. The supernatant is used as test solution.

Standards:

Standard solutions were prepared in a concentration of 0.4 mg/mL in methanol.

Chromatography Following USP <203>[7]:

Stationary phase:
HPTLC Si 60 F_{254} 20×10 cm (Merck).

Sample application:
5 µL each of test solution and standards are applied as 8 mm bands, 8 mm from lower edge of plate and 20 mm from the left edge using the ATS 4.

Developing solvent:
Toluene, ethyl acetate, glacial acetic acid (40:10:1 v/v/v).

Development:
Development is performed with ADC 2, saturated for 20 min with the mobile phase (filter paper). Prior to the development, the plate was exposed to a relative humidity of 33% (with a saturated solution of $MgCl_2$).

Developing distance:
70 mm from lower edge of the plate.

Plate drying:
5 min in a stream of cold air.

Evaluation:
Documentation under UV 366 nm.

Results:

As observed in Figure 6, only the *G. Biloba* powdered leaf sample (track 6) shows a wide blue fluorescent zone due to unresolved ginkgolic acids between R_Fs 0.38 and 0.49.

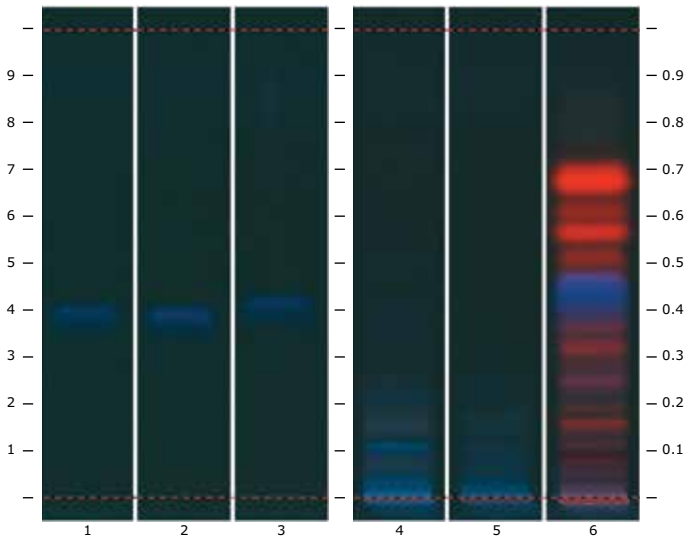


Figure 6.

Chromatogram under UV 366 nm. Track 1: Ginkgolic Acid C15:1; Track 2: Ginkgolic Acid C13:0; Track 3: Ginkgolic Acid C15:1; Track 4: *G. Biloba* Leaf Powdered Extract 05485001; Track 5: *G. Biloba* Leaf Dry Extract; Track 6: *G. Biloba* Powdered Leaf

Conclusions:

The examples shown above demonstrate that HPTLC is a very powerful and efficient tool for fast analysis of complex compound mixtures such as plant materials. Besides consuming little time and low quantities of solvents, the method allows for simultaneous analysis of multiple samples and in addition does not require a time-consuming sample preparation procedure, thus making HPTLC a valuable alternative to other chromatographical methods. Further information on instrumentation for HPTLC can be found at: **www.camag.com**

Merck is very proud to offer all consumables needed for the described applications including reference materials and TLC plates ready from stock. Find all used products listed below.

Product Group	Description	Package Size	Cat. No.
Flavonoids	Apigenin 7-glucoside	10 mg	**00720585**
	Kaempferol	10 mg	**00550580**
	Quercetin	50 mg	**00200595**
	Quercetin 3-glucoside	10 mg	**16654**
	Quercitrin	25 mg	**00740580**
	Rutin	25 mg	**78095**
Ginkgolic Acids	Ginkgolic acid C13:0	10 mg	**49962**
	Ginkgolic acid C15:1	10 mg	**02580585**
	Ginkgolic acid C17:1	10 mg	**01390590**
Terpene Lactones	(-)-Bilobalide	10 mg	**00760595**
	Ginkgolide A	25 mg	**00770590**
	Ginkgolide B	10 mg	**94970**
	Ginkgolide C	25 mg	**01490590**
	Ginkgolide J	5 mg	**89556**

Table 1.

Analytical Standards Used for Applications

Description	Quantitative Markers	Qualitative Markers	Package Size	Cat. No.
Ginkgo Biloba extract	Bilobalide, Ginkgolide A	Bilobalide, Ginkgolide A, Ginkgolide B, Ginkgolide C	150 mg	**05485001**

Table 2.

Ginkgo Plant Extract Reference Material Used for Applications

Description	Dimensions	Package Size	Cat. No.
HPTLC glass plate Silica gel 60 F_{254}	20×10 cm	50 Plates	**1.05642.0001**

Table 3.

TLC Plates Used for Applications

SigmaAldrich.com/phytochemicals

A list of our complete offering of phytochemical standards can be found at **SigmaAldrich.com/medicinalplants** and all our extract reference materials including an example certificate can be viewed here: **SigmaAldrich.com/plantextracts**. All plant extract reference materials are delivered with a certificate giving the exact mass fractions for the quantitative markers. Additional qualitative markers are confirmed. A chromatographical method is also provided, including a chromatogram with peak assignation.

HPTLC plates from Merck enable significant faster results at high precision in outstanding quality.

Learn more about the features of High Performance Thin Layer Chromatography plates at **MerckMillipore.com/hptlc**

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Index by Plant Genus

On the following pages, a list of almost 100 of the most widely used medicinal plant genera are listed, showing the most relevant constituents that can be used as analytical markers for each corresponding plant.

Compound	Cat. No.
Acacia sp.	
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
Catechin 5-O-gallate	**89106**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
3,3'-Di-O-methylellagic acid 4'-xylopyranoside	**90905**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
Epicatechin 3-gallate (-)*	**03950590**
Epigallocatechin gallate*	**03970590**
(−)-Epigallocatechin gallate	**93894**
Gallic acid**	**91215**
(−)-Gallocatechin	**01388**
Geraniol	**48798**
Hordenine	**61207**
Hyperoside*	**00180585**
Isovitexin*	**01120590**
Isovitexin	**67135**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
(±)-Naringenin	**52186**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
p-Hydroxybenzoic acid	**PHR1048**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**

Compound	Cat. No.
Quercitrin*	**00740580**
Rutin trihydrate*	**00300590**
Salicylic acid**	**52341**
Spiraeoside	**91802**
(+)-α-Terpineol	**83073**
Vitexin*	**00840595**
Vitexin	**49513**
Achillea sp.	
Apigenin*	**01760595**
Apigenin	**42251**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
(−)-Bornyl acetate	**45855**
Casticin	**16382**
Chamazulen	**91595**
1,5-Dicaffeoylquinic acid	**16917**
(−)-β-Elemene	**63965**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Rutin trihydrate*	**00300590**
Scopoletin	**38332**

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Compound	Cat. No.
Aesculus sp.	
Allantoin	**93791**
Esculin hydrate	**06212**
Fraxin	**80533**
Kaempferol*	**00550580**
Kaempferol	**96353**
Quercetin dihydrate*	**00200595**
Allium sp.	
(+)-L-Alliin	**72805**
trans-Ferulic acid**	**52229**
Kaempferol*	**00550580**
Kaempferol	**96353**
Kaempferol 3-glucoside	**68437**
Protocatechuic acid*	**03930590**
Protocatechuic acid	**08992**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Resorcinol**	**53363**
Spiraeoside	**91802**
Aloe sp.	
Aloe-emodin	**93938**
Aloenin A	**41757**
Aloin A	**50292**
Chrysophanol	**01542**
Salicylic acid**	**52341**
Ammi sp.	
Khellin	**00899**
Anacardium sp.	
(15:0)-Anacardic acid	**05506**
Cardanol	**04016**
5-Pentadecylresorcinol	**91822**
Protocatechuic acid*	**03930590**
Protocatechuic acid	**08992**
Andrographis sp.	
Andrograpanin	**19443**
Andrographolide	**90281**
14-Deoxy-11,12-didehydroandrographolide	**55549**
7-O-Methylwogonin	**41442**
Neoandrographolide	**49879**
Angelica sp.	
Angelicin	**18118**
Bergapten	**69664**
(−)-α-Bisabolol*	**00320188**

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Compound	Cat. No.
(−)-α-Bisabolol	**95426**
(+)-Borneol	**68878**
Biacangelicin	**77686**
trans-Caffeic acid**	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
Chlorogenic acid*	**00500590**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
Eugenol**	**79891**
Eugenol*	**01050595**
Eugenol	**35995**
trans-Ferulic acid**	**52229**
Fumaric acid**	**76635**
8-Geranyloxypsoralen	**40594**
Hesperidin	**50162**
Isoimperatorin	**68771**
Isopimpinellin	**61419**
(−)-α-Pinene	**80599**
α-Pinene*	**00040590**
(+)-β-Pinene	**80607**
Psoralen	**73633**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Scopoletin	**38332**
Umbelliferone	**54826**
Vanillic acid**	**68654**
Xanthotoxin	**56448**
Arctostaphylos sp.	
Arbutin	**66468**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Corilagin	**75251**
Ellagic acid	**14668**
Gallic acid**	**91215**
Hydroquinone	**74347**
Hyperoside*	**00180585**
Myricetin	**72576**
Myricitrin	**67268**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin 3-glucoside	**16654**

Compound	Cat. No.
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Rutin trihydrate*	**00300590**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Armoracia sp.	
(−)-Sinigrin hydrate	**00290**
Arnica sp.	
Chlorogenic Acid*	**00500590**
Cynarin	**91801**
1,5-Dicaffeoylquinic acid	**16917**
Isoquercitrin*	**00140585**
Kaempferide	**69545**
Matairesinol	**04157**
Naringenin 4',7-dimethylether	**76716**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
(−)-α-Santonin	**53653**
Artemisia sp.	
Artemisinin	**69532**
(−)-α-Bisabolol*	**00320188**
(−)-α-Bisabolol	**95426**
(+)-Borneol	**68878**
(−)-Bornyl acetate	**45855**
Camphor (dl)*	**02070595**
Camphene	**442505**
Casticin	**16382**
Chlorogenic acid*	**00500590**
Cirsilineol	**67403**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
Eupalitin	**66324**
Isofraxidin	**91214**
Matricin	**77347**
Naringenin 4',7-dimethylether	**76716**
α-Pinene	**80599**
α-Pinene*	**00040590**
Resorcinol**	**53363**
Rutin trihydrate	**00300590**
Scopoletin	**38332**
Sesamin	**59867**

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Compound	Cat. No.
Aspalathus sp.	
Aspalathin	**03520585**
Orientin	**55736**
Quercetin 3-glucoside	**16654**
Quercitrin	**00740580**
Asparagus sp.	
Chelidonic acid	**49526**
Hyperoside	**00180585**
Quercetin 3-glucoside	**16654**
Rutin trihydrate*	**00300590**
Shatavarin IV	**30151**
Azadirachta sp.	
2′,3′-Dehydrosalannol	**80098**
Kaempferol*	**00550580**
Kaempferol	**96353**
Quercetin dihydrate*	**00200595**
Bacopa sp.	
Bacopasaponin C	**76092**
Bacopaside I	**56619**
Bacopaside X	**42488**
Bacopaside-II	**44698**
Bacoside A, mixture of Bacoside A3, Bacopaside II, Bacopaside X and Bacopasaponin C	**76091**
Bacoside A3	**53889**
Bacosine	**69528**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
Genistein	**92136**
Kaempferol*	**00550580**
Kaempferol	**96353**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Rutin trihydrate*	**00300590**
Scopoletin	**38332**
Tectoridin	**89948**
Tectorigenin	**67359**
Betula sp.	
Betulin	**92648**
Betulin 3,28-diacetate	**59919**
Betulinic acid	**91466**
trans-Caffeic acid**	**51868**

Compound	Cat. No.
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chlorogenic Acid*	**00500590**
Hyperoside*	**00180585**
Lupeol	**18692**
Myricitrin*	**02180585**
Myricitrin	**67268**
Pyrogallol	**06931**
Quercetin 3-glucuronide*	**00310590**
Quercetin 3-O-glucuronide	**90733**
Quercitrin*	**00740580**
Rutin trihydrate*	**00300590**
Salicylic acid**	**52341**
Scutellarin	**73577**
Vanillic acid**	**68654**
Boerhaavia sp.	
Boeravinone B	**96844**
Eupalitin	**66324**
Eupalitin 3-Oβ-D-galactopyranoside	**89165**
Boswellia sp.	
3-O-Acetyl-β-boswellic acid	**49873**
3-O-Acetyl-11-keto-β-boswellic acid	**74607**
3-O-Acetyl-α-boswellic acid	**56208**
3-O-Acetylboswellic acid, mixture of α and β	**96729**
(+)-Borneol	**68878**
(−)-Bornyl acetate	**45855**
β-Boswellic acid	**80342**
Boswellic acid, mixture of α and β	**63850**
α-Boswellic acid	**06813**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Elemolic acid, mixture of α and β	**73527**
β-Elemonic acid	**00708**
11-Keto- b-boswellic acid	**78535**
Lupeol	**18692**
α-Pinene	**80599**
α-Pinene*	**00040590**
Serratol	**78689**
Brassica sp.	
trans-Ferulic acid**	**52229**
Lutein	**07168**
trans-Sinapic acid	**93878**
(−)-Sinigrin hydrate	**00290**

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Compound	Cat. No.
Calendula sp.	
Allantoin	**93791**
trans-Caffeic acid**	**51868**
trans-p-Coumaric acid	**55823**
trans-Ferulic acid**	**52229**
Hyperoside*	**00180585**
Isorhamnetin	**38907**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Protocatechuic acid*	**03930590**
Protocatechuic acid	**08992**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Rutin trihydrate*	**00300590**
Scopoletin	**38332**
Umbelliferone	**54826**
Camellia sp.	
Camellia sinensis extract	**05495001**
trans-Caffeic acid**	**51868**
Caffeine**	**56396**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
trans-p-Coumaric acid	**55823**
Epigallocatechin	**03960590**
(−)-Epigallocatechin*	**08108**
Gallic acid**	**91215**
(−)-Gallocatechin	**01388**
(−)-Gallocatechin gallate	**80352**
Theaflavin	**55016**
Theaflavin monogallate	**53963**
Theaflavin 3,3'-digallate	**92223**
Theophylline	**PHR1023**
Cannabis sp.	
Hordenine	**61207**
Isovitexin*	**01120590**
Isovitexin	**67135**
Methyl eugenol	**04607**
α-Pinene	**80599**
α-Pinene*	**00040590**
(+)-β-Pinene	**80607**
Tetrahydrocannabinol(delta9)	**56296**
Trigonelline hydrochloride	**61407**
Vitexin*	**00840595**
Vitexin	**49513**

Compound	Cat. No.
Capsicum sp.	
Apigenin*	**01760595**
Apigenin	**42251**
Capsaicin	**12084**
Dihydrocapsaicin	**03813**
Esculin hydrate	**06212**
Isovitexin*	**01120590**
Isovitexin	**67135**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
N-Vanillylnonamide	**15971**
Orientin*	**03810585**
Orientin	**55736**
Scopoletin	**38332**
Vitexin*	**00840595**
Vitexin	**49513**
Carica sp.	
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
Geraniol	**48798**
Carum sp.	
Bergapten	**69664**
(−)-Carveol, mixture of isomers	**61370**
(−)-Carvone*	**00290595**
(+)-Carvone**	**79245**
(+)-Carvone	**22070**
Chlorogenic acid*	**00500590**
Cryptochlorogenic acid	**90467**
(+)-Dihydrocarvone, mixture of isomers	**09164**
(R)-(+)-Limonene	**62118**
Neochlorogenic acid	**91213**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercetin 3-glucuronide*	**00310590**
Quercetin 3-O-glucuronide	**90733**
Salicylic acid**	**52341**
trans-Sinapic acid	**93878**
Vanillic acid**	**68654**
Xanthotoxin	**56448**

Compound	Cat. No.
Cassia sp.	
Aloe-emodin	**93938**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chrysophanol	**01542**
Dihydrokaempferol	**92204**
Emodin	**30269**
Isorhamnetin	**38907**
Kaempferol*	**00550580**
Kaempferol	**96353**
Physcion	**93893**
Rhein	**30873**
Rubiadin	**74553**
Sennoside A*	**01870575**
Sennoside B*	**00530580**
Sennosid C	**73235**
Sennoside D	**16383**
Chamomilla sp.	
Apigenin*	**01760595**
Apigenin	**42251**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
(−)-α-Bisabolol*	**00320188**
(−)-α-Bisabolol	**95426**
Bisabolol oxide A*	**00630590**
Bisabolol oxide A	**59761**
(+)-Borneol	**68878**
(−)-Bornyl acetate	**45855**
trans-Caffeic acid*	**51868**
Chamazulen	**91595**
Luteolin*	**03880590**
Luteolin	**72511**
Matricin	**77347**
Quercetin dihydrate*	**00200595**
Umbelliferone	**54826**
Vanillic acid**	**68654**
Cichorium sp.	
trans-Caffeic acid**	**51868**
Caftaric acid	**88656**
(−)-Chicoric acid	**06957**
Chlorogenic acid*	**00500590**
trans-p-Coumaric acid	**55823**

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Compound	Cat. No.
Esculin hydrate	**06212**
trans-Ferulic acid**	**52229**
Hyperoside*	**00180585**
Isorhamnetin	**38907**
Kaempferol 3-glucoside	**68437**
Quercetin 3-glucoside	**16654**
Quercetin 3-glucuronide*	**00310590**
Quercetin 3-O-glucuronide	**90733**
Quercitrin*	**00740580**
Scopoletin	**38332**
Umbelliferone	**54826**
Cimicifuga sp.	
Friedelin	**92187**
Kaempferol*	**00550580**
Kaempferol	**96353**
Cinchona sp.	
Epiquinidine	**00998**
Epiquinine	**89457**
Cinnamomum sp.	
Quinine**	**69311**
Benzyl benzoate**	**55177**
Benzyl benzoate	**68183**
(+)-Borneol	**68878**
trans-Caffeic acid**	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
(−)-trans-Caryophyllene	**75541**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
trans-Cinnamaldehyde	**06536**
trans-Cinnamic acid	**97013**
Cinnamyl acetate	**42759**
Cinnamyl alcohol	**93066**
m-Coumaric acid	**92649**
trans-p-Coumaric acid	**55823**
Coumarin**	**72609**
Coumarin*	**01260595**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**

Compound	Cat. No.
Eugenol**	**79891**
Eugenol*	**01050595**
Eugenol	**35995**
trans-Ferulic acid**	**52229**
Kaempferol*	**00550580**
Kaempferol	**96353**
Linalool**	**61706**
Linalool	**51782**
trans-p-Methoxycinnamaldehyde	**61384**
Methyl eugenol	**04607**
α-Pinene	**80599**
α-Pinene*	**00040590**
Procyanidin B1	**19542**
Procyanidin B2	**42157**
Procyanidin C1	**50878**
Protocatechuic acid*	**03930590**
Protocatechuic acid	**08992**
Salicylic acid*	**52341**
trans-Sinapic acid	**93878**
(+)-α-Terpineol	**83073**
Vanillic acid*	**68654**
Citrus sp.	
Bergamottin	**01338**
Bergapten	**69664**
Bergaptol	**62707**
(−)-α-Bisabolol*	**00320188**
(−)-α-Bisabolol	**95426**
Biacangelicin	**77686**
trans-Caffeic acid**	**51868**
Caffeine**	**56396**
(−)-Carvone*	**00290595**
(+)-Carvone**	**79245**
(+)-Carvone	**22070**
(−)-trans-Caryophyllene	**75541**
Citropten	**08941**
trans-p-Coumaric acid	**55823**
p-Cymene**	**49679**
p-Cymene	**30039**
Didymin	**38964**
Dimethyl anthranilate	**49919**
Diosmetin	**90985**
Diosmin	**61386**

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Compound	Cat. No.
Eleutheroside B	**90974**
6′,7′-Epoxybergamottin	**69779**
Eriodictyol	**89061**
trans, trans-Farnesol	**92386**
trans-Ferulic acid**	**52229**
Friedelin	**92187**
Geranyl Acetate	**45896**
8-Geranyloxypsoralen	**40594**
(±)-Hesperetin	**51864**
Hesperidin	**50162**
Isoimperatorin	**68771**
Isopimpinellin	**61419**
Isovitexin*	**01120590**
Isovitexin	**67135**
(R)-(+)-Limonene	**62118**
Limonin	**64081**
Linalool**	**61706**
Linalool*	**00350190**
Linalool	**51782**
Linalyl acetate	**49599**
Myrcene	**64643**
(±)-Naringenin	**52186**
Naringin	**91842**
Neohesperidin	**40927**
trans-Nerolidol	**18143**
Neryl acetate	**46015**
Nobiletin	**92600**
Nomilin	**77518**
Obacunone	**74191**
Octanal	**52466**
Poncirin	**77536**
Sabinene hydrate	**96573**
trans-Sinapic acid	**93878**
Sinensetin	**89392**
Synephrine	**75256**
Tangeretin	**91004**
Taxifolin**	**03890585**
Taxifolin	**78666**
γ-Terpinene	**86476**
Theophylline	**PHR1023**
Umbelliferone	**54826**
(+)-Valencene	**06808**
Xanthotoxin	**56448**

Compound	Cat. No.
Coleus sp.	
Crocetin dialdehyde	**18804**
1,9-Dideoxyforskolin	**92589**
Forskolin	**93049**
Isoforskolin	**94597**
Commiphora sp.	
(E)-Guggulsterone	**68797**
(Z)-Guggulsterone	**78251**
Linalool**	**61706**
Linalool*	**00350190**
Linalool	**51782**
α-Pinene*	**80599**
α-Pinene	**00040590**
Sesamin	**59867**
Crataegus sp.	
Crataegus spp extract	**05095001**
trans-Caffeic acid**	**51868**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chlorogenic Acid*	**00500590**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
Hyperoside*	**00180585**
Kaempferol*	**00550580**
Kaempferol	**96353**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Procyanidin A2	**28660**
Procyanidin B1	**19542**
Procyanidin C1	**50878**
Rutin trihydrate*	**00300590**
Spiraeoside	**91802**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Vanillic acid 4-β-D-glucoside	**14515**
Vitexin*	**00840595**
Vitexin	**49513**
Vitexin 2-O-rhamnoside*	**00660585**
Vitexin 4''-O-glucoside	**43907**

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Compound	Cat. No.
Curcuma sp.	
(+)-Borneol	**68878**
Camphor (dl)*	**02070595**
Camphene	**442505**
trans-Cinnamic acid	**97013**
trans-p-Coumaric acid	**55823**
Curcumin*	**00280590**
Curcumin	**08511**
(−)-Curcumol	**36236**
Demethoxycurcumin	**90593**
Ethyl trans-4-methoxycinnamate	**42479**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
Hexahydrocurcumin	**69727**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Tetrahydrocurcumin	**50202**
(S)-ar-Turmerone	**42258**
Vanillic acid**	**68654**
Cynara sp.	
trans-Caffeic acid**	**51868**
Chlorogenic Acid*	**00500590**
Cryptochlorogenic acid	**90467**
Cynarin	**91801**
1,5-Dicaffeoylquinic acid	**16917**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Neochlorogenic acid	**91213**
Rutin trihydrate*	**00300590**
Echinacea sp.	
Betaine**	**30056**
(+)-Borneol	**68878**
(−)-Bornyl acetate	**45855**
Caftaric acid	**88656**
(−)-Chicoric acid	**06957**
Chlorogenic acid*	**00500590**
Cynarin	**91801**
Echinacoside*	**01710580**
Echinacoside	**07538**
Kaempferol*	**00550580**

Compound	Cat. No.
Kaempferol	**96353**
Kuromanin chloride (Chrysanthemin)	**44689**
α-Pinene	**80599**
α-Pinene*	**00040590**
Quercetin dihydrate*	**00200595**
Rutin trihydrate*	**00300590**
Verbascoside*	**00820580**
Eclipta sp.	
Eclalbasaponin I	**79736**
Eclalbasaponin II	**77084**
Eleutherococcus sp.	
trans-Caffeic acid**	**51868**
Chlorogenic Acid*	**00500590**
Isofraxidin	**91214**
Eleutheroside E	**08198**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Eleutheroside B	**90974**
Epilobium sp.	
Hyperoside*	**00180585**
Kaempferol*	**00550580**
Kaempferol	**96353**
Myricetin	**72576**
Myricitrin	**67268**
Oenothein B	**03805**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Equisetum sp.	
Apigenin*	**01760595**
Apigenin	**42251**
Dihydrokaempferol	**92204**
Kaempferol 3-glucoside	**68437**
Luteolin*	**03880590**
Luteolin	**72511**
(±)-Naringenin	**52186**
Quercetin 3-glucoside	**16654**
Taxifolin*	**03890585**
Taxifolin	**78666**

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Compound	Cat. No.
Eucalyptus sp.	
Camphor (dl)*	**02070595**
Camphene	**442505**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Ellagic acid	**14668**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
Gallic acid*	**91215**
Hyperoside*	**00180585**
Kaempferol*	**00550580**
Kaempferol	**96353**
Myricetin	**72576**
α-Pinene	**80599**
α-Pinene*	**00040590**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Rutin trihydrate*	**00300590**
Sabinene hydrate	**96573**
Foeniculum sp.	
4-Allylanisole (Estragole)	**05818**
trans-Anethol	**10368**
trans-Anethol*	**00130595**
p-Anisaldehyde**	**43621**
p-Anisaldehyde	**97063**
Bergapten	**69664**
trans-Caffeic acid**	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
Chlorogenic Acid*	**00500590**
trans-Cinnamic acid	**97013**
1,5-Dicaffeoylquinic acid	**16917**
(+)-Fenchone*	**00380590**
(+)-Fenchone	**46208**
trans-Ferulic acid	**52229**
Fumaric acid**	**76635**
Isorhamnetin	**38907**
Kaempferol*	**00550580**
Kaempferol	**96353**
(R)-(+)-Limonene	**62118**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
(−)-α-Pinene	**80599**

Compound	Cat. No.
α-Pinene*	**00040590**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Psoralen	**73633**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate	**00200595**
Quercetin 3-glucuronide*	**00310590**
Quercetin 3-O-glucuronide	**90733**
Rutin trihydrate*	**00300590**
Scopoletin	**38332**
Umbelliferone	**54826**
Vanillic acid**	**68654**
Xanthotoxin	**56448**
Galium sp.	
Apigenin*	**01760595**
Apigenin	**42251**
trans-Caffeic acid**	**51868**
Chlorogenic Acid*	**00500590**
Coumarin**	**72609**
Coumarin*	**01260595**
Diosmetin	**90985**
Gallic acid**	**91215**
Hesperidin	**50162**
Kaempferol*	**00550580**
Kaempferol	**96353**
Luteolin*	**03880590**
Luteolin	**72511**
Myricetin	**72576**
Quercetin 3-glucoside	**16654**
Rubiadin	**74553**
Rutin trihydrate*	**00300590**
Salicylic acid**	**52341**
Scopoletin	**38332**
Garcinia sp.	
Amentoflavone	**18571**
Betulin	**92648**
(+)-Garcinia acid	**44292**
(−)-Calcium hydroxycitrate tribasic	**75450**
Kuromanin chloride (Chrysanthemin)	**44689**
Gentiana sp.	
Isoorientin	**78109**
Isovitexin*	**01120590**
Isovitexin	**67135**
Mangiferin	**06279**
Swertiamarine	**90957**

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Compound	Cat. No.
Ginkgo sp.	
Ginkgo Biloba extract	**05485001**
Amentoflavone	**18571**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
Benzyl alcohol**	**39971**
Benzyl alcohol	**08421**
(−)-Bilobalide	**79593**
Dihydrokaempferol	**92204**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
Epigallocatechin*	**03960590**
(−)-Epigallocatechin	**08108**
Ginkgolic acid C13:0	**49962**
Ginkgolic acid C15:1*	**02580185**
Ginkgolic acid C17:1*	**01390590**
Ginkgolid A*	**00770590**
Ginkgolid B	**94970**
Ginkgolide C	**18309**
Ginkgolid J	**89556**
Ginkgotoxin	**89960**
Isorhamnetin	**38907**
Kaempferol*	**00550580**
Kaempferol	**96353**
Kaempferol 3-glucoside	**68437**
Luteolin*	**03880590**
Luteolin	**72511**
N-Malonyl-DL-tryptophan	**77556**
Protocatechuic acid*	**03930590**
Protocatechuic acid	**08992**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Rutin trihydrate*	**00300590**
Shikimic acid	**69686**
Thymol*	**00670590**
Thymol	**72477**
Vanillic acid**	**68654**
Glycine sp.	
Daidzein	**16587**
Daidzin	**42926**
Fumaric acid**	**76635**
Genistein	**92136**
Genistin	**73822**
N-Malonyl-DL-tryptophan	**77556**

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Compound	Cat. No.
β-Sitosterol	**43623**
β-Sitosterol β-D-glucoside	**89851**
Vitexin*	**00840595**
Vitexin	**49513**
Vitexin 2-O-rhamnoside*	**00660585**
Glycyrrhiza sp.	
Betulinic acid	**91466**
Docosyl caffeate	**40971**
Genistein	**92136**
Genistin	**73822**
Glycyrrhizic acid ammonium salt*	**01250570**
Glycyrrhizic acid ammonium salt	**91443**
Isoliquiritigenin	**38986**
Isorhamnetin	**38907**
Isovitexin*	**01120590**
Isovitexin	**67135**
Kaempferol*	**00550580**
Kaempferol	**96353**
Kaempferol 3-glucoside	**68437**
Lupeol	**18692**
(±)-Naringenin	**52186**
Quercetin dihydrate*	**00200595**
Rutin trihydrate*	**00300590**
Scopoletin	**38332**
Umbelliferone	**54826**
Vitexin*	**00840595**
Vitexin	**49513**
Gossypium sp.	
trans-Caffeic acid**	**51868**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chlorogenic acid*	**00500590**
Kaempferide	**69545**
Kaempferol*	**00550580**
Kaempferol	**96353**
Kaempferol 3-glucoside	**68437**
Kuromanin chloride (Chrysanthemin)	**44689**
Quercitrin*	**00740580**
Rutin trihydrate*	**00300590**
β-Sitosterol	**43623**
β-Sitosterol β-D-glucoside	**89851**
Gymnema sp.	
Deacylgymnemic acid	**40501**
Gymnemangenin	**52181**

Compound	Cat. No.
Hamamelis sp.	
trans-Caffeic acid**	**51868**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Epigallocatechin gallate*	**03970590**
(−)-Epigallocatechin gallate	**93894**
Gallic acid**	**91215**
(−)-Gallocatechin	**01388**
Hamamelitannin	**04646**
Kaempferol*	**00550580**
Kaempferol	**96353**
Kaempferol 3-glucoside	**68437**
Myricetin	**72576**
Myricitrin	**67268**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Spiraeoside	**91802**
Harpagophytum sp.	
Harpagophytum procumbens extract	**05125001**
Harpagoside*	**00420580**
Verbascoside*	**00820580**
Hedera sp.	
trans-Caffeic acid**	**51868**
Chlorogenic acid*	**00500590**
trans-p-Coumaric acid	**55823**
trans-Ferulic acid	**52229**
Hederacoside C*	**00930585**
Hederacoside C	**79737**
α-Hederin*	**01240585**
α-Hederin	**07512**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Quercetin 3-glucoside	**16654**
Rutin trihydrate*	**00300590**
Apigenin 7-glucoside*	**00720585**
Humulus sp.	
Apigenin 7-glucoside	**44692**
trans-Caffeic acid**	**51868**
Chlorogenic Acid*	**00500590**
trans-p-Coumaric acid	**55823**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
trans-Ferulic acid**	**52229**

Compound	Cat. No.
Gallic acid**	**91215**
Hulupinic acid*	**01090595**
α-Humulene	**12448**
Isoxanthohumol	**55423**
Kaempferol 3-glucoside	**68437**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
2-Methyl-3-buten-2-ol	**05392**
Neochlorogenic acid	**91213**
6-Prenylnaringenin	**75602**
8-Prenylnaringenin	**75119**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin 3-glucoside	**16654**
Rutin trihydrate*	**00300590**
Vanillic acid**	**68654**
Vitexin*	**00840595**
Vitexin	**49513**
Xanthohumol	**01130595**
Huperzia sp.	
(−)-Huperzine A	**42643**
Hypericum sp.	
Hypericum perforatum extract	**05295001**
Amentoflavone	**18571**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
Avicularin	**44006**
I3,II8-Biapigenin	**73962**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chlorogenic Acid*	**00500590**
Hypericin*	**00190585**
Hyperoside*	**00180585**
Kaempferol*	**00550580**
Kaempferol	**96353**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Mangiferin	**06279**
Myricetin	**72576**
Orientin*	**03810585**
Orientin	**55736**
Oxybenzone	**59647**

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Compound	Cat. No.
Procyanidin B2	**42157**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate	**00200595**
Quercitrin	**00740580**
Illicium sp.	
4-Allylanisole (Estragole)	**05818**
trans-Anethol	**10368**
trans-Anethol*	**00130595**
p-Anisaldehyde**	**43621**
p-Anisaldehyde	**97063**
Anisatin	**80478**
trans-Caffeic acid**	**51868**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
1,4-Cineole	**27393**
trans-p-Coumaric acid	**55823**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
Epigallocatechin*	**03960590**
(−)-Epigallocatechin	**08108**
(+)-Fenchone	**00380590**
(+)-Fenchone	**46208**
trans-Ferulic acid**	**52229**
Hyperoside*	**00180585**
Kaempferol 3-glucoside	**68437**
Linalool**	**61706**
Linalool*	**00350190**
Linalool	**51782**
Methyl eugenol	**04607**
Protocatechuic acid*	**03930590**
Protocatechuic acid	**08992**
Quercetin 3-glucoside	**16654**
Quercitrin*	**00740580**
Rutin trihydrate*	**00300590**
Shikimic acid	**69686**
(+)-α-Terpineol	**83073**
Vanillic acid**	**68654**
Justicia sp.	
Vanillic acid**	**68654**
Vasicine	**92951**
Lagerstroemia sp.	
Corosolic acid	**89067**
3-O-Methylellagic acid	**93026**

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Compound	Cat. No.
Lavandula sp.	
Betulinic acid	**91466**
(+)-Borneol	**68878**
trans-Caffeic acid**	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
Coumarin**	**72609**
Coumarin*	**01260595**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
trans-Isoferulic acid	**05407**
Lavandulol	**42583**
(R)-(+)-Limonene	**62118**
Linalool**	**61706**
Linalool*	**00350190**
Linalool	**51782**
Linalyl acetate	**49599**
Lupeol	**18692**
Luteolin*	**03880590**
Luteolin	**72511**
3-Octanone	**46214**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
(+)-β-Pinene	**80607**
Protocatechuic acid*	**03930590**
Protocatechuic acid	**08992**
Rosmarinic acid*	**00390580**
trans-Sinapic acid	**93878**
Terpinen 4-ol*	**03900590**
(−)-Terpinen-4-ol	**49598**
(+)-α-Terpineol	**83073**
Umbelliferone	**54826**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Vanillic acid**	**68654**
Vitexin	**00840595**
Vitexin	**49513**
Lycium sp.	
Kaempferol*	**00550580**
Kaempferol	**96353**
Quercetin dihydrate*	**00200595**
Rutin trihydrate*	**00300590**

Compound	Cat. No.
Scopoletin	**38332**
Vanillic acid**	**68654**
Withanolide A	**74776**
Withanolide B	**94284**
Magnolia sp.	
(−)-Bornyl acetate	**45855**
Camphene	**442505**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
Honokiol	**42612**
α-Pinene	**80599**
α-Pinene*	**00040590**
(+)-β-Pinene	**80607**
Sesamin	**59867**
(+)-α-Terpineol	**83073**
Malus sp.	
trans-Caffeic acid**	**51868**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
trans-p-Coumaric acid	**55823**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
(−)-Gallocatechin	**01388**
Hyperoside*	**00180585**
Phloretin	**91897**
Phloridzin dihydrate	**79589**
Procyanidin B1	**19542**
Procyanidin B2	**42157**
Procyanidin C1	**50878**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Rutin trihydrate*	**00300590**
Mangifera sp.	
Iriflophenone 3-C-β-D-glucopyranoside	**91627**
3β-Taraxerol	**75934**
Matricaria sp.	
Apigenin*	**01760595**
Apigenin	**42251**
(−)-α-Bisabolol*	**00320188**
(−)-α-Bisabolol	**95426**
Chamazulen	**91595**
Luteolin*	**03880590**

Compound	Cat. No.
Luteolin	**72511**
Matricin	**77347**
Melilotus sp.	
(+)-Borneol	**68878**
(−)-Bornyl acetate	**45855**
trans-p-Coumaric acid	**55823**
Coumarin**	**72609**
Coumarin*	**01260595**
Protocatechuic acid*	**03930590**
Protocatechuic acid	**08992**
Salicylic acid*	**52341**
Scopoletin	**38332**
trans-Sinapic acid	**93878**
(+)-α-Terpineol	**83073**
Thujone Standard Mixture	**04314**
Umbelliferone	**54826**
Vanillic acid**	**68654**
Melissa sp.	
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
Betulinic acid	**91466**
trans-Caffeic acid**	**51868**
(−)-*trans*-Caryophyllene	**75541**
Chlorogenic Acid*	**00500590**
(±)-Citronellal	**72638**
trans-p-Coumaric acid	**55823**
trans-Ferulic acid**	**52229**
Geraniol	**48798**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Protocatechuic acid*	**03930590**
Protocatechuic acid	**08992**
Quercetin 3-glucoside	**16654**
Rosmarinic acid*	**00390580**
Salicylic acid**	**52341**
trans-Sinapic acid*	**93878**
Ursolic acid	**03240595**
Ursolic acid	**89797**
Vanillic acid**	**68654**
Mentha sp.	
Apigenin*	**01760595**
Apigenin	**42251**

*Primary pharmaceutical reference standard HWI
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Compound	Cat. No.
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
trans-Caffeic acid*	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
(+)-Carvone**	**79245**
(−)-Carvone*	**00290595**
(−)-Carvone	**22060**
(+)-Carvone	**22070**
trans-p-Coumaric acid	**55823**
Diosmetin	**90985**
Diosmin	**61386**
Eriocitrin	**94113**
Eriodictyol	**89061**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
trans-Ferulic acid**	**52229**
Geraniol	**48798**
Hesperidin	**50162**
(1S,2R,5R)-(+)-Isomenthol	**59802**
(−)-Isopulegol*	**04570595**
(−)-Isopulegol	**59770**
Jasmon	**59975**
(R)-(+)-Limonene	**62118**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
(+)-Menthofuran*	**04580595**
(+)-Menthofuran	**63661**
(−)-Menthol	**00580590**
(−)-Menthol	**63660**
(−)-Menthone	**63677**
(1R)-(−)-Menthyl acetate	**45985**
(+)-Pulegone*	**04620590**
(+)-Pulegone	**82569**
Rosmarinic acid*	**00390580**
(+)-α-Terpineol	**83073**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Momordica sp.	
Vicine	**78260**

Compound	Cat. No.
Murraya sp.	
Koenigicine	**94500**
Koenimbine	**41096**
Mahanimbine	**77875**
Myristica sp.	
(+)-Borneol	**68878**
Kaempferol*	**00550580**
Kaempferol	**96353**
(R)-(+)-Limonene	**62118**
Myristicin	**09237**
(−)-α-Pinene	**80599**
α-Pinene*	**00040590**
(+)-β-Pinene	**80607**
Sabinene hydrate	**96573**
Terpinen 4-ol*	**03900590**
(−)-Terpinen-4-ol	**49598**
γ-Terpinene	**86476**
(+)-α-Terpineol	**83073**
Myroxylon sp.	
Benzyl cinnamate	**69139**
Methyl trans-cinnamate	**75032**
Nerium sp.	
Betulin	**92648**
Betulinic acid	**91466**
Oleandrin	**06069**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Rutin trihydrate*	**00300590**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Ocimum sp.	
Apigenin*	**01760595**
Apigenin	**42251**
Cirsilineol	**67403**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
Isoeugenol	**34038**
Methyl eugenol	**04607**
Orientin*	**03810585**
Orientin	**55736**
Ursolic acid*	**03240595**
Ursolic acid	**89797**

*Primary pharmaceutical reference standard HWI
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Compound	Cat. No.
Olea sp.	
Apigenin*	**01760595**
Apigenin	**42251**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
Betulinic acid	**91466**
trans-Caffeic acid*	**51868**
trans-Cinnamic acid	**97013**
trans-p-Coumaric acid	**55823**
Esculin hydrate	**06212**
trans-Ferulic acid**	**52229**
Kaempferol*	**00550580**
Kaempferol	**96353**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Maslinic acid	**68594**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Oleuropein	**92167**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Rutin trihydrate*	**00300590**
Scopoletin	**38332**
Vanillic acid**	**68654**
Ononis sp.	
Apigenin*	**01760595**
Apigenin	**42251**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
trans-Caffeic acid**	**51868**
trans-Cinnamic acid	**97013**
trans-p-Coumaric acid	**55823**
trans-Ferulic acid**	**52229**
Gallic acid**	**91215**
Genistein	**92136**
Hyperoside*	**00180585**
Kaempferol*	**00550580**
Kaempferol	**96353**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**

Compound	Cat. No.
Myricitrin	**67268**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Resorcinol**	**53363**
Rutin trihydrate*	**00300590**
trans-Sinapic acid	**93878**
Vanillin**	**30304**
Vitexin*	**00840595**
Vitexin	**49513**
Paeonia sp.	
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
Kaempferol*	**00550580**
Kaempferol	**96353**
Kaempferol 3-glucoside	**68437**
Paeoniflorin	**75603**
Quercetin dihydrate*	**00200595**
Panax sp.	
Panax ginseng extract*	**05115001**
Ginsenoside Rb1*	**00170580**
Ginsenoside Rb2	**41868**
Ginsenoside Rb3	**42635**
Ginsenoside Rd	**01518**
Ginsenoside Re*	**03000590**
Ginsenoside Re	**77960**
Ginsenoside Rf*	**01580590**
Ginsenoside Rg1*	**00370580**
Ginsenoside Rg2	**08171**
Ginsenoside Rg3	**64139**
Ginsenoside Rh1	**56805**
Notoginsenoside R1	**77089**
Protopanaxadiol	**62685**
Protopanaxatriol	**42476**
Pseudoginsenoside F11	**67530**
Vanillic acid**	**68654**
Papaver sp.	
Fumaric acid**	**76635**
Papaverine hydrochloride	**PHR1182**
Quercetin 3-glucoside	**16654**
Vanillic acid**	**68654**
Passiflora sp.	
Passiflora incarnata extract	**05085001**
Apigenin*	**01760595**

*Primary pharmaceutical reference standard HWI
***Trace*CERT®**, certified reference material

Compound	Cat. No.
Apigenin	**42251**
Chrysin	**95082**
Geraniol	**48798**
Isoorientin	**78109**
Hyperoside*	**00180585**
Isoorientin*	**03820585**
Isovitexin	**01120590**
Isovitexin	**67135**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Orientin*	**03810585**
Orientin	**55736**
Schaftoside	**42925**
Scopoletin	**38332**
(+)-α-Terpineol	**83073**
Umbelliferone	**54826**
Vitexin*	**00840595**
Vitexin	**49513**
Pelargonium sp.	
Umckalin	**50792**
Peumus sp.	
Boldine	**67592**
Phyllanthus sp.	
Chebulagic acid	**69455**
Friedelin	**92187**
1-O-Galloyl-β-D-glucose	**69288**
Hypophyllanthin	**75142**
Phyllanthin	**75110**
Pimpinella sp.	
4-Allylanisole (Estragole)	**05818**
Anethol trans	**10368**
Anethol trans*	**00130595**
Angelicin	**18118**
p-Anisaldehyde**	**43621**
p-Anisaldehyde	**97063**
Apigenin*	**01760595**
Apigenin	**42251**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
Bergapten	**69664**
trans-Caffeic acid**	**51868**
Chlorogenic Acid*	**00500590**
Cryptochlorogenic acid	**90467**
(+)-Fenchone*	**00380590**

Compound	Cat. No.
(+)-Fenchone	**46208**
Fumaric acid**	**76635**
Isoorientin	**78109**
Isoorientin*	**03820585**
Isopimpinellin	**61419**
Isovitexin*	**01120590**
Isovitexin	**67135**
Kaempferol*	**00550580**
Kaempferol	**96353**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Neochlorogenic acid	**91213**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercetin 3-glucuronide*	**00310590**
Quercetin 3-O-glucuronide	**90733**
Rutin trihydrate*	**00300590**
Scopoletin	**38332**
(+)-α-Terpineol	**83073**
Umbelliferone	**54826**
Vanillic acid**	**68654**
Vanillic acid 4-β-D-glucoside	**14515**
Xanthotoxin	**56448**
Pinus sp.	
(+)-Borneol	**68878**
(−)-Bornyl acetate	**45855**
Camphene	**442505**
(−)-*trans*-Caryophyllene	**75541**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chrysin	**95082**
*p-Cymene***	**49679**
p-Cymene	**30039**
Dihydrokaempferol	**92204**
Guaiacol	**PHR1136**
Kaempferol*	**00550580**
Kaempferol	**96353**
(R)-(+)-Limonene	**62118**
Linalool**	**61706**
Linalool*	**00350190**

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Compound	Cat. No.
Linalool	**51782**
Myrcene	**64643**
Myricetin	**72576**
(−)-α-Pinene	**80599**
α-Pinene*	**00040590**
(+)-β-Pinene	**80607**
Pinoresinol	**06709**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Shikimic acid	**69686**
Taxifolin*	**03890585**
Taxifolin	**78666**
(+)-α-Terpineol	**83073**
Piper sp.	
4-Allylpyrocatechol	**18078**
trans-Caffeic acid**	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
trans-Cinnamic acid	**97013**
Desmethoxyyangonin	**51773**
(S)-(+)-7,8-Dihydrokavain	**41866**
(+)-Dihydromethysticin	**52007**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
trans-Ferulic acid**	**52229**
DL-Kavain	**59780**
Methyl eugenol	**04607**
R-(+)-Methysticin	**80488**
Naringenin 4',7-dimethylether	**76716**
Piperine	**75047**
Piperyline	**55805**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Salicylic acid**	**52341**
trans-Sinapic acid	**93878**
(+)-α-Terpineol	**83073**
Vanillic acid**	**68654**
Yangonin	**75575**
Plantago sp.	
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
Aucubine	**55561**
trans-Caffeic acid**	**51868**

Compound	Cat. No.
Chlorogenic Acid*	**00500590**
Neochlorogenic acid	**91213**
Verbascoside	**00820580**
Polygonum sp.	
Aloe-emodin*	**93938**
trans-Caffeic acid**	**51868**
Chlorogenic acid*	**00500590**
Chrysophanol	**01542**
trans-p-Coumaric acid	**55823**
Emodin	**30269**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
Epicatechin 3-gallate (-)*	**03950590**
Gallic acid*	**91215**
Hyperoside*	**00180585**
Isovitexin*	**01120590**
Isovitexin	**67135**
Luteolin*	**03880590**
Luteolin	**72511**
Physcion	**93893**
Quercitrin*	**00740580**
trans-Resveratrol**	**76511**
Rhein	**30873**
Scopoletin	**38332**
Umbelliferone	**54826**
Vitexin*	**00840595**
Vitexin	**49513**
Potentilla sp.	
trans-Caffeic acid**	**51868**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chlorogenic Acid*	**00500590**
trans-p-Coumaric acid	**55823**
Coumarin**	**72609**
Coumarin*	**01260595**
Cyanidin 3-O-rutinoside chloride (Keracyanin chloride)	**36428**
Ellagic acid	**14668**
Epigallocatechin*	**03960590**
(−)-Epigallocatechin	**08108**
trans-Ferulic acid**	**52229**
Gallic acid**	**91215**
(−)-Gallocatechin	**01388**
trans-Isoferulic acid	**05407**
Kaempferol*	**00550580**

*Primary pharmaceutical reference standard HWI
***Trace*CERT®**, certified reference material

Compound	Cat. No.
Kaempferol	**96353**
Kuromanin chloride (Chrysanthemin)	**44689**
Myricetin	**72576**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin dihydrate*	**00200595**
Quercetin 3-glucuronide*	**00310590**
Quercetin 3-O-glucuronide	**90733**
Quercitrin*	**00740580**
Scopoletin	**38332**
trans-Sinapic acid	**93878**
Umbelliferone	**54826**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Vanillic acid**	**68654**
Primula sp.	
Apigenin*	**01760595**
Apigenin	**42251**
trans-Caffeic acid**	**51868**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Epicatechin	**03940590**
(−)-Epicatechin	**68097**
Epigallocatechin*	**03960590**
(−)-Epigallocatechin	**08108**
Isorhamnetin	**38907**
Kaempferol*	**00550580**
Kaempferol	**96353**
Kaempferol 3-glucoside	**68437**
Myricetin	**72576**
Oenin chloride	**04288**
Primulaverin	**30147**
Primverin	**90657**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Rutin trihydrate*	**00300590**
Psoralea sp.	
Bakuchicin	**75747**
Bakuchiol	**68612**
Pueraria sp.	
Daidzein	**16587**
Daidzin	**42926**
Puerarin	**96006**
Tectoridin	**89948**
Tectorigenin	**67359**

Compound	Cat. No.
Punica sp.	
Asiatic acid	**89773**
Asiaticoside	**43191**
Betulinic acid	**91466**
Chlorogenic acid*	**00500590**
Corilagin	**75251**
trans-p-Coumaric acid	**55823**
Delphinidin 3-O-β-D-glucoside chloride	**73705**
Ellagic acid	**14668**
Gallic acid**	**91215**
Kuromanin chloride (Chrysanthemin)	**44689**
Neochlorogenic acid	**91213**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Punicalagin	**50793**
Punicalin, mixture of anomers	**67988**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Quercus sp.	
Betulin	**92648**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
Friedelin	**92187**
Gallic acid**	**91215**
(−)-Gallocatechin	**01388**
Hyperoside*	**00180585**
Lupeol	**18692**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Tiliroside	**79257**
Rhamnus sp.	
Aloe-emodin	**93938**
Aloin A	**50292**
Chelidonic acid	**49526**
Chrysophanol	**01542**
Emodin	**30269**
Frangulin A	**61237**
Frangulin B	**68912**
Isorhamnetin	**38907**
Kaempferide	**69545**
Kaempferol*	**00550580**
Kaempferol	**96353**

*Primary pharmaceutical reference standard HWI
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Compound	Cat. No.
Kaempferol 3-glucoside	**68437**
Physcion	**93893**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Rheum sp.	
Aloe-emodin	**93938**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chrysophanol	**01542**
trans-p-Coumaric acid	**55823**
Cyanidin 3-O-rutinoside chloride (Keracyanin chloride)	**36428**
Emodin	**30269**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
Gallic acid**	**91215**
(−)-Gallocatechin	**01388**
Kuromanin chloride (Chrysanthemin)	**44689**
Physcion	**93893**
Quercetin 3-glucoside	**16654**
Quercitrin*	**00740580**
Rhapontin	**94168**
Rhein	**30873**
Rutin trihydrate*	**00300590**
Sennoside A*	**01870575**
Sennoside B*	**00530580**
Rosmarinus sp.	
Betulin	**92648**
(+)-Borneol	**68878**
(−)-Bornyl acetate	**45855**
trans-Caffeic acid**	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
Carnosic acid	**91209**
Carnosol (Pikrosalvin)	**49702**
trans-p-Coumaric acid	**55823**
Cryptotanshinone	**80709**
*p-Cymene***	**49679**
p-Cymene	**30039**
Diosmetin	**90985**
Diosmin	**61386**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
trans-Ferulic acid**	**52229**
(±)-Hesperetin	**51864**
Hesperidin	**50162**

Compound	Cat. No.
(R)-(+)-Limonene	**62118**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Myrcene	**64643**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
(−)-α-Pinene	**80599**
α-Pinene*	**00040590**
Protocatechuic acid	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Rosmarinic acid*	**00390580**
trans-Sinapic acid	**93878**
(+)-α-Terpineol	**83073**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Vanillic acid**	**68654**
Salix sp.	
(1S)-(−)-Verbenone	**94882**
Amentoflavone	**18571**
Apigenin*	**01760595**
Apigenin	**42251**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chlorogenic Acid*	**00500590**
Dihydrokaempferol	**92204**
Eleutheroside B	**90974**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
Eriodictyol	**89061**
Hyperoside*	**00180585**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
(±)-Naringenin	**52186**
Neochlorogenic acid	**91213**
Picein	**74192**
Procyanidin B1	**19542**
Quercitrin*	**00740580**
D-(−)-Salicin	**79588**
Salidroside	**43866**
Taxifolin*	**03890585**
Taxifolin	**78666**

*Primary pharmaceutical reference standard HWI
***Trace*CERT®**, certified reference material

Compound	Cat. No.
Salvia sp.	
Apigenin*	**01760595**
Apigenin	**42251**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
Betulin	**92648**
(+)-Borneol	**68878**
(−)-Bornyl acetate	**45855**
trans-Caffeic acid**	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
Carnosic acid	**91209**
Carnosol (Pikrosalvin)	**49702**
Chlorogenic Acid*	**00500590**
Eucalyptol (1,8-Cineole)*	**00020590**
Cirsilineol	**67403**
trans-p-Coumaric acid	**55823**
Cryptochlorogenic acid	**90467**
Cryptotanshinone	**80709**
Diosmetin	**90985**
Eucalyptol (1,8-Cineole)	**29210**
trans-Ferulic acid**	**52229**
trans-Isoferulic acid	**05407**
(R)-(+)-Limonene	**62118**
Linalool	**51782**
Linalyl acetate	**49599**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Neochlorogenic acid	**91213**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
(−)-α-Pinene	**80599**
α-Pinene*	**00040590**
(+)-β-Pinene	**80607**
Rosmarinic acid*	**00390580**
Salvianolic acid A	**97599**
Salvianolic acid B	**49724**
Sclareol	**49944**
trans-Sinapic acid	**93878**
Sodium 3-(3,4-dihydroxyphenyl)-DL-lactate	**39363**
Tanshinone I	**80714**
Tanshinone II A	**51704**
(+)-α-Terpineol	**83073**
Thujone Standard Mixture	**04314**

Compound	Cat. No.
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Sambucus sp.	
Betulin	**92648**
trans-Caffeic acid**	**51868**
Chlorogenic Acid*	**00500590**
trans-p-Coumaric acid	**55823**
Cyanidin 3-O-rutinoside chloride (Keracyanin chloride)	**36428**
trans-Ferulic acid**	**52229**
Hyperoside*	**00180585**
Isoquercitrin*	**00140585**
Kaempferol*	**00550580**
Kaempferol	**96353**
Kaempferol 3-glucoside	**68437**
Kuromanin chloride (Chrysanthemin)	**44689**
Lupeol	**18692**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Rutin trihydrate*	**00300590**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Schisandra sp.	
Schizandrin A	**90139**
Scrophularia sp.	
Aucubine	**55561**
trans-Caffeic acid**	**51868**
trans-Cinnamic acid	**97013**
trans-p-Coumaric acid	**55823**
Diosmetin	**90985**
Diosmin	**61386**
trans-Ferulic acid**	**52229**
Harpagoside*	**00420580**
Hesperidin	**50162**
trans-Isoferulic acid	**05407**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
trans-Sinapic acid	**93878**
Vanillic acid**	**68654**
Senecio sp.	
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
(−)-α-Bisabolol*	**00320188**
(−)-α-Bisabolol	**95426**

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Compound	Cat. No.
Kaempferol 3-glucoside	**68437**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Rutin trihydrate*	**00300590**
Senecionine, dried down	**37031**
Senecionine	**50351**
Seneciphylline, dried down	**37033**
Seneciphylline	**73913**
Senkirkine, dried down	**37032**
Senna sp.	
Senna extract	**05475001**
Sennoside A*	**01870575**
Sennoside B*	**00530580**
Sennosid C	**73235**
Sennoside D	**16383**
Serenoa sp.	
Kaempferol 3-glucoside	**68437**
Rutin trihydrate*	**00300590**
β-Sitosterol	**43623**
β-Sitosterol β-D-glucoside	**89851**
Silybum sp.	
Silybum marianum extract	**05135001**
Apigenin*	**01760595**
Apigenin	**42251**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
Dihydrokaempferol	**92204**
Eriodictyol	**89061**
Fumaric acid*	**76635**
Isofraxidin	**91214**
Isosilybin A	**97326**
Isosilybin B	**95684**
Kaempferide	**69545**
(±)-Naringenin	**52186**
Quercetin dihydrate*	**00200595**
Silybin	**02000585**
Silybin B	**59527**
Silychristin	**51681**
Silydianin	**30494**
Taxifolin*	**03890585**
Taxifolin	**78666**
Solanum sp.	
trans-Caffeic acid**	**51868**
trans-p-Coumaric acid	**55823**

Compound	Cat. No.
Degalactotigonin	**92056**
N-Malonyl-DL-tryptophan	**77556**
Scopoletin	**38332**
Umbelliferone	**54826**
Stevia sp.	
Dulcoside A	**90378**
Geraniol	**48798**
Isosteviol	**92273**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Quercetin 3-glucoside	**16654**
Quercitrin*	**00740580**
Rebaudioside A	**38462**
Rebaudioside B	**49747**
Rebaudioside C	**30987**
Rebaudioside D	**19189**
Rubusoside	**62933**
Steviol	**19345**
Steviolbioside	**59754**
Stevioside	**50956**
Syzygium sp.	
Acetyleugenol	**04733**
Bergenin	**80479**
Betulinic acid	**91466**
(+)-Borneol	**68878**
(−)-Bornyl acetate	**45855**
trans-Caffeic acid**	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
(−)-*trans*-Caryophyllene	**75541**
trans-p-Coumaric acid	**55823**
Cryptochlorogenic acid	**90467**
Ellagic acid	**14668**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
Eugenol**	**79891**
Eugenol*	**01050595**
Eugenol	**35995**
trans-Ferulic acid**	**52229**
Gallic acid**	**91215**
Geraniol	**48798**
Guaiacol	**PHR1136**
Hyperoside*	**00180585**
Isoeugenol	**34038**

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Compound	Cat. No.
Kaempferol*	**00550580**
Kaempferol	**96353**
Kaempferol 3-glucoside	**68437**
Kuromanin chloride (Chrysanthemin)	**44689**
Methyl eugenol	**04607**
Myricetin	**72576**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
(−)-α-Pinene	**80599**
α-Pinene*	**00040590**
(+)-β-Pinene	**80607**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
(+)-α-Terpineol	**83073**
Vanillic acid**	**68654**
Tanacetum sp.	
Apigenin*	**01760595**
Apigenin	**42251**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
(−)-Bornyl acetate	**45855**
trans-Caffeic acid**	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
Chamazulen	**91595**
Chlorogenic Acid*	**00500590**
Cirsilineol	**67403**
Diosmetin	**90985**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
trans-Ferulic acid**	**52229**
Isofraxidin	**91214**
Isorhamnetin	**38907**
Linalyl acetate	**49599**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
(±)-Naringenin	**52186**
Orientin*	**03810585**
Orientin	**55736**
(−)-α-Pinene	**80599**

Compound	Cat. No.
α-Pinene*	**00040590**
(+)-β-Pinene	**80607**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin dihydrate*	**00200595**
Scopoletin	**38332**
Sesamin	**59867**
Thymol*	**00670590**
Thymol	**72477**
Terminalia sp.	
Arjunetin	**90331**
Arjunic acid	**06244**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chebulagic acid	**69455**
Corilagin	**75251**
3,3'-Di-O-methyl ellagic acid 4'-O-β-D-xylopyranoside	**90905**
Ellagic acid	**14668**
Friedelin	**92187**
Gallic acid**	**91215**
Kaempferol*	**00550580**
Kaempferol	**96353**
Naringenin 4',7-dimethylether	**76716**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Punicalagin	**50793**
Quercetin dihydrate*	**00200595**
Shikimic acid	**69686**
trans-Sinapic acid	**93878**
1,3,6-Tri-O-galloyl-β-D-glucose	**78864**
Thymus sp.	
Apigenin*	**01760595**
Apigenin	**42251**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**
(+)-Borneol	**68878**
(−)-Bornyl acetate	**45855**
trans-Caffeic acid**	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
Carvacrol	**42632**
Carvacrol	**42632**
Carvacrol methyl ether	**43778**
Cirsilineol	**67403**
*p-Cymene***	**49679**

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Compound	Cat. No.
p-Cymene	**30039**
Dihydrokaempferol	**92204**
Eriocitrin	**94113**
Eriodictyol	**89061**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
trans-Ferulic acid**	**52229**
Geraniol	**48798**
Linalool**	**61706**
Linalool*	**00350190**
Linalool	**51782**
Linalyl acetate	**49599**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Myrcene	**64643**
(±)-Naringenin	**52186**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
(−)-α-Pinene	**80599**
α-Pinene*	**00040590**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Rosmarinic acid*	**00390580**
Sakuranetin	**73422**
Salicylic acid*	**52341**
trans-Sinapic acid	**93878**
Taxifolin*	**03890585**
Taxifolin	**78666**
Terpinen 4-ol*	**03900590**
(−)-Terpinen-4-ol	**49598**
γ-Terpinene	**86476**
(+)-α-Terpineol	**83073**
Thymol*	**00670590**
Thymol	**72477**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Vanillic acid**	**68654**
Tilia sp.	
trans-Caffeic acid**	**51868**
Chlorogenic Acid*	**00500590**
trans-*p*-Coumaric acid	**55823**
Ellagic acid	**14668**

Compound	Cat. No.
Esculin hydrate	**06212**
Fraxetin	**18224**
Fraxin	**80533**
Gallic acid**	**91215**
Hyperoside*	**00180585**
Isoquercitrin*	**00140585**
Kaempferol*	**00550580**
Kaempferol	**96353**
Kaempferol 3-glucoside	**68437**
Procyanidin B2	**42157**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercitrin	**00740580**
Rutin trihydrate*	**00300590**
Tiliroside	**79257**
Tribulus sp.	
Tribulosin	**51675**
Triticum sp.	
N-Malonyl-DL-tryptophan	**77556**
β-Sitosterol	**43623**
β-Sitosterol β-D-glucoside	**89851**
Urtica sp.	
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
β-Sitosterol	**43623**
Vaccinum sp.	
Arbutin	**66468**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chlorogenic Acid*	**00500590**
Cyanidin 3-O-α-L-arabinoside chloride	**05098**
Cyanidin 3-galactoside chloride (Idaein chloride)	**91635**
Cyanidin chloride	**94099**
Delphinidin chloride	**14389**
Delphinidin 3-O-β-D-galactoside chloride	**04301**
Delphinidin 3-O-β-D-glucoside chloride	**73705**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
Hyperoside*	**00180585**
Kuromanin chloride (Chrysanthemin)	**44689**
Malvidin chloride	**92607**
Malvidin 3-galactoside chloride	**79311**
Myricetin	**72576**

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Compound	Cat. No.
Oenin chloride	**04288**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Peonidin 3-O-glucoside chloride	**42008**
Petunidin 3-O-β-D-glucoside chloride	**30638**
Procyanidin B1	**19542**
Procyanidin B2	**42157**
Procyanidin C1	**50878**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin 3-glucoside	**16654**
Quercetin dihydrate*	**00200595**
Quercitrin*	**00740580**
Salicylic acid*	**52341**
Salidroside	**43866**
Syringic acid	**63627**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Valeriana sp.	
Valeriana officinalis extract	**05105001**
Acetoxyvalerenic acid	**18543**
(+)-Borneol	**68878**
(−)-Bornyl acetate	**45855**
trans-Caffeic acid**	**51868**
Camphor (dl)*	**02070595**
Camphene	**442505**
Chlorogenic acid*	**00500590**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
Hesperidin	**50162**
Hydroxyvalerenic acid	**55507**
trans-Isoferulic acid	**05407**
(−)-α-Pinene	**80599**
α-Pinene*	**00040590**
(+)-β-Pinene	**80607**
(+)-α-Terpineol	**83073**
Valerenic acid*	**02010595**
Vanilla sp.	
Vanillin**	**30304**
Verbascum sp.	
Apigenin*	**01760595**
Apigenin	**42251**
Apigenin 7-glucoside*	**00720585**
Apigenin 7-glucoside	**44692**

Compound	Cat. No.
Aucubine	**55561**
trans-Caffeic acid**	**51868**
Chlorogenic acid*	**00500590**
trans-p-Coumaric acid	**55823**
Diosmin	**61386**
Eriodictyol	**89061**
trans-Ferulic acid**	**52229**
Harpagoside*	**00420580**
Hesperidin	**50162**
Kaempferol*	**00550580**
Kaempferol	**96353**
Luteolin*	**03880590**
Luteolin	**72511**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin dihydrate*	**00200595**
Rutin trihydrate*	**00300590**
Vanillic acid*	**68654**
Verbascoside*	**00820580**
Viscum sp.	
Betulinic acid	**91466**
trans-Caffeic acid**	**51868**
Eleutheroside B	**90974**
Eleutheroside E	**08198**
trans-Ferulic acid**	**52229**
Isorhamnetin	**38907**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Protocatechuic acid*	**03930590**
Protocatechuic acid (3,4-Dihydroxybenzoic acid)	**08992**
Quercetin dihydrate*	**00200595**
Sakuranetin	**73422**
trans-Sinapic acid	**93878**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Vanillic acid**	**68654**
Vitex sp.	
Agnuside	**12274**
Aucubine	**55561**
(−)-Bornyl acetate	**45855**
Casticin	**16382**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**

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Compound	Cat. No.
Eucalyptol (1,8-Cineole)	**29210**
Isoorientin	**78109**
Isoorientin*	**03820585**
Isovitexin*	**01120590**
Isovitexin	**67135**
Luteolin 7-glucoside*	**03600585**
Luteolin 7-glucoside	**49968**
Negundoside	**80724**
Orientin*	**03810585**
Orientin	**55736**
(−)-α-Pinene	**80599**
α-Pinene*	**00040590**
(+)-β-Pinene	**80607**
Ursolic acid*	**03240595**
Ursolic acid	**89797**
Vitexin*	**00840595**
Vitexin	**49513**
Vitis sp.	
Caftaric acid	**88656**
(+)-Catechin*	**03910590**
(+)-Catechin	**43412**
Chlorogenic acid*	**00500590**
trans-p-Coumaric acid	**55823**
Delphinidin 3-O-β-D-glucoside chloride	**73705**
Epicatechin*	**03940590**
(−)-Epicatechin	**68097**
Geraniol	**48798**
Kuromanin chloride (Chrysanthemin)	**44689**
Malvidin chloride	**92607**
Oenin chloride	**04288**
Oleanolic acid*	**03920590**
Oleanolic acid	**42515**
Petunidin 3-O-β-D-glucoside chloride	**30638**
Procyanidin B1	**19542**
Procyanidin B2	**42157**
Procyanidin C1	**50878**
Quercetin 3-glucoside	**16654**
Quercetin 3-glucuronide*	**00310590**
Quercetin 3-O-glucuronide	**90733**
trans-Resveratrol**	**76511**

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Compound	Cat. No.
Withania sp.	
12-Deoxywithastramonolide	**94187**
β-Sitosterol β-D-glucoside	**89851**
Withaferin A	**89910**
Withanolide A	**74776**
Withanolide B	**94284**
Withanone	**90896**
Withanoside IV	**94186**
Withanoside V	**66042**
Zingiber sp.	
Asarylaldehyde	**16219**
(+)-Borneol	**68878**
Camphor (dl)*	**02070595**
Camphene	**442505**
(+)-Carvone**	**79245**
(−)-Carvone*	**00290595**
(−)-Carvone	**22060**
(+)-Carvone	**22070**
trans-p-Coumaric acid	**55823**
Eucalyptol (1,8-Cineole)**	**95656**
Eucalyptol (1,8-Cineole)*	**00020590**
Eucalyptol (1,8-Cineole)	**29210**
trans-Ferulic acid**	**52229**
[10]-Gingerol	**42630**
[6]-Gingerol	**50866**
[8]-Gingerol	**01514**
Kuromanin chloride (Chrysanthemin)	**44689**
Resorcinol*	**53363**
[6]-Shogaol	**39303**
trans-Sinapic acid	**93878**
Vanillic acid**	**68654**

Alphabetical Index

On the following pages, a complete list of phytochemical standards available through Merck is shown in alphabetical order. The over 600 products include primary pharmaceutical standards from HWI (*) and *Trace***CERT**® certified reference materials (**).

Description	Package	Cat. No.
Abscisic acid	25 mg	**90769**
Acacetin	10 mg	**49975**
Acetoxyvalerenic acid	10 mg	**18543**
3-O-Acetyl-β-boswellic acid	5 mg	**49873**
3-O-Acetyl-11-keto-β-boswellic acid	5 mg	**74607**
3-O-Acetyl-α-boswellic acid	5 mg	**56208**
3-O-Acetylboswellic acid, mixture of α and β	5 mg	**96729**
Acetyleugenol	100 mg	**04733**
Aconitine	10 mg	**44787**
Agnuside	10 mg	**12274**
Allantoin	50 mg	**93791**
(+)-L-Alliin	10 mg	**72805**
4-Allylanisole (Estragole)	1 mL, 5 mL	**05818**
4-Allylpyrocatechol	10 mg	**18078**
Aloe-emodin	10 mg	**93938**
Aloenin A	10 mg	**41757**
Aloin A	10 mg	**50292**
Amentoflavone	10 mg	**18571**
(15:0)-Anacardic acid	10 mg	**05506**
Andrograpanin	5 mg	**19443**
Andrographolide	5 mg	**90281**
trans-Anethol*	100 mg	**00130595**
trans-Anethol	1 mL, 5 mL	**10368**
Angelicin	10 mg	**18118**
p-Anisaldehyde**	100 mg	**43621**
p-Anisaldehyde*	50 mg	**05320590**

Description	Package	Cat. No.
p-Anisaldehyde	1 mL, 5 mL	**97063**
Anisatin	10 mg	**80478**
Apigenin	10 mg	**01760595**
Apigenin	10 mg	**42251**
Apigenin-6,8-diglucoside (Vicenin 2)*	10 mg	**03980585**
Apigenin 7-glucoside*	10 mg	**00720585**
Apigenin 7-glucoside	5 mg, 25 mg	**44692**
Apigenin 7-O-glucuronide*	10 mg	**04490590**
Arbutin	50 mg	**66468**
Arbutin*	50 mg	**00890590**
Arjunetin	5 mg	**90331**
Arjunic acid	5 mg	**06244**
Artemisinin	10 mg	**69532**
β-Asarone*	25 mg	**02890590**
Asarylaldehyde	50 mg	**16219**
L-Ascorbic acid**	100 mg	**57803**
Asiatic acid	10 mg	**89773**
Asiaticoside*	10 mg	**04560590**
Asiaticoside	1 mg, 5 mg	**43191**
Aspalathin*	10 mg	**03520585**
Aspidinol	10 mg	**55659**
Aucubin*	25 mg	**00090590**
Aucubine	5 mg, 25 mg	**55561**
Avicularin	5 mg	**44006**
Bacopasaponin C	5 mg	**76092**
Bacopaside I	5 mg	**56619**

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Description	Package	Cat. No.
Bacopaside X	5 mg	**42488**
Bacopaside-II	5 mg	**44698**
Bacoside A, mixture of Bacoside A3, Bacopaside II, Bacopaside X and Bacopasaponin C	5 mg	**76091**
Bacoside A3	5 mg	**53889**
Bacosine	5 mg	**69528**
Bakuchicin	10 mg	**75747**
Bakuchiol	10 mg	**68612**
Benzyl alcohol**	100 mg	**39971**
Benzyl alcohol	5 mL, 25 mL	**08421**
Benzyl benzoate**	1 mL	**55177**
Benzyl benzoate	1 mL	**68183**
Benzyl cinnamate	100 mg	**69139**
Bergamottin	5 mg	**01338**
Bergapten	25 mg	**69664**
Bergaptol	10 mg	**62707**
Bergenin	10 mg	**80479**
Betaine**	50 mg	**30056**
Betulin	50 mg	**92648**
Betulin 3, 28-diacetate	25 mg	**59919**
Betulinic acid	10 mg	**91466**
Biacangelicin	10 mg	**77686**
I3,II8-Biapigenin	10 mg	**73962**
Bilobalide*	10 mg	**00760595**
(−)-Bilobalide	10 mg	**79593**
Biotin**	50 mg	**91827**
(−)-α-Bisabolol*	100 mg	**00320188**
(−)-α-Bisabolol	1 mL	**95426**
Bisabolol oxide A*	25 mg	**00630590**
Bisabolol oxide A	10 mg	**59761**
Boeravinone B	10 mg	**96844**
Boldine	100 mg	**67592**
(+)-Borneol	10 mg	**68878**
(−)-Bornyl acetate*	50 mg	**00400585**
(−)-Bornyl acetate	1 mL, 5 mL	**45855**
α-Boswellic acid	10 mg	**06813**
β-Boswellic acid	5 mg	**80342**
Boswellic acid, mixture of α and β	5 mg	**63850**
Butein	10 mg	**72795**
trans-Caffeic acid**	50 mg	**51868**
Caffeine**	100 mg	**56396**
Caftaric acid	10 mg	**88656**
Camellia sinensis extract	150 mg	**05495001**

*Primary pharmaceutical reference standard HWI
_Trace_CERT**®, certified reference material

Description	Package	Cat. No.
Camphene*	100 mg	**01410590**
Camphor (dl)*	100 mg	**02070595**
Camphene	1000 mg	**442505**
Capsaicin	10 mg, 50 mg	**12084**
Capsaicin**	50 mg	**75049**
Cardanol	50 mg	**04016**
(+)-3-δ-Carene*	100 mg	**00410590**
Carnosic acid*	10 mg	**05330590**
Carnosic acid	5 mg	**91209**
Carnosol (Pikrosalvin)	10 mg	**49702**
Carvacrol	50 mg	**42632**
Carvacrol*	50 mg	**04270590**
Carvacrol methyl ether	50 mg	**43778**
(−)-Carveol, mixture of isomers	50 mg	**61370**
(−)-Carvone*	100 mg	**00290595**
(+)-Carvone**	100 mg	**79245**
(−)-Carvone	1 mL, 5 mL	**22060**
(+)-Carvone	1 mL	**22070**
(−)-*trans*-Caryophyllene	1 mL	**75541**
Castalagin	10 mg	**61221**
Casticin	10 mg	**16382**
Casticin*	10 mg	**01940590**
(+)-Catechin*	10 mg	**03910590**
(+)-Catechin	10 mg	**43412**
Catechin 5-O-gallate	10 mg	**89106**
Chamazulen	20 mg	**91595**
Chebulagic acid	10 mg	**69455**
Chebulinic acid	10 mg	**40820**
Chelidonic acid	100 mg	**49526**
(−)-Chicoric acid	10 mg	**06957**
Chlorogenic acid*	25 mg	**00500590**
Chrysanthemin (Kuromanin chloride)	5 mg	**44689**
Chrysin	50 mg	**95082**
Chrysophanol	25 mg	**01542**
2CR-Cinchonin	50 mg	**30729**
(+)-Cinchonine	50 mg	**19431**
1,4-Cineole	1 mL, 5 mL	**27393**
1,8-Cineole (Eucalyptol)**	100 mg	**95656**
1,8-Cineole (Eucalyptol)*	100 mg	**00020590**
1,8-Cineole (Eucalyptol)	1 mL	**29210**
trans-Cinnamaldehyde	50 mg	**06536**
trans-Cinnamic acid	50 mg	**97013**
Cinnamyl acetate	1 mL	**42759**

Description	Package	Cat. No.
Cinnamyl alcohol	50 mg	**93066**
Cirsilineol	5 mg	**67403**
Citral	1 mL	**43318**
Citric acid**	100 mg	**94676**
(±)-Citronellal	1 mL	**72638**
Citropten	100 mg	**08941**
Coptisin chloride	10 mg	**39273**
Corilagin	10 mg	**75251**
Corosolic acid	10 mg	**89067**
m-Coumaric acid	10 mg	**92649**
p-Coumaric acid*	50 mg	**03200595**
trans-p-Coumaric acid	50 mg	**55823**
Coumarin*	50 mg	**01260595**
Coumarin**	100 mg	**72609**
Crataegus spp extract	150 mg	**05095001**
Crocetin dialdehyde	10 mg	**18804**
Cryptochlorogenic acid	5 mg	**90467**
Cryptotanshinone	10 mg	**80709**
Curcumin*	10 mg	**00280590**
Curcumin	10 mg	**08511**
(−)-Curcumol	10 mg	**36236**
Cyanidin 3-O-α-L-arabinoside chloride	10 mg	**05098**
Cyanidin chloride	10 mg	**94099**
Cyanidin 3-galactoside chloride (Idaein chloride)	10 mg	**91635**
Cyanidin 3-O-rutinoside chloride (Keracyanin chloride)	1 mg, 5 mg	**36428**
Cyanidin-3-sambubiosidchloride	5 mg	**43046**
Cyanidin-3-sophorosidchloride	5 mg	**42739**
Cycloolivil	10 mg	**56523**
p-Cymene	5 mL	**30039**
p-Cymene**	100 mg	**49679**
Cynarin	5 mg	**91801**
Daidzein*	50 mg	**05340590**
Daidzein	10 mg	**16587**
Daidzin*	10 mg	**05370590**
Daidzin	10 mg	**42926**
Deacylgymnemic acid	5 mg	**40501**
Degalactotigonin	10 mg	**92056**
Dehydrocostus lactone	10 mg	**42575**
2′,3′-Dehydrosalannol	10 mg	**80098**
Delphinidin chloride	10 mg	**14389**
Delphinidin 3-O-β-D-galactoside chloride	10 mg	**04301**

*Primary pharmaceutical reference standard HWI
_Trace_CERT**®, certified reference material

Description	Package	Cat. No.
Delphinidin 3-O-β-D-glucoside chloride	10 mg	**73705**
Delphinidin-3-sambubioside chloride	5 mg	**42883**
Demethoxycurcumin	10 mg	**90593**
14-Deoxy-11,12-didehydroandrographolide	5 mg	**55549**
12-Deoxywithastramonolide	10 mg	**94187**
Desmethoxyyangonin	5 mg	**51773**
1,5-Dicaffeoylquinic acid	5 mg	**16917**
1,9-Dideoxyforskolin	10 mg	**92589**
Didymin	10 mg	**38964**
Digoxin**	50 mg	**04599**
Dihydrocapsaicin	5 mg	**03813**
(+)-Dihydrocarvone, mixture of isomers	50 mg	**09164**
Dihydrokaempferol	5 mg	**92204**
(S)-(+)-7,8-Dihydrokavain	5 mg	**41866**
(+)-Dihydromethysticin	5 mg	**52007**
Dihydromyricetin	10 mg	**42866**
(-)-Dihydroquinine	50 mg	**11532**
Dimethyl anthranilate	1 mL	**49919**
Dimethylpropiothetin hydrochloride	100 mg	**80828**
3,3'-Di-O-methylellagic acid 4'-xylopyranoside	10 mg	**90905**
Diosmetin	10 mg	**90985**
Diosmin	50 mg	**61386**
Docosyl caffeate	10 mg	**40971**
Dulcoside A	10 mg	**90378**
Echinacoside*	10 mg	**01710580**
Echinacoside	10 mg	**07538**
Eclalbasaponin I	10 mg	**79736**
Eclalbasaponin II	10 mg	**77084**
(−)-β-Elemene	25 mg	**63965**
Elemolic acid, mixture of α and β	5 mg	**73527**
β-Elemonic acid	5 mg	**00708**
Eleutheroside B (Syringin)	10 mg	**90974**
Ellagic acid*	50 mg	**05350590**
Ellagic acid	50 mg	**14668**
Emodin	10 mg	**30269**
Epicatechin*	10 mg	**03940590**
(−)-Epicatechin	10 mg	**68097**
(−)-Epicatechin 3-gallate*	10 mg	**03950590**
Epicinchonine	50 mg	**38105**
Epigallocatechin*	10 mg	**03960590**

Description	Package	Cat. No.
(−)-Epigallocatechin	1 mg	**08108**
Epigallocatechin gallate*	10 mg	**03970590**
(−)-Epigallocatechin gallate	10 mg	**93894**
Epiquinidine	50 mg	**00998**
Epiquinine	50 mg	**89457**
6′,7′-Epoxybergamottin	10 mg	**69779**
Eriocitrin	5 mg	**94113**
Eriocitrin*	10 mg	**02660590**
Eriodictyol	10 mg	**89061**
Esculin hydrate	100 mg	**06212**
Estragole (4-Allylanisole)	1 mL, 5 mL	**05818**
Ethyl trans-4-methoxycinnamate	10 mg	**42479**
Eucalyptol (1,8-Cineole)**	100 mg	**95656**
Eucalyptol (1,8-Cineole)*	100 mg	**00020590**
Eucalyptol (1,8-Cineole)	1 mL	**29210**
Eugenol**	100 mg	**79891**
Eugenol*	100 mg	**01050595**
Eugenol	250 mg	**35995**
Eupalitin	10 mg	**66324**
Eupalitin 3-Oβ-D-galactopyranoside	10 mg	**89165**
Eupatorin	10 mg	**52559**
trans, trans-Farnesol	100 mg	**92386**
(+)-Fenchone*	100 mg	**00380590**
(+)-Fenchone	1 mL, 5 mL	**46208**
trans-Ferulic acid**	50 mg	**52229**
Formononetin	50 mg	**94334**
Forskolin	10 mg	**93049**
Frangulin A	10 mg	**61237**
Frangulin B	10 mg	**68912**
Fraxetin	50 mg	**18224**
Fraxin	10 mg	**80533**
Friedelin	10 mg	**92187**
Fumaric acid**	100 mg	**76635**
Gallic acid**	100 mg	**91215**
(−)-Gallocatechin	10 mg	**01388**
(−)-Gallocatechin gallate	10 mg	**80352**
1-O-Galloyl-β-D-glucose	10 mg	**69288**
(+)-Garcinia acid	10 mg	**44292**
Genistein*	50 mg	**05360590**
Genistein	10 mg	**92136**
Genistin*	25 mg	**05380590**
Genistin	10 mg	**73822**
Genkwanin	10 mg	**42734**
Geraniol	1 mL, 5 mL	**48798**

Description	Package	Cat. No.
Geranyl Acetate	1 mL	**45896**
Geranyl acetate*	100 mg	**01290190**
8-Geranyloxypsoralen	10 mg	**40594**
Germacron	10 mg	**42924**
[10]-Gingerol	10 mg	**42630**
[6]-Gingerol	10 mg	**50866**
[8]-Gingerol	10 mg	**01514**
Ginkgo Biloba extract	150 mg	**05485001**
Ginkgolic acid C13:0	10 mg	**49962**
Ginkgolic acid C15:1*	10 mg	**02580185**
Ginkgolic acid C17:1*	10 mg	**01390590**
Ginkgolid A*	25 mg	**00770590**
Ginkgolid B	10 mg	**94970**
Ginkgolide C	10 mg	**18309**
Ginkgolid J	5 mg	**89556**
Ginkgotoxin	10 mg	**89960**
Ginkgolide C*	25 mg	**01490590**
Ginsenoside R0	10 mg	**94381**
Ginsenoside Rb1*	10 mg	**00170580**
Ginsenoside Rb2	10 mg	**41868**
Ginsenoside Rb3	10 mg	**42635**
Ginsenoside Rc	5 mg	**44987**
Ginsenoside Rd	10 mg	**01518**
Ginsenoside Re*	10 mg	**03000590**
Ginsenoside Re*	10 mg	**77960**
Ginsenoside Rf*	10 mg	**01580590**
Ginsenoside Rg1*	10 mg	**00370580**
Ginsenoside Rg2	10 mg	**08171**
Ginsenoside Rg3	10 mg	**64139**
Ginsenoside Rg6	5 mg	**43019**
Ginsenoside Rh1	10 mg	**56805**
Ginsenoside Rh3	5 mg	**43084**
Ginsenoside Rh4	5 mg	**42776**
Glutaric acid**	100 mg	**89147**
Glycolic acid**	100 mg	**94815**
Glycitein	10 mg	**43534**
Glycyrrhizic acid ammonium salt*	50 mg	**01250570**
Glycyrrhizic acid ammonium salt	10 mg	**91443**
Guaiacol	1.5g	**PHR1136**
Guajaverin	5 mg	**94821**
(E)-Guggulsterone	10 mg	**68797**
(Z)-Guggulsterone	10 mg	**78251**
(−)-α-Gurjunene	5 mg	**93449**
Gymnemangenin	5 mg	**52181**

*Primary pharmaceutical reference standard HWI
***Trace*CERT®, certified reference material

Description	Package	Cat. No.
Hamamelitannin	5 mg	**04646**
Harpagophytum procumbens extract	150 mg	**05125001**
Harpagoside*	25 mg	**00420580**
Hederacoside C*	10 mg	**00930585**
Hederacoside C	10 mg	**79737**
α-Hederin*	10 mg	**01240585**
α-Hederin	10 mg	**07512**
Herniarin*	10 mg	**02250595**
(±)-Hesperetin	50 mg	**51864**
Hesperidin*	25 mg	**04650590**
Hesperidin	10 mg	**50162**
Hexahydrocurcumin	10 mg	**69727**
Isoorientin	5 mg	**78109**
Honokiol	25 mg	**42612**
Hordenine	50 mg	**61207**
Hulupinic acid*	10 mg	**01090595**
α-Humulene	250 mg	**12448**
(−)-Huperzine A	25 mg	**42643**
Hydroquinone	100 mg	**74347**
(−)-Calcium hydroxycitrate tribasic	10 mg	**75450**
Hydroxyvalerenic acid	5 mg	**55507**
Hypericin*	10 mg	**00190585**
Hypericum perforatum extract	150 mg	**05295001**
Hyperoside*	25 mg	**00180585**
Hyperforin dicyclohexylammonium salt	5 mg	**42891**
Hypophyllanthin	10 mg	**75142**
Icariin	25 mg	**56601**
Idaein chloride (Cyanidin 3-galactoside chloride)	10 mg	**91635**
Imperatorin (Marmelosin)	10 mg	**55193**
Iriflophenone 3-C-β-D-glucopyranoside	10 mg	**91627**
(+)-Isocorydin	10 mg	**42899**
Isoeugenol	5 mL	**34038**
trans-Isoferulic acid	10 mg	**05407**
Isoforskolin	10 mg	**94597**
Isofraxidin	5 mg	**91214**
Isoimperatorin	10 mg	**68771**
Isoliquiritigenin	50 mg	**38986**
(1S,2R,5R)-(+)-Isomenthol*	25 mg	**04280590**
(1S,2R,5R)-(+)-Isomenthol	25 mg	**59802**
Isoorientin*	10 mg	**03820585**
Isopimpinellin	10 mg	**61419**
(−)-Isopulegol*	50 mg	**04570595**
(−)-Isopulegol	5 mL	**59770**

*Primary pharmaceutical reference standard HWI
_Trace_CERT**®, certified reference material

Description	Package	Cat. No.
Isoquercitrin*	25 mg	**00140585**
Isorhamnetin	10 mg	**38907**
Isorhamnetin*	10 mg	**04290585**
Isorhamnetin-3-O-β-D glucopyranosyl-(1→2)-β-D glucopyranosyl-(1→6)-β-D glucopyranoside*	10 mg	**00960590**
Isosilybin A	5 mg	**97326**
Isosilybin B	5 mg	**95684**
Isosteviol	10 mg	**92273**
Isovitexin*	10 mg	**01120590**
Isovitexin	5 mg	**67135**
Isoxanthohumol	5 mg	**55423**
Jasmon	1 mL	**59975**
Kaempferide	10 mg	**69545**
Kaempferol*	10 mg	**00550580**
Kaempferol	10 mg	**96353**
Kaempferol 3-glucoside	5 mg	**68437**
Kaempferol-3-glucoside*	10 mg	**04500585**
DL-Kavain	500 mg	**59780**
Keracyanin chloride (Cyanidin 3-O-rutinoside chloride)	1 mg, 5 mg	**36428**
11-Keto- b-boswellic acid	5 mg	**78535**
Khellin	100 mg	**00899**
Koenigicine	10 mg	**94500**
Koenimbine	10 mg	**41096**
Kuromanin chloride (Chrysanthemin)	5 mg	**44689**
Larixylacetat*	50 mg	**02730595**
Lavandulol	50 mg	**42583**
(R)-(+)-Limonene*	100 mg	**00590590**
(R)-(+)-Limonene	1 mL, 5 mL	**62118**
Limonin	10 mg	**64081**
Linalool**	50 mg	**61706**
Linalool*	100 mg	**00350190**
Linalool	1 mL	**51782**
Linalyl acetate	100 mg	**49599**
Eleutheroside E	10 mg	**08198**
Lupeol	10 mg	**18692**
Lutein	1 mg, 5 mg	**07168**
Luteolin*	25 mg	**03880590**
Luteolin	10 mg	**72511**
Luteolin 7-glucoside*	10 mg	**03600585**
Luteolin 7-glucoside	10 mg	**49968**
Luteolin-7-O-β-D-glucuronide*	10 mg	**04480585**
Magnesium L-lactate hydrate**	100 mg	**40394**

Description	Package	Cat. No.
Mahanimbine	10 mg	**77875**
L-(−)-Malic acid**	100 mg	**09172**
Malonic acid**	100 mg	**68714**
N-Malonyl-DL-tryptophan	10 mg	**77556**
Malvidin chloride	10 mg	**92607**
Malvidin 3-galactoside chloride	1 mg	**79311**
Mangiferin	10 mg	**06279**
Marmelosin (Imperatorin)	10 mg	**55193**
Maslinic acid	5 mg	**68594**
Matairesinol	5 mg	**04157**
Matricin	5 mg	**77347**
Menthofuran*	50 mg	**04580595**
(+)-Menthofuran*	50 mg	**04580595**
(+)-Menthofuran	1 mL, 5 mL	**63661**
(−)-Menthol*	100 mg	**00580590**
(−)-Menthol	1g	**63660**
(−)-Menthone	5 mL	**63677**
(−)-Menthone*	100 mg	**04660585**
Menthylacetat*	100 mg	**04590595**
(1R)-(−)-Menthyl acetate	1 mL, 5 mL	**45985**
trans-p-Methoxycinnamaldehyde	50 mg	**61384**
Methyl trans-cinnamate	50 mg	**75032**
2-Methyl-3-buten-2-ol	1 mL	**05392**
3-O-Methylellagic acid	10 mg	**93026**
Methyl eugenol	50 mg	**04607**
Methylophiopogonanone B	5 mg	**92542**
7-O-Methylwogonin	5 mg	**41442**
R-(+)-Methysticin	5 mg	**80488**
Myrcene*	50 mg	**04600585**
Myrcene	100 mg	**64643**
Myricetin*	10 mg	**05390590**
Myricetin	10 mg	**72576**
Myricitrin*	10 mg	**02180585**
Myricitrin	10 mg	**67268**
Myristicin	10 mg, 50 mg	**09237**
(±)-Naringenin	50 mg	**52186**
Naringenin 4',7-dimethylether	5 mg	**76716**
Naringin	500 mg	**91842**
Negundoside	10 mg	**80724**
Neoandrographolide	5 mg	**49879**
Neochlorogenic acid	5 mg	**91213**
Neohesperidin	10 mg	**40927**
Neohesperidin dihydrochalcone	100 mg	**75041**
trans-Nerolidol*	50 mg	**04610590**

Description	Package	Cat. No.
trans-Nerolidol	100 mg	**18143**
Neryl acetate	1 mL	**46015**
Nobiletin	10 mg	**92600**
Nomilin	10 mg	**77518**
Notoginsenoside R1	10 mg	**77089**
N-Vanillylnonamide	50 mg, 100 mg	**15971**
Obacunone	10 mg	**74191**
Octanal	1 mL, 5 mL	**52466**
3-Octanone	5 mL	**46214**
Oenin chloride	10 mg	**04288**
Oenothein B	10 mg	**03805**
Oleandrin	5 mg	**06069**
Oleanolic acid*	10 mg	**03920590**
Oleanolic acid	10 mg	**42515**
Oleuropein*	10 mg	**05400590**
Oleuropein	10 mg	**92167**
Orientin*	10 mg	**03810585**
Orientin	5 mg	**55736**
Osthole*	10 mg	**02150595**
Oxybenzone	50 mg	**59647**
Oxypeucedanin	5 mg	**42904**
Paeoniflorin	10 mg	**75603**
Panax ginseng extract	150 mg	**05115001**
Papaverine hydrochloride	500 mg	**PHR1182**
Passiflora incarnata extract	150 mg	**05085001**
5-Pentadecylresorcinol	10 mg	**91822**
Peonidin 3-O-glucoside chloride	1 mg	**42008**
Petunidin 3-O-β-D-glucoside chloride	10 mg	**30638**
Phloretin	10 mg	**91897**
Phloridzin dihydrate	50 mg	**79589**
p-Hydroxybenzoic acid	1g	**PHR1048**
Phyllanthin	10 mg	**75110**
Physcion	10 mg	**93893**
Picein	10 mg	**74192**
Pikrosalvin (Carnosol)	10 mg	**49702**
(−)-β-Pinene*	100 mg	**00080590**
α-Pinene*	100 mg	**00040590**
(−)-α-Pinene	1 mL, 5 mL	**80599**
(+)-β-Pinene	1 mL, 5 mL	**80607**
Pinoresinol	10 mg	**06709**
Piperine	50 mg	**75047**
Piperyline	10 mg	**55805**
Poncirin	10 mg	**77536**
6-Prenylnaringenin	5 mg	**75602**

*Primary pharmaceutical reference standard HWI
***Trace*CERT®, certified reference material

Description	Package	Cat. No.
8-Prenylnaringenin	5 mg	**75119**
Primulaverin	5 mg	**30147**
Primverin	5 mg	**90657**
Procyanidin A2	10 mg	**28660**
Procyanidin B1	1 mg	**19542**
Procyanidin B2	1 mg	**42157**
Procyanidin C1	5 mg	**50878**
Progoitrin potassium salt	10 mg	**76197**
Protocatechuic acid*	50 mg	**03930590**
Protocatechuic acid	50 mg	**08992**
Protopanaxadiol	10 mg	**62685**
Protopanaxatriol	10 mg	**42476**
Protopin	10 mg	**07267**
Pseudoginsenoside F11	10 mg	**67530**
Pseudohypericin	5 mg	**51593**
Psoralen	10 mg	**73633**
Puerarin	10 mg	**96006**
(+)-Pulegone*	100 mg	**04620590**
(+)-Pulegone	5 mL	**82569**
Punicalagin	10 mg	**50793**
Punicalin, mixture of anomers	10 mg	**67988**
Pyrogallol	50 mg	**06931**
Quercetin dihydrate*	50 mg	**00200595**
Quercetin 3-glucoside	10 mg	**16654**
Quercetin 3-glucuronide*	25 mg	**00310590**
Quercetin 3-O-glucuronide	5 mg	**90733**
Quercetin 3-O-rutinoside-7-O-glucoside	10 mg	**55836**
Quercitrin*	25 mg	**00740580**
trans-Quercus lactone	100 mg	**72777**
Quinine**	50 mg	**69311**
Rebaudioside A	10 mg	**38462**
Rebaudioside B	10 mg	**49747**
Rebaudioside C	10 mg	**30987**
Rebaudioside D	10 mg	**19189**
Reserpine**	50 mg	**06859**
Resorcinol**	100 mg	**53363**
trans-Resveratrol**	100 mg	**76511**
Rhapontin	50 mg	**94168**
Rhein	10 mg	**30873**
Rosmarinic acid*	25 mg	**00390580**
Rubiadin	10 mg	**74553**
Rubusoside	10 mg	**62933**
Rutin trihydrate*	50 mg	**00300590**

*Primary pharmaceutical reference standard HWI
_Trace_CERT**®, certified reference material

Description	Package	Cat. No.
Sabinen hydrate*	50 mg	**04630590**
Sabinene hydrate	500 mg	**96573**
Safrole**	100 mg	**08010**
Sakuranetin	10 mg	**73422**
D-(−)-Salicin	100 mg	**79588**
Salicylic acid**	50 mg	**52341**
Salidroside*	10 mg	**05410590**
Salidroside	25 mg	**43866**
Salvianolic acid A	10 mg	**97599**
Salvianolic acid B	10 mg	**49724**
(−)-α-Santonin	10 mg	**53653**
Schaftoside	5 mg	**42925**
Schizandrin A	50 mg	**90139**
Sclareol	100 mg	**49944**
Scopoletin	10 mg	**38332**
Scutellarin	10 mg	**73577**
Senecionine, dried down solution	0.05 mg	**37031**
Senecionine	5 mg	**50351**
Seneciphylline, dried down solution	0.05 mg	**37033**
Seneciphylline	5 mg	**73913**
Senkirkine, dried down solution	0.05 mg	**37032**
Senna extract	150 mg	**05475001**
Sennoside A*	25 mg	**01870575**
Sennoside A	5 mg, 25 mg	**68909**
Sennoside B*	25 mg	**00530580**
Sennoside B	25 mg	**75412**
Sennosid C	10 mg	**73235**
Sennoside D	10 mg	**16383**
Serratol	5 mg	**78689**
Sesamin	10 mg	**59867**
Shatavarin IV	10 mg	**30151**
Shikimic acid	50 mg	**69686**
[6]-Shogaol	10 mg	**39303**
Silybin*	25 mg	**02000585**
Silybin B	5 mg	**59527**
Silybum marianum extract	150 mg	**05135001**
Silychristin	10 mg	**51681**
Silydianin	10 mg	**30494**
trans-Sinapic acid	50 mg	**93878**
Sinensetin	10 mg	**89392**
(−)-Sinigrin hydrate	10 mg	**00290**
β-Sitosterol*	10 mg	**05410590**
β-Sitosterol	10 mg	**43623**

Description	Package	Cat. No.
β-Sitosterol β-D-glucoside	10 mg	**89851**
Sodium 3-(3,4-dihydroxyphenyl)-DL-lactate	5 mg, 25 mg	**39363**
Sodium propionate**	100 mg	**49894**
Spiraeoside	5 mg	**91802**
Steviol	10 mg	**19345**
Steviolbioside	10 mg	**59754**
Stevioside*	25 mg	**05420590**
Stevioside	10 mg	**50956**
Succinic acid**	100 mg	**49893**
Swertiamarine	10 mg	**90957**
Synephrine	50 mg	**75256**
Syringic acid	100 mg	**63627**
Syringin (Eleutherosid B)	10 mg	**90974**
Tangeretin	10 mg	**91004**
Tanshinone I	10 mg	**80714**
Tanshinone II A	10 mg	**51704**
3β-Taraxerol	10 mg	**75934**
L-(+)-Tartaric acid**	100 mg	**41447**
Taxifolin*	10 mg	**03890585**
Taxifolin	25 mg, 100 mg	**78666**
Tectoridin	50 mg	**89948**
Tectorigenin	25 mg	**67359**
Terpinen 4-ol*	50 mg	**03900590**
Terpinen-4-ol	50 mg	**49598**
α-Terpinene	100 mg	**72777**
γ-Terpinene	1 mL, 5 mL	**86476**
γ-Terpinene*	100 mg	**04640590**
α-Terpineol*	100 mg	**03420590**
(+)-α-Terpineol	5 mL	**83073**
(−)-Δ9-Tetrahydrocannabinol, solution ~1 mg/ mL in ethanol	1 mL	**56296**
Tetrahydrocurcumin	10 mg	**50202**
Theaflavin	1 mg	**55016**
Theaflavin 3,3'-digallate	1 mg	**92223**
Theaflavin monogallate	1 mg	**53963**
Theophylline	1g	**PHR1023**
Thujone Standard Mixture	1 mL, 5 mL	**04314**
Thymol*	100 mg	**00670590**
Thymol	500 mg	**72477**
Tiliroside	10 mg	**79257**
Tribulosin	10 mg	**51675**
Trigonelline hydrochloride	100 mg	**61407**
1,3,6-Tri-O-galloyl-β-D-glucose	10 mg	**78864**
(S)-ar-Turmerone	10 mg	**42258**

*Primary pharmaceutical reference standard HWI
***Trace*CERT®**, certified reference material

Description	Package	Cat. No.
Umbelliferone	50 mg	**54826**
Umckalin	10 mg	**50792**
Ursolic acid*	10 mg	**03240595**
Ursolic acid	5 mg, 25 mg	**89797**
(+)-Valencene	50 mg	**06808**
Valerenic acid*	10 mg	**02010595**
Valeriana officinalis extract	150 mg	**05105001**
Vanillic acid**	50 mg	**68654**
Vanillic acid 4-β-D-glucoside	5 mg	**14515**
Vanillin**	50 mg	**30304**
N-Vanillylnonanamide	50 mg, 100 mg	**15971**
Vasicine	10 mg	**92951**
Verbascoside*	10 mg	**00820580**
(1S)-(−)-Verbenone	1 mL, 5 mL	**94882**
Vescalagin	5 mg	**76418**
Vicine	10 mg	**78260**
Vincamine	50 mg	**75778**
Vitexin*	10 mg	**00840595**
Vitexin	10 mg	**49513**
Vitexin 2-O-rhamnoside*	10 mg	**00660585**
Vitexin 4''-O-glucoside	5 mg	**43907**
Wedelolactone	10 mg	**56639**
Withaferin A	10 mg	**89910**
Withanolide A	10 mg	**74776**
Withanolide B	10 mg	**94284**
Withanone	10 mg	**90896**
Withanoside IV	10 mg	**94186**
Withanoside V	10 mg	**66042**
Xanthohumol*	10 mg	**01130595**
Xanthotoxin	50 mg	**56448**
Yangonin	5 mg	**75575**
Zingerone	5 mg	**88787**

Other Reference Materials

Pharmacopeia Compendial Standards

For testing according to pharmacopeia monographs, Merck distributes compendial standards from the USP and the European Pharmacopoeia (EP). Find the corresponding product listings at **SigmaAldrich.com/usp** and **SigmaAldrich.com/ep** respectively.

Inorganic Certified Reference Materials (CRMs)

Herbal Medicinal Products should be tested for the presence of potentially harmful inorganics such as Cadmium, Lead or Mercury. Under the *Trace***CERT**® brand, we offer a comprehensive range of inorganic CRM solutions, suitable for ICP, AAS and Ion Chromatography. The products are manufactured according to ISO/IEC 17025 and ISO Guide 34 accreditation. An overview and comprehensive information, as well as a brochure download link can be found on **SigmaAldrich.com/inorganiccrm.**

Pesticides

Especially in plant materials originating from cultivation, traces of pesticides might be present. Our comprehensive PESTANAL® and *Trace***CERT**® ranges of pesticide standards and CRMs are ideal for their analysis. A complete list of the more than 1400 products are listed on **SigmaAldrich.com/pesticides.**

Mycotoxins

Fungal infection of plants can lead to mycotoxin contamination of plant derived products. To ensure the safety of these products, testing for mycotoxins is therefore important. Find a comprehensive product listing, analytical methods guide as well as the mycotoxin standards brochure on **SigmaAldrich.com/mycotoxins.**

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- Economic, convenient and easy to use
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