

## Botanical Reference Materials

Plant based products are widely used for herbal medicinal drugs, dietary supplements or cosmetic applications. The complexity and the natural variations of the chemical composition of plants pose big challenges to quality control and authenticity confirmation of botanical products. Chromatographic fingerprint analysis of marker compounds including both unique compounds and constituents common across multiple species is an efficient method to verify the plant species and detect potential adulteration with different plant parts, different species, or the addition of synthetic compounds. We have a very comprehensive portfolio of more than 1500 phytochemical neat standards of the most important marker compounds for a large variety of plants.

Complementing these purified marker standards, we also offer a range of botanical extract standards and calibration certified reference materials (CRM) mixes for identity confirmation and as calibration standards for quantification.

### [SigmaAldrich.com/medicinalplants](http://SigmaAldrich.com/medicinalplants)

Discover our extensive portfolio of botanical reference materials, including our Cerilliant® phytochemical mixes, NIST Standard Reference Materials® (SRMs), and a range of botanical extracts from HWI with HPLC and HPTLC fingerprinting data for your analytical needs.

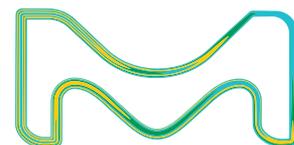
### Cerilliant® Phytochemical Mixes

These Supelco® certified reference materials mixes are produced at the Cerilliant® site in Round Rock Texas under ISO/IEC 17025 and ISO 17034 accreditation and offer cost-efficient and precise tools for calibration and verification of multiple key components for some of the most popular medicinal plants and dietary supplements. These products are supplied with a comprehensive certificate of analysis including traceable values and expanded uncertainties for all the analytes.

Two new mixes for Kava and Ginger have also been added to our comprehensive portfolio. These new products were developed in collaboration with the U.S. National Institutes of Health (NIH) Office of Dietary Supplements (ODS). Responding to increased biomedical interest in kava's and ginger's health effects, as well as an expressed need to more rigorously characterize food and dietary supplement preparations, the ODS Analytical Methods and Reference Materials Program contracted with Cerilliant to develop suitable CRM calibration solutions of major constituents of these plants to aid industry, academic, and regulatory scientists and analysts.

### [SigmaAldrich.com/phytochemicalmixes](http://SigmaAldrich.com/phytochemicalmixes)

Description	Components	Concentration	Pack Size	Cat. No.
Green Tea Catechin Mix	Caffeine, (-)-Epigallocatechin 3-gallate, (+)-Catechin, (-)-Epicatechin, (-)-Epicatechin 3-gallate, (-)-Gallocatechin, (-)-Gallocatechin 3-gallate, and (-)-Catechin 3-gallate	100 µg/mL each component in acetonitrile: water (8:2) with 5% 1M HCl	1 mL	<b>G-016</b>
Ginkgo Biloba Flavonoids Mix	Kaempferol, Quercetin, Isorhamnetin	100 µg/mL each component in methanol	1 mL	<b>G-014</b>
Ginkgo Biloba Terpene Lactones Mix	Bilobalid, Ginkgolide A, Ginkgolide B, Ginkgolide C, Ginkgolide J	100 µg/mL each component in acetonitrile	1 mL	<b>G-013</b>
Kava Mix *NEW	Yangonin (250 µg/mL), Desmethoxyyangonin (250 µg/mL), Dihydrokavain (250 µg/mL), D,L-Kavain (250 µg/mL), Methysticin (250 µg/mL), Dihydromethysticin (250 µg/mL), Flavokawain A (25 µg/mL), Flavokawain B (25 µg/mL), Flavokawain C (25 µg/mL)	25 - 250 µg/mL in acetonitrile	1 mL	<b>K-007</b>
Ginger Gingerols and Shogaols Mix *NEW	6-Gingerol, 8-Gingerol, 10-Gingerol, 6-Shogaol, 8-Shogaol, 10-Shogaol	500 µg/mL each component in acetonitrile	1 mL	<b>G-025</b>



## Botanical Standard Reference Materials (SRMs) from NIST

The complete range of SRMs produced by the National Institute of Standards and Technology (NIST) is available through SigmaAldrich.com. This portfolio includes extensively qualified and characterized botanical extract matrix reference materials certified for a big range of analytes including phytochemicals, trace elements, lipids and fatty acids and vitamins.

[SigmaAldrich.com/botanicalmatrixrm](https://www.sigmaaldrich.com/botanicalmatrixrm)

Description	Analytes	Cat. No.
Bilberry Extract	<b>Phosphate, Sulfate</b> <b>Organic Acids</b> Citric Acid, Galacturonic Acid, Isocitric Acid, Malic Acid, Oxalic Acid, Quinic Acid, Shikimic Acid	NIST3291
Cranberry Extract	<b>Phosphate, Sulfate (SO<sub>4</sub>)</b> <b>Organic Acids</b> Citric Acid, Galacturonic Acid, Glycolic Acid, Isocitric Acid, Malic Acid, Oxalic Acid, Quinic Acid, Shikimic Acid, Tartaric Acid	NIST3283
Cranberry-Containing Solid Oral Dosage Form	<b>Phosphate, Sulfate</b> <b>Organic Acids</b> Citric Acid, Galacturonic Acid, Isocitric Acid, Malic Acid, Oxalic Acid, Quinic Acid, Shikimic Acid	NIST3284
Curcumin Extract of Turmeric (Curcuma longa L.) Rhizome	<b>Phytochemicals</b> Bisdemethoxycurcumin, Desmethoxycurcumin, Curcumin	NIST3300
Ginkgo biloba (Extract)	<b>Phytochemicals</b> Bilobalide, Ginkgolide A, Ginkgolide B, Ginkgolide C, Ginkgolide J, Isorhamnetin, Kaempferol, Quercetin, Total Aglycones, Total Terpene Lactones <b>Trace Elements</b> Arsenic (As), Cadmium (Cd), Lead (Pb)	NIST3247
Ginkgo biloba (Leaves)	<b>Phytochemicals</b> Bilobalide, Ginkgolide A, Ginkgolide B, Ginkgolide C, Ginkgolide J, Isorhamnetin, Kaempferol, Quercetin, Total Aglycones, Total Terpene Lactones <b>Trace Elements</b> Cadmium (Cd), Lead (Pb), Mercury (Hg)	NIST3246
Ginkgo-Containing Tablets	<b>Phytochemicals</b> Bilobalide, Ginkgolide A, Ginkgolide B, Ginkgolide C, Ginkgolide J, Isorhamnetin, Kaempferol, Quercetin, Total Aglycones, Total Terpene Lactones <b>Trace Elements</b> Arsenic (As), Cadmium (Cd), Lead (Pb), Mercury (Hg)	NIST3248
Green Tea (Camellia sinensis) Extract	<b>Phytochemicals</b> (-)-Epicatechin, (-)-Epicatechin gallate, (-)-Epigallocatechin, (-)-Epigallocatechin gallate, (-)-Epigallocatechin methylgallate, (-)-Gallocatechin, (-)-Gallocatechin gallate, (+)-Catechin, Caffeine, Gallic acid, L-Theanine, theobromine, Theophylline <b>Trace Elements</b> Aluminum (Al), Arsenic (As), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Zinc (Zn)	NIST3255

Description	Analytes	Cat. No.
Green Tea (Camellia sinensis) Leaves	<b>Phytochemicals</b> (-)-Epicatechin, (-)-Epicatechin gallate, (-)-Epigallocatechin, (-)-Epigallocatechin gallate, (-)-Gallocatechin gallate, caffeine, theobromine, (+)-Catechin, (-)-Gallocatechin, Gallic acid, L-Theanine	NIST3254
Green Tea- Containing Solid Oral Dosage Form	<b>Phytochemicals</b> (-)-Epicatechin, (-)-Epicatechin gallate, (-)-Epigallocatechin, (-)-Epigallocatechin gallate, (-)-Gallocatechin, (-)-Gallocatechin gallate, (-)-Gallocatechin gallate, (+)-Catechin, caffeine, Gallic acid, L-Theanine, Theobromine, Theophylline  <b>Trace Metals</b> Arsenic (As), Cadmium (Cd), Lead (Pb), Mercury (Hg)	NIST3256
Ground Turmeric (Curcuma longa L.) Rhizome	<b>Phytochemicals</b> Bisdemethoxycurcumin, Desmethoxycurcumin, Curcumin  <b>Trace Elements</b> Arsenic (As), Cadmium (Cd), Lead (Pb)	NIST3299
Mixed Berry- Containing Solid Oral Dosage Form	<b>Phosphate, Sulfate</b>  <b>Organic Acids</b> Malic Acid, Citric Acid, Galacturonic Acid, Glycolic Acid, Isocitric Acid, Oxalic Acid, Quinic Acid, Shikimic Acid	NIST3285
Saw Palmetto (Serenoa repens) Extract	<b>Lipids and Fatty Acids</b> Arachidic Acid, Behenic Acid, Behenic Acid, Capric Acid, Caproic Acid, Caprylic Acid, Caprylic Acid, Erucic Acid, Gondoic Acid, Lauric Acid, Lauric Acid, Lignoceric Acid, Lignoceric Acid, Linoleic acid, Linoleic acid, Linolenic Acid, Linolenic Acid, Margaric Acid, Margaric Acid, Myristic Acid, Myristic Acid, Oleic Acid, Oleic Acid, Palmitic Acid, Palmitic Acid, Palmitoleic Acid, Palmitoleic Acid, Pentadecanoic Acid (C15:0), Pentadecanoic Acid (C15:0), Stearic acid, Stearic acid, Tridecanoic Acid (C13:0), Tridecanoic Acid (C13:0), Undecanoic Acid (C11:0), Vaccenic Acid, Vaccenic Acid  <b>Phytochemicals</b> Brassicasterol, Campesterol, Cycloartenol, Lupeol, Stigmasterol, $\beta$ -Sitosterol  <b>Vitamins</b> 9-Cis- $\beta$ -carotene, Total $\beta$ -carotene, Trans- $\beta$ -carotene, $\gamma$ -Tocopherol	NIST3251
Saw Palmetto (Serenoa repens) Fruit	<b>Lipids and Fatty Acids</b> Arachidic Acid, Arachidic Acid, Behenic Acid, Behenic Acid, Capric Acid, Caprylic Acid, Caprylic Acid, Gondoic Acid, Lauric Acid, Lauric Acid, Lignoceric Acid, Lignoceric Acid, Linoleic acid, Linoleic acid, Linolenic Acid, Margaric Acid, Margaric Acid, Myristic Acid, Myristic Acid, Oleic Acid, Oleic Acid, Palmitic Acid, Palmitic Acid, Palmitoleic Acid, Palmitoleic Acid, Pentadecanoic Acid (C15:0), Pentadecanoic Acid (C15:0), Stearic acid, Stearic acid, Tridecanoic Acid (C13:0), Tridecanoic Acid (C13:0), Vaccenic Acid, Vaccenic Acid  <b>Phytochemicals</b> Campesterol, Phytosterols, Stigmasterol, $\beta$ -Sitosterol	NIST3250
St. John's Wort	<b>Phytochemicals</b> Chlorogenic Acid, Rutin, Hyperoside, Quercitrin, Hypericin, Pseudohypericin  <b>Trace Elements</b> Arsenic (As), Cadmium (Cd), Mercury (Hg), Lead (Pb)	NIST3262

## Botanical Extract Reference Materials from HWI

For the authenticity testing of plant sourced products, we offer a range of botanical extract reference materials with HPLC and HPTLC fingerprint assigning the most important components qualitatively and for one or two key components also a quantitative value is included. The newest additions to this portfolio are the stevia extract and natural and synthetic vanilla extracts to distinguish between synthetic and natural vanilla. These products are manufactured by HWI pharma services in Rülzheim Germany.

[SigmaAldrich.com/plantextracts](https://sigmaaldrich.com/plantextracts)

[SigmaAldrich.com/botanicalmatrixrm](https://sigmaaldrich.com/botanicalmatrixrm)

Description	Quantified Components	Qualitatively Confirmed Components	Pack Size	Cat. No.
Camellia sinensis extract	Epigallocatechin gallate	Catechin, Epicatechin, Epicatechin gallate, Epigallocatechin, Epigallocatechin gallate	500 mg	05495001
Crataegus spp. extract	Vitexin 2-O-rhamnoside	Chlorogenic acid, Hyperoside, Vitexin 2-O-rhamnoside	500 mg	05095001
Ginkgo biloba extract	Bilobalide, Ginkgolide A	Ginkgolides A, B, C, Bilobalide	500 mg	05485001
Hypericum perforatum extract	Hypericin		500 mg	05295001
Panax ginseng extract	Ginsenosides Rb1+Rg1	Ginsenosides Rg1, Rb1, Re, Rf, Rg2, Rc, Rb2, Rd	500 mg	05115001
Passiflora incarnata extract	Isovitexin	Vitexin, Orientin, Homoorientin, Isovitexin	500 mg	05085001
Silybum marianum extract	Silybin A+B	Silichristin, Silidianin, Isosilbinin A, Isosilbinin B, Silybin A, Silybin B	500 mg	05135001
Stevia extract	Stevioside	Rebaudiosides A, B, C and D, Dulcoside A, Rubusoside, Steviolbioside, Stevioside	500 mg	6295001

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