pTeroPure™

99% Pure Nature-Identical Form of
trans-Pterostilbene (tero-STILL-bean)

Brought to you by

ChromaDex™

Introduction

ChromaDex promotes health and well-being through the discovery and development of nutraceutical ingredients - naturally occurring molecules that can be integrated into dietary supplements, nutritional products and functional foods.

pTeroPure is a nature identical form of trans-Pterostilbene. Pterostilbene is a natural analog of resveratrol, which is one of the compounds thought to contribute to the "French Paradox" associated with red wine consumption.[1] Like resveratrol, it belongs to a class of compounds called phytoalexins, which are naturally produced by plants when under attack by pathogens such as bacteria or fungi. And like resveratrol, there are animal studies showing it's efficacy at improving heart health, most notably by correcting the dyslipidemia that leads to atherosclerosis and coronary heart.[2-4] Pterostilbene is one of several stilbenes found in certain berries (e.g., blueberries, cranberries, sparkleberries, lingonberries, and grapes), thus, consumption of these small fruits may help improve health.[5,6]

"The more we study Pterostilbene, the more we see its huge potential in the human health field."

-Dr. Agnes Rimando, USDA ARS[5]

Pterostilbene is...
The Next Generation Resveratrol™

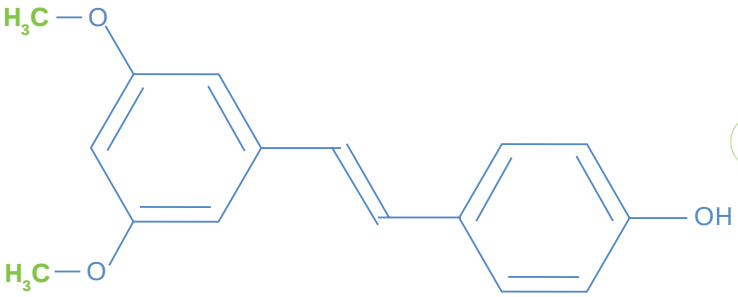
- A methylated version of resveratrol naturally found in berries[7,8]
- Superior biological activity[2,9-12]
- Better oral bioavailability[13-15]
- Metabolizes more slowly in the body, allowing more time for its antioxidant activities to act[13,15-17]
- Extensive tissue distribution[15]

Phytochemical Profile of Pterostilbene

CAS#: 537-42-8

Molecular Weight: 256.299

Molecular Formula: $C_{16}H_{16}O_3$



Other Names: Methylated Resveratrol
Dimethoxyresveratrol
3',5'-Dimethoxy-4-stilbenol
3,5-Dimethoxy-4'-hydroxy-trans-stilbene
4-(2-(3,5-Dimethoxyphenyl)ethenyl)phenol

Why Pterostilbene is Better Than Resveratrol

Pterostilbene and resveratrol have very similar pharmacologic properties, however Pterostilbene has several key advantages over resveratrol. The main difference between Pterostilbene and resveratrol is structural; Pterostilbene contains two methoxy groups and one hydroxyl group while resveratrol has three hydroxyl groups. The two methoxy groups cause Pterostilbene to be more lipophilic (oil-soluble) than resveratrol, which increases oral absorption and gives it a higher potential for cellular uptake.[10] Pterostilbene also has a much longer half life in the blood than resveratrol (105 minutes vs. 14 minutes).[2,18] A recent paper also demonstrated that when administered orally, Pterostilbene showed 80% bioavailability vs resveratrol's 20%, and Pterostilbene's lower total body clearance rates and subsequent V_{ss} value (measuring apparent volume of distribution) suggested extensive tissue distribution.[15]

Several published studies refer to Pterostilbene as having better activity than resveratrol. For example, the result of one study indicates that Pterostilbene is more effective than resveratrol as an inhibitor of DNA synthesis in the human adenocarcinoma HT-29 cell line.[19] Additionally, it has been shown that unlike the related stilbenes resveratrol, piceatannol, or resveratrol trimethylether, Pterostilbene is a potent peroxisome proliferator activated receptor alpha (PPARa) agonist, lowering lipid levels in the blood stream to reduce cholesterol levels at a higher rate than even pharmaceuticals such as ciprofibrate.[2] Both resveratrol and Pterostilbene have been shown to exhibit beneficial effects in the control of atherosclerosis and heart disease, however the structural modifications to resveratrol that are found in Pterostilbene are needed to increase its bioavailability while preserving the published beneficial activities.[2,11,12,17,20,21]

How Pterostilbene and Resveratrol Work Together

Pterostilbene and resveratrol, both stilbene compounds, have very similar pharmacologic properties, but published data suggests that they act very differently. Much of the bioassay and animal data suggests that Pterostilbene is the most potent stilbene, following a different mechanism of action than resveratrol. However, researchers have suggested that these two compounds also work synergistically, supporting the theory that a combination of Pterostilbene and resveratrol in a formulation maybe more effective than using these ingredients separately. For example, a recent publication showed that Pterostilbene and resveratrol act synergistically as anti-oxidants in protecting human erythrocytes from damage due to oxidative stress.[22]

Potential Health Benefits of Pterostilbene

- Strong antioxidant[10,24]
- May be a potent anti-aging compound[10,25]
- Potent anti-inflammatory activity[10,26,27]
- May alleviate neurodegeneration[10,25]
- May limit damage caused by oxidative stress[10]
- Mimics calorie restriction
- Improves heart health[2,3,5,28,29]
- Can be used to maintain healthy cholesterol levels[2,3,5,28]
- Orally active and works to decrease plasma glucose levels in some animals[2,18]
- Identified as an potential antiviral compound with broad target specificity[30]

Why pTeroPure™?

pTeroPure Pterostilbene is a nature-identical, 99+% pure, all-trans pterostilbene. The pTeroPure brand Pterostilbene is superior to natural extracts due to its high purity and its sustainable source material. The majority of the other Pterostilbene ingredients on the market are extracts made from *Pterocarpus marsupium*, an endangered tree found in India. The amounts of Pterostilbene found in the *Pterocarpus* heartwood are low, leading to concentrated extracts typically in 5-25% range. The fact that *Pterocarpus* is a threatened species further limits its use as a viable and sustainable source of Pterostilbene. Even though Pterostilbene is found in blueberries and other small berries, it is typically in the 25-50ppm range, too small to be commercially viable.[6] pTeroPure is also the only Pterostilbene to be used in sanctioned human clinical trials and the only Pterostilbene to have designated GRAS status.[23]

"Pterostilbene showed strong inhibitory activity - much more than resveratrol - against a particular form of cytochrome P450."

-Dr. Agnes Rimando, USDA ARS[5]

Potential Areas of Interests for Sirtuins

SIRT1	Metabolic, neurological, mitochondrial, carcinogenesis, inflammation
SIRT2	Carcinogenesis, neurological, metabolic
SIRT3	Metabolic, mitochondrial, neurological, cardiovascular
SIRT4	Metabolic, mitochondrial
SIRT5	Metabolic
SIRT6	Inflammation, carcinogenesis, metabolic
SIRT7	Cardiovascular, metabolic

Sample pTeroPure™ Pterostilbene Certificate of Analysis

pTeroPure™

Certificate of Analysis

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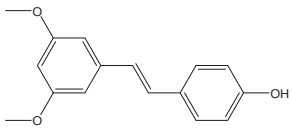
PRODUCT	Pterostilbene
PART NUMBER	00016996
MATERIAL TYPE	Food Grade Bulk Material
LOT NUMBER	XXXXXX
REPORT NUMBER	XXXXXX
DATE OF SAMPLE	01/06/20XX
DATE OF REPORT	01/18/20XX

Structure



NAME	Pterostilbene
OTHER NAME	4-(2-(3,5-Dimethoxyphenyl)ethenyl)phenol; 3,5-Dimethoxy-4'-hydroxy-trans-stilbene; 3',5'-Dimethoxy-4-stilbenol
CHEMICAL FORMULA	$C_{16}H_{16}O_3$
MOLECULAR WEIGHT (MW)	256.30
PUBLISHED MELTING POINT	85-86 °C
CAS NUMBER	[537-42-8]
CHEMICAL FAMILY	Stilbenes

MANUFACTURER ASSAY

TEST	METHOD	SPECIFICATION	RESULT
HPLC	NA	NLT 99.0%	99.81%
Loss on Drying	NA	NMT 2.0%	0.1%
Heavy Metals	ICP	See Below	See Below
Lead	ICP	NMT 1 ppm	< 1.0
Arsenic	ICP	NMT 1 ppm	< 1.0
Cadmium	ICP	NMT 1 ppm	< 1.0
Mercury	ICP	NMT 1 ppm	< 1.0
Total Plate Count	MICRO	NMT 1000 CFU/g	< 10
Yeast and Mold	MICRO	NMT 100 CFU/g	< 10
Salmonella	MICRO	NEGATIVE	NEGATIVE
E. Coli	MICRO	NEGATIVE	NEGATIVE
Staphylococcus	MICRO	NEGATIVE	NEGATIVE
Pseudomonas aeruginosa	MICRO	NEGATIVE	NEGATIVE
Appearance	NA	Off-white to Light brown	Pale Yellow Powder

STORAGE CONDITIONS

STORAGE	Room Temperature in a dry place.
EXPIRATION DATE	01/20XX under the above conditions.

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Intellectual Property

pTeroPure is a licensee of two U.S. patents from the USDA-ARS and the University of Mississippi and is working on the third patent with a strategic partner.

Patent Pending #1: "Pterostilbene as a New Agonist for the Peroxisome Proliferator-Activated Receptor Alpha Isoform."

Patent Pending #2: "Method to Ameliorate Oxidative Stress and Improve Working Memory via Pterostilbene Administration."

Patent Pending #3: "A Key Intermediate for the Preparation of Stilbenes"

The pterostilbene products developed by pTeroPure will be based on the technologies licensed from the USDA ARS and the University of Mississippi.

References

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FDA disclaimer: These statements have not been fully evaluated by the FDA and are not intended to prevent, treat, mitigate or cure any disease condition.

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