



# BIOPERINE®

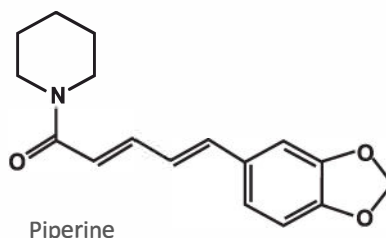
Nature's Bioavailability Enhancing Thermonutrient

# BioPerine®

## A Natural Bioavailability Enhancer

*Piper nigrum* L. is considered the “King of Spices” throughout the world due to its pungent principle “Piperine”.

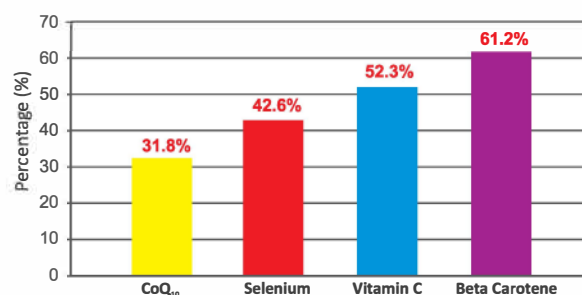
BioPerine® the patented extract obtained from black pepper fruits (*Piper nigrum*) is standardized for a minimum of 95% Piperine.



BioPerine® has been used as a bioavailability enhancer for over 18 years.

BioPerine® may be co-administered with various nutrients to enhance their bioavailability in both human and animal.

In general, BioPerine® was found to enhance absorption of nutrients by at least 30%.



BioPerine® is an effective bioavailability enhancer across a broad spectrum of water and fat soluble vitamins, multi vitamins, botanicals, minerals and other nutritional ingredients

### Traditional Uses

**Pepper:** One of the most common herbs in Ayurveda.

Black pepper (*Piper nigrum*, Piperaceae) has been used in human diet from ancient times and is one of the most widely used spices throughout the world. It has also been used in various traditional medicines, preservatives and health supplements.

The Materia Medica of Ayurveda, documents black pepper as one of the three herbs essential for several prescriptions and formulations.

Out of 370 compound formulations listed in Handbook of Domestic Medicines and Common Ayurvedic Remedies, 210 contain either Trikatu (three acrids) or its individual ingredients (Black pepper, Long pepper and Ginger). In Ayurveda, Trikatu has been described as a major decoction useful in restoring imbalance of Kapha, Vata and Pitta.

### Patents:

★ US5,536,506 ★ US5,744,161

★ US5,972,382 ★ US6,054,585

★ EP0810868 ★ JP3953513

★ CA2247467

BioPerine® is promoted as a “**Bioavailability Enhancer**” and a natural “**Thermonutrient**”

### Bio-enhancement by Piperine

- By modulating efflux mechanisms
- By modulating metabolizing enzymes
- Thermogenesis

(Acharya SG, et al, (2012), *Am. J. PharmTech Res.* 2(2))

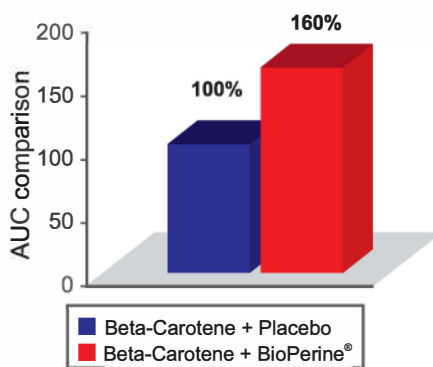
## Comparison of nutrient bioavailability when ingested alone and in combination with BioPerine®

BioPerine®, has been clinically tested with several nutrient groups including fat soluble vitamins ( $\beta$ -carotene), water soluble vitamins (vitamin B6, vitamin C), selenoamino acid (L(+)-Selenomethionine), Coenzyme Q<sub>10</sub> and shown to significantly enhance the bioavailability of supplemented nutrients through increased absorption. Herbal extracts such as curcumin also absorbed better when co-administered with BioPerine®.

### $\beta$ -carotene

A double blind cross over study using small amount of BioPerine® (5mg) combined with 15mg of  $\beta$ -carotene, given as a food supplement once a day increased almost two fold the blood levels of beta carotene in human volunteers.

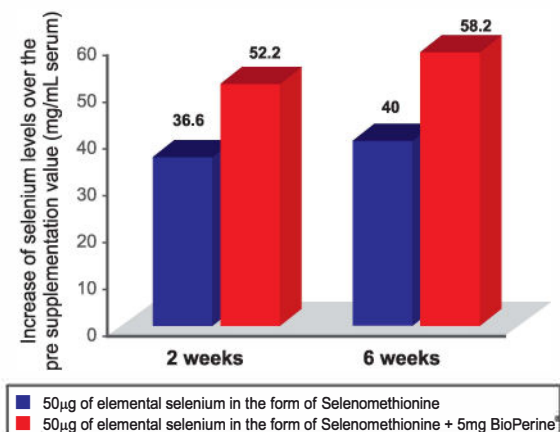
Increased Beta-Carotene absorption using 5mg of BioPerine®



However, a 60% increase in the area under the curve was observed during the experimental phase ( $\beta$ -carotene + BioPerine®) compared to the control after 14-day supplementation (Majeed M. et al. (1999). *Nutr Res*; 19(3) : 381-388).

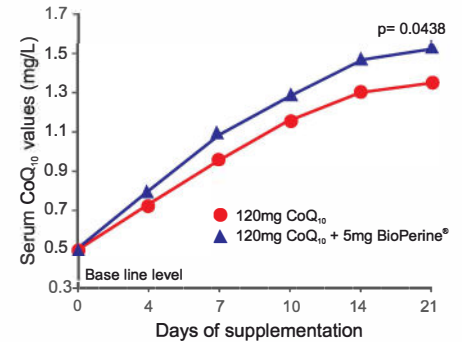
### Selenium

Bioavailability of selenium was evaluated alone and supplemented with BioPerine® in a double blind study. The serum selenium levels were approximately 30% higher in the group receiving selenium with BioPerine® after 2 weeks of treatment with a plateau in the subsequent time-points tested. The serum selenium levels were within normal limits in both groups at all time-points tested.



### Coenzyme Q<sub>10</sub>

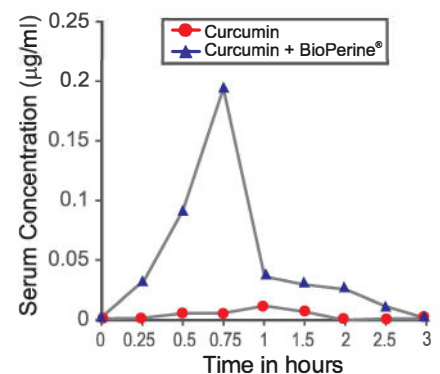
Bioavailability of CoQ<sub>10</sub> (120mg) was evaluated with and without BioPerine® supplementation. After 21 days of supplementation, co-administration of BioPerine® resulted in an absolute



increase in CoQ<sub>10</sub> serum levels by 1.12 mg/L as compared to the absolute increase of 0.85 mg/L in the control group. A 30% increase was observed in the area under the curve of CoQ<sub>10</sub> supplemented with BioPerine® compared to control (Majeed M. et al. (2000). *J Nutr Biochem*;11(2):109-113).

### Curcumin

A clinical study done at St. John's Medical College, Bangalore, India and published in *Planta Medica* provided clinical evidence of piperine's role in increasing the bioavailability of Curcumin, and has become one of the most downloaded papers of that journal.

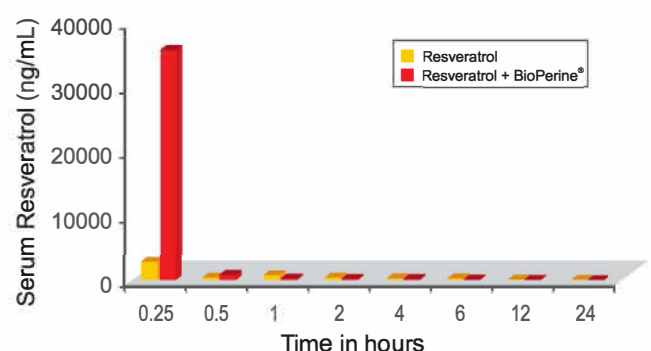


BioPerine® improved the uptake of Curcumin by 2000%, the healthful extract from turmeric roots, with clinically validated efficacy in inflammatory conditions including several forms of cancer (Majeed M. et al. (1998). *Planta Med.*;64(4):353-356).

Bioavailability of Curcumin (2000mg) co-administered with BioPerine® (20mg) was enhanced than the oral bioavailability of Curcumin alone in humans at doses that were devoid of adverse side effects.

### Resveratrol

In a recent study conducted by University of Wisconsin, BioPerine® significantly improved the bioavailability of Resveratrol by 229% and the maximum serum concentration (C<sub>max</sub>) was increased to 1544% (Johnson JJ. et al.(2011). *Mol Nutr Food Res*; 55: 1169-1176).







### Dosage form and Suggested use level:

BioPerine® can be used in the form of capsules or tablets.

Suggested use level: 5mg three times a day.

### Self Affirmed GRAS

BioPerine® is a self affirmed GRAS ingredient; it is safe, completely natural ingredient for increasing the efficacy of the nutrients of choice.

- GRAS status allows BioPerine® to be used as a nutrient in a variety of foods such as imitation dairy products, hard candies, chewing gums, granulated sugar, seasonings and flavor.
- A suggested maximum use levels in specified food is 15ppm and intake of 13.3mg per day per person has been found to be safe.

### Why BioPerine® stands out from the Crowd

- BioPerine® is the only product sourced out of piperine to obtain a patented status for its ability to increase the bioavailability of nutritional compounds.
- BioPerine® is the only source from piperine to have undergone clinical studies in the U.S. to substantiate its safety and efficacy for nutritional use.

|                                     |                                                                                                               |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Brand Name</b>                   | BioPerine®                                                                                                    |
| <b>Common Name</b>                  | Piper nigrum extract                                                                                          |
| <b>Description</b>                  | Off white to greenish yellow powder with characteristic odor                                                  |
| <b>Solubility</b>                   | Soluble in alcohol; Insoluble in water                                                                        |
| <b>Bulk Density</b>                 | Tapped Bulk Density – Between 0.55 g/ml and 0.85 g/ml<br>Loose Bulk Density – Between 0.30 g/ml and 0.65 g/ml |
| <b>Particle Size</b>                | 80 mesh - Not less than 95% w/w                                                                               |
| <b>Assay</b>                        |                                                                                                               |
| <b>Content of Piperine by HPLC</b>  | Not less than 95.0% w/w and not more than 102.0% w/w on dry basis                                             |
| <b>Shelf life</b>                   | 5 years                                                                                                       |
| <b>Storage Condition</b>            | Store at room temperature                                                                                     |
| <b>Certification</b>                |                                                                                                               |
| <b>Product certifications</b>       | Kosher & Halal Certified, GMO Free, FSSC, TSE-BSE Free, Nanotechnology Free                                   |
| <b>Manufacturing certifications</b> | ISO 22000:2005, GMP, FDA audited, FSSAI                                                                       |

\* These statements have not been evaluated by the Food and Drug administration. This product is not intended to diagnose, treat, cure or prevent any disease.