

# BioPerine®



- BioPerine® is a patented standardized extract obtained from black pepper, containing not less than 95% piperine
- A clinically proven bioavailability enhancer for nutrients<sup>1</sup>

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## Bioavailability

- Bioavailability is “the quantity of a substance, either nutrient, drug, or toxicant, that effectively reaches the target cells where it modifies, for good or bad, their metabolism and consequently their fate”.<sup>1</sup>

<sup>1</sup> Basu, T.K.: The influence of drugs with particular reference to aspirin on bioavailability of Vitamin C; in Counsell, Hornig, Vitamin C, pp.273-281 (Applied Science Publishers, Barking 1981)

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## Characteristic Features

- Gram positive, Indole negative, rod shaped bacteria with terminal spores
- Produces L(+) Lactic Acid only
- Naturally microencapsulated for stability
- Proliferates within the GI tract
- Extremely fastidious organisms
- Grow optimally at 30°C to 37°C & optimum pH in the range 5.5 to 6.2
- Microaerophilic
- The acidic environment created by production of L(+) Lactic Acid & other antimicrobial compounds prevents the growth of disease causing microbes like Clostridia, which are responsible for production of undesirable gases
- Long & slender cells (0.3 to 0.8 microns)
- Colonies are usually 2.5 mm in diameter, convex, smooth, glistening and do not produce any pigment

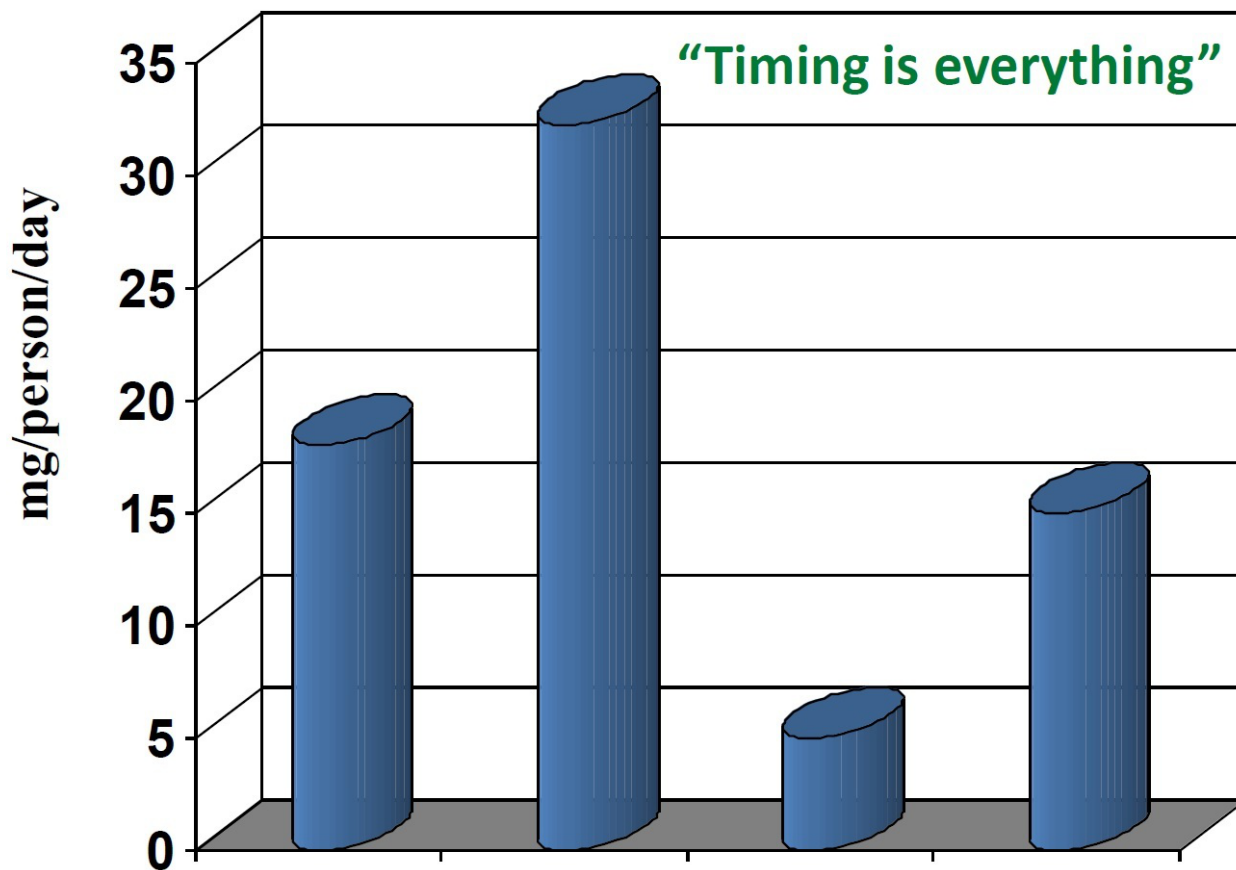
## A natural bioavailability enhancer for nutrients

- Herbal extracts
    - e.g. curcumin, Boswellin®, ashwagandha, Gingko biloba, capsaicin
  - Water-soluble vitamins
    - e.g. vitamin B1, vitamin B2, niacinamide, vitamin B6, vitamin B12, folic acid, vitamin C
  - Fat-soluble vitamins
    - e.g. vitamin A, vitamin D, vitamin E, vitamin K
  - Antioxidants
    - e.g. vitamin A, vitamin C, vitamin E, alpha-carotene, transbeta-carotene, beta-cryptoxanthin, lycopene, lutein/zeaxanthin, pine bark bioflavanoids complex, germanium, selenium, zinc
  - Amino Acids
    - e.g. lysine, isoleucine, leucine, threonine, valine, tryptophan, phenylalanine, methionine
  - Minerals
    - e.g. calcium, iron, zinc, vanadium, selenium, chromium, iodine, potassium, manganese, copper, magnesium
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## Possible mechanisms for increased nutrient bioavailability using BioPerine®

- Non specific mechanisms promoting rapid absorption of nutrients
  - Increases blood supply to the GI tract
- Water-soluble vitamins
  - Increases emulsifying content of the gut
- Fat-soluble vitamins
  - Increases active nutrient transport

## Average daily consumption of piperine with black pepper vs. daily requirements for BioPerine®



\*Estimated daily consumption of piperine with black pepper

Data based on doctoral thesis by Shore Scott Kindell, Drexel University, 1984

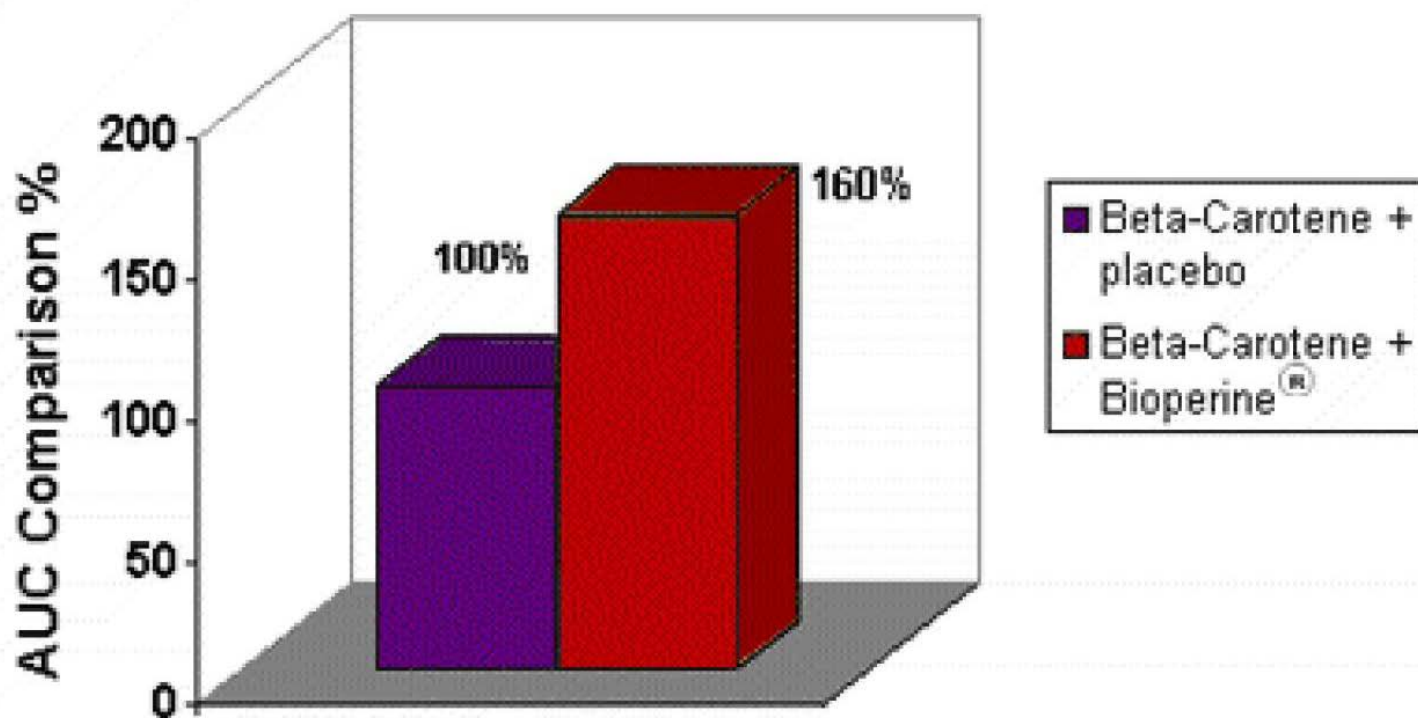
\*\* Estimated daily consumption of BioPerine®

“Once the window of opportunity for piperine-nutrient interaction has been missed nutrient absorption is not enhanced”

-Nutrition Science News, March 1996

**BioPerine® increased the absorption of co-administered beta-carotene in human volunteers**

### Increased Beta-Carotene absorption using 5mg of BioPerine®

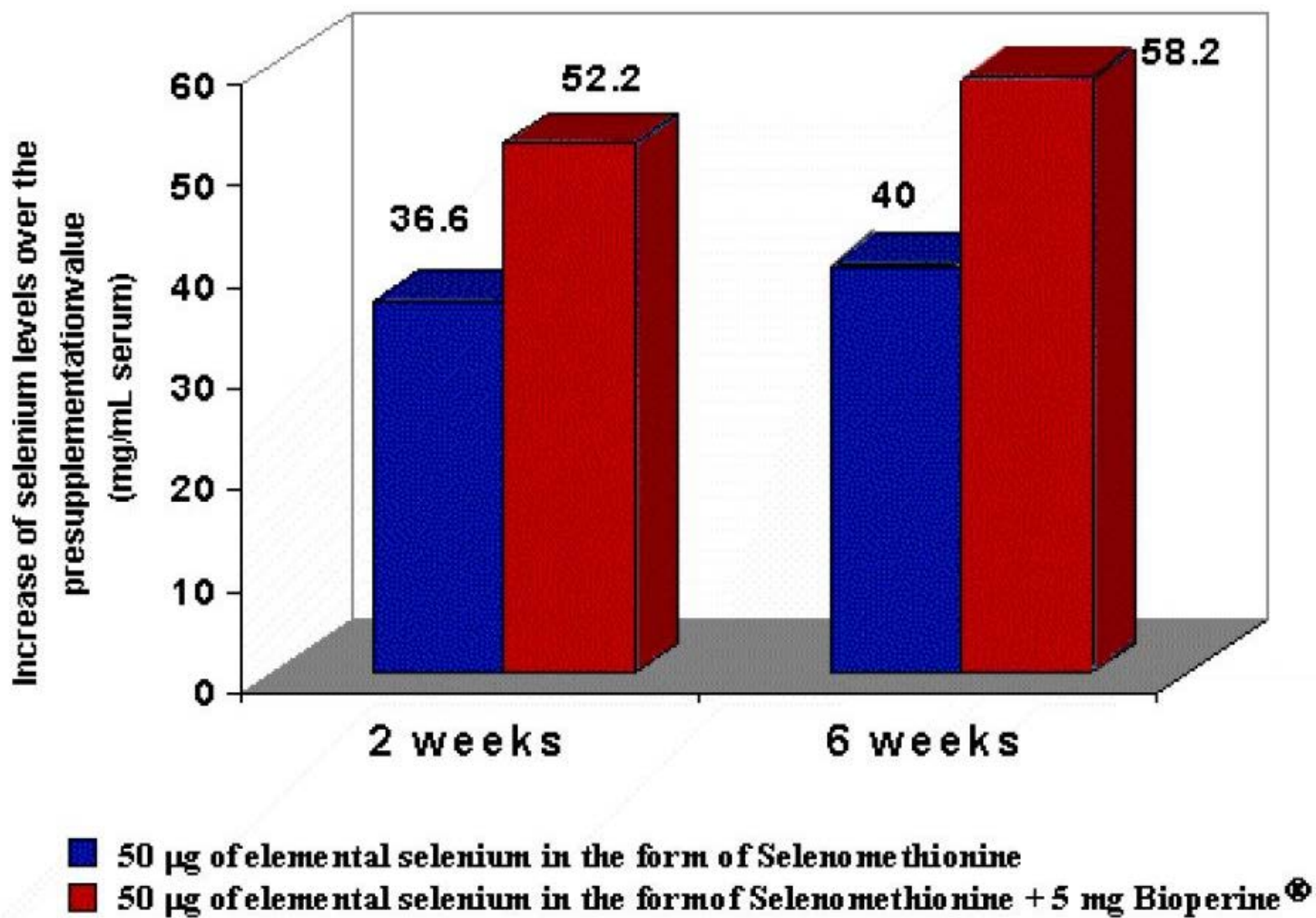


\*Estimated daily consumption of piperine with black pepper

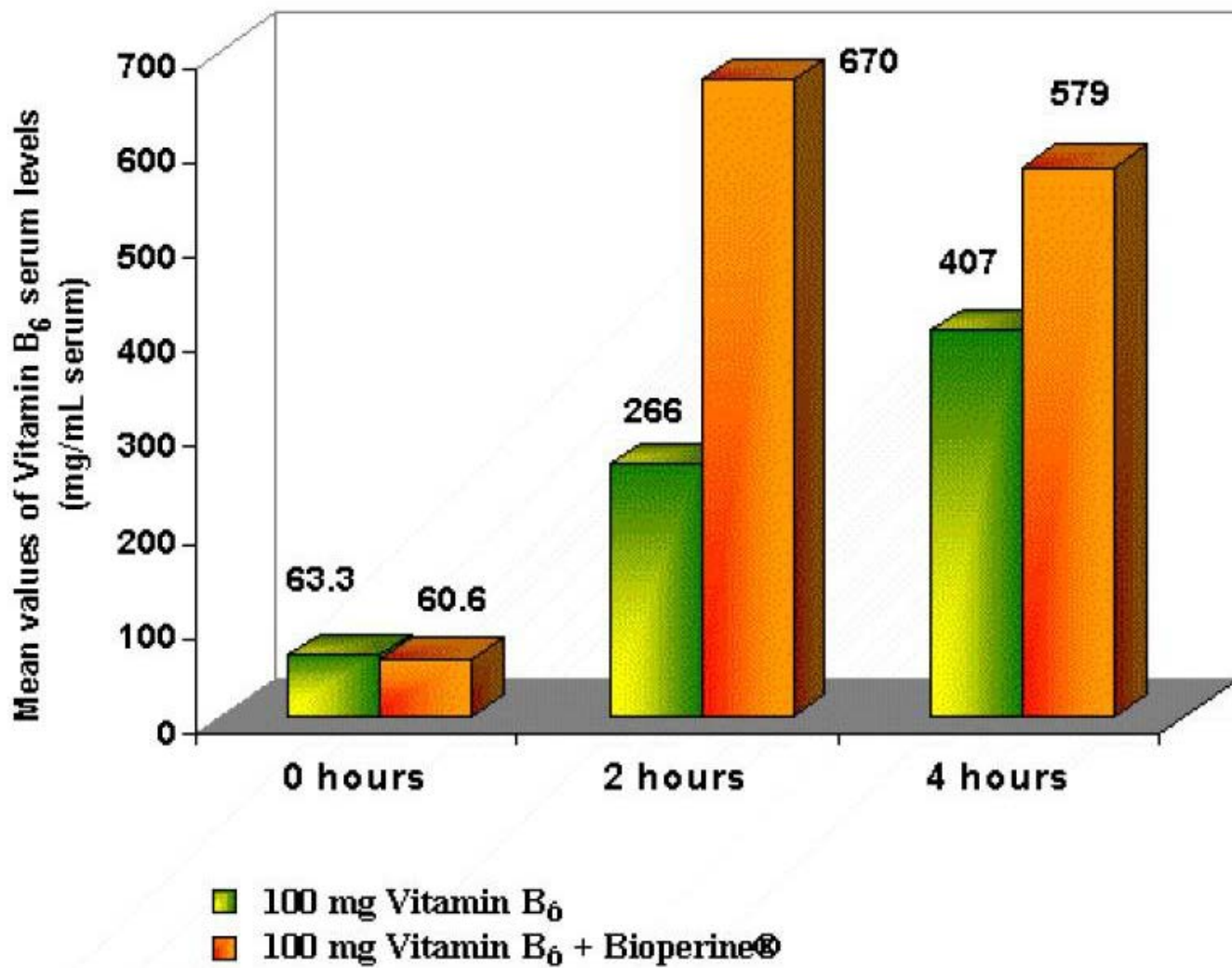
Data based on doctoral thesis by Shore Scott Kindell, Drexel University, 1984

\*\* Estimated daily consumption of BioPerine®

**Effect of BioPerine® on serum selenium levels during a 6 week supplementation trial in human volunteers**

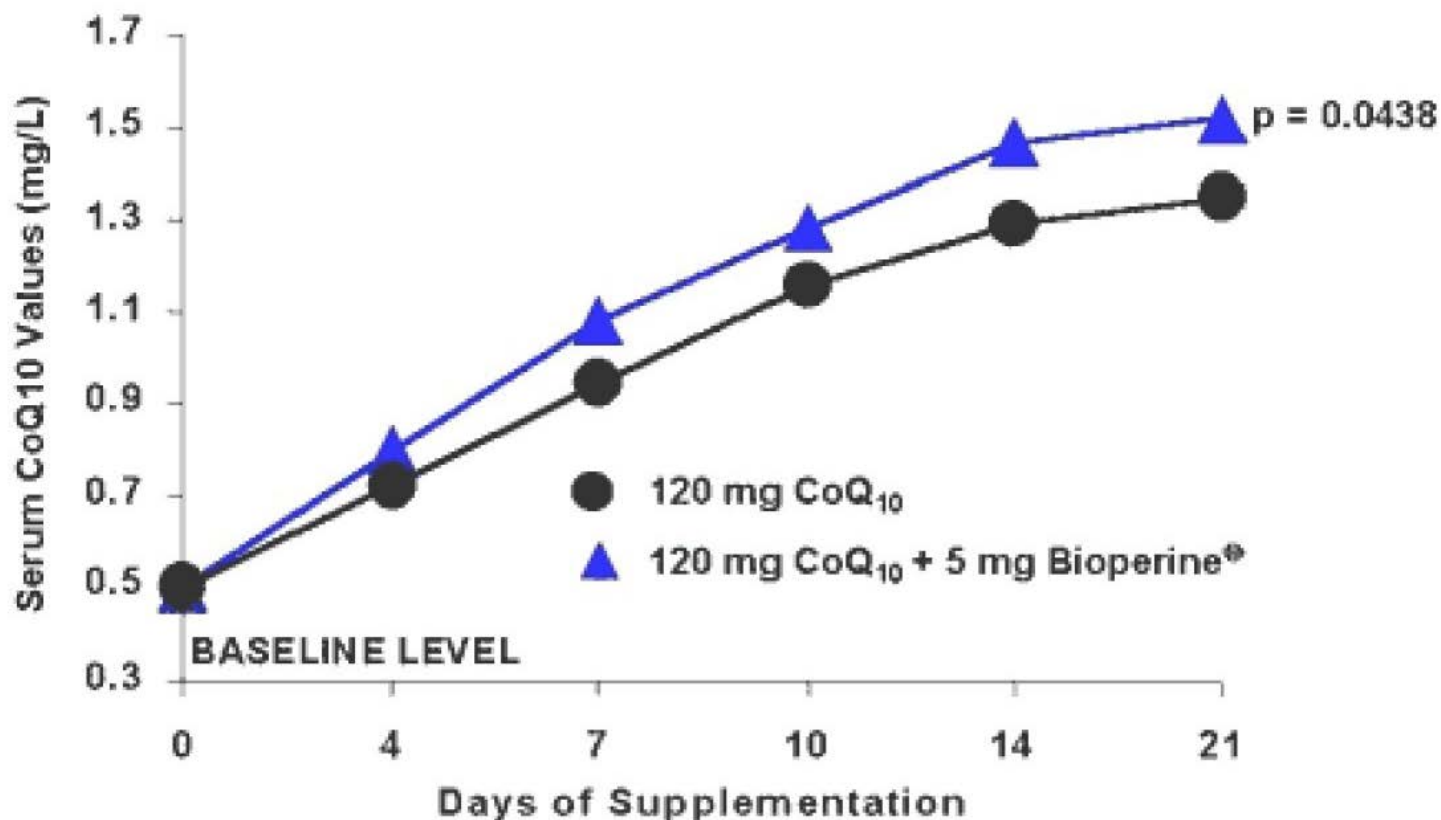


Efficacy of BioPerine® (5 mg) on the bioavailability of Vitamin B6 absorption in human volunteers

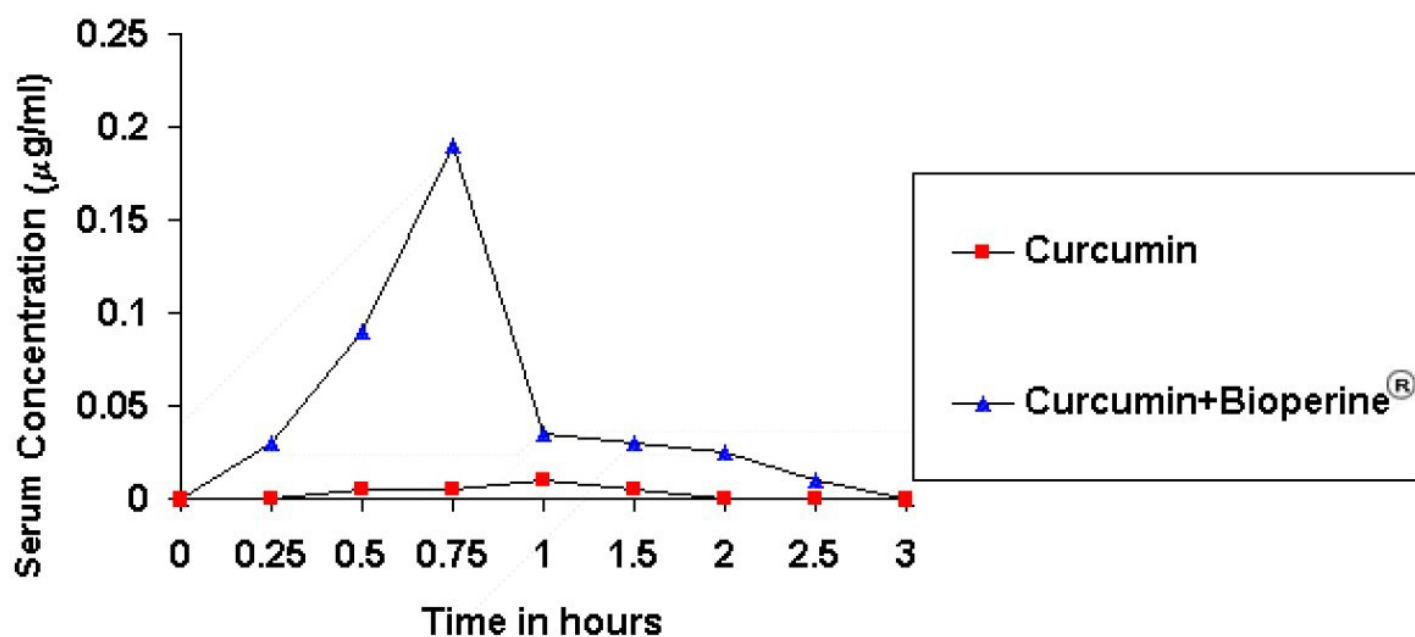


Effect of BioPerine® on serum CoQ10 levels during a 21 day supplementation trial





### Effect of BioPerine® on Serum Concentrations of Curcumin in Human Volunteers



### Multivitamin Bioavailability (+/- Piperine)

- Piperine supplementation significantly increased the bioavailability of vitamin C and vitamin E from the standard multivitamin formulation
- The bioavailability of vitamin B6, B12, Betacarotene, or calcium was improved with piperine supplementation