

# HIGHLY BIOAVAILABLE CURCUMIN

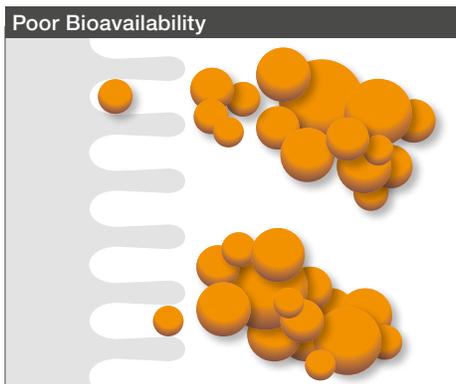
Curcumin and its derivatives, demethoxy-curcumin and bis-demethoxy-curcumin, commonly called curcuminoids, constitute the major coloring matter and the biologically active constituents of the herb *curcuma longa* or turmeric. Turmeric has been widely used for centuries and is a well-known substance used in the traditional Ayurvedic approach to nutrition. Modern science has provided a solid basis for such uses and current clinical trials make curcumin one of the best investigated natural compounds to date. Supplying the body with beneficial amounts of curcumin can be difficult, as it is a very hydrophobic substance and thus poorly bioavailable. With CAVACURMIN®, these problems no longer exist.

The main mode of action is via free-radical scavenging. While the bioavailability of diet-derived polyphenols varies greatly, curcumin is known to show very poor uptake efficiency. Thus, it has been proven difficult to translate the physiological activities of curcumin into clear benefits. Poor absorption in the gut, and rapid metabolism, are the two main reasons for the lack of systemic availability. These circumstances limit curcumin's ability to reach targets that are distant from the gut and exert its beneficial action.

Although it is a helpful strategy to use curcumin in dietary supplements to provide larger amounts of curcuminoids, many products that are available on the market cannot ensure adequate bioavailability.

**The Solution: CAVACURMIN®**

By complexation with the naturally occurring vegetarian oligosaccharide CAVAMAX® W8 gamma-cyclodextrin, which has GRAS

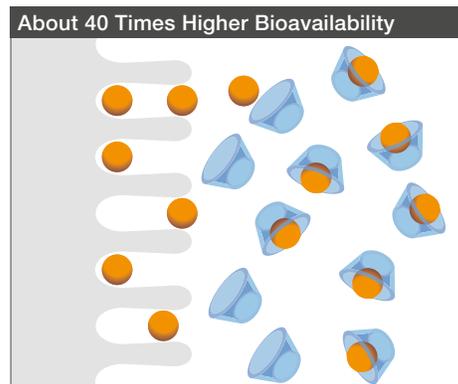


Curcumin extract's molecules are hydrophobic and therefore agglomerate in the human body. As a result, only a few molecules are absorbed in the gut.

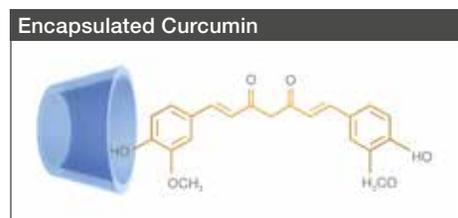
approval and is recognized as a novel food ingredient, WACKER offers an excellent solution for increasing the bioavailability of hydrophobic health-promoting ingredients like curcumin. The special feature of this oligosaccharide is its donut-shaped, three-dimensional structure: it creates an inner hydrophobic cavity which is able to accommodate a lipophilic molecule like curcumin as a "guest." The hydrophilic exterior, on the other hand, ensures compatibility in aqueous systems.

In the presence of water, CAVAMAX® W8 gamma-cyclodextrin leads to molecular dispersions, resulting in much enhanced bioavailability of the hydrophobic curcumin.

Formulation with CAVAMAX® W8 gamma-cyclodextrin is based on simple van der Waals bonds and does not change the nutritional value or functionality of the ingredient. With CAVACURMIN®, WACKER offers highly bioavailable curcumin powder.



By creating a molecular dispersion through encapsulation of curcumin in gamma-cyclodextrin, much larger numbers of curcumin molecules are transported to the epithelial cell membrane.



Gamma-cyclodextrin functions as the hydrophilic carrier for hydrophobic curcumin, which is bound by the inner cavity of the gamma-cyclodextrin.

**Enhanced Bioavailability – How?**

The increased bioavailability seems to correlate with an enlarged surface of curcumin molecules. Pure curcumin extract agglomerates in the human body. Only a few curcumin molecules from the small surface area of the agglomerates will be absorbed, the bigger part is excreted without uptake.

Formerly marketed as CAVAMAX® W8 Curcumin.

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By creating a molecular dispersion through encapsulation of curcumin with CAVAMAX® W8 gamma-cyclodextrin, much larger numbers of these molecules are transported into the upper intestinal tract, where only the curcumin molecules are absorbed into the body.

This explains the about 40 times higher absorption of CAVACURMIN® as shown in

our human bioavailability study (please see additional information sheet).

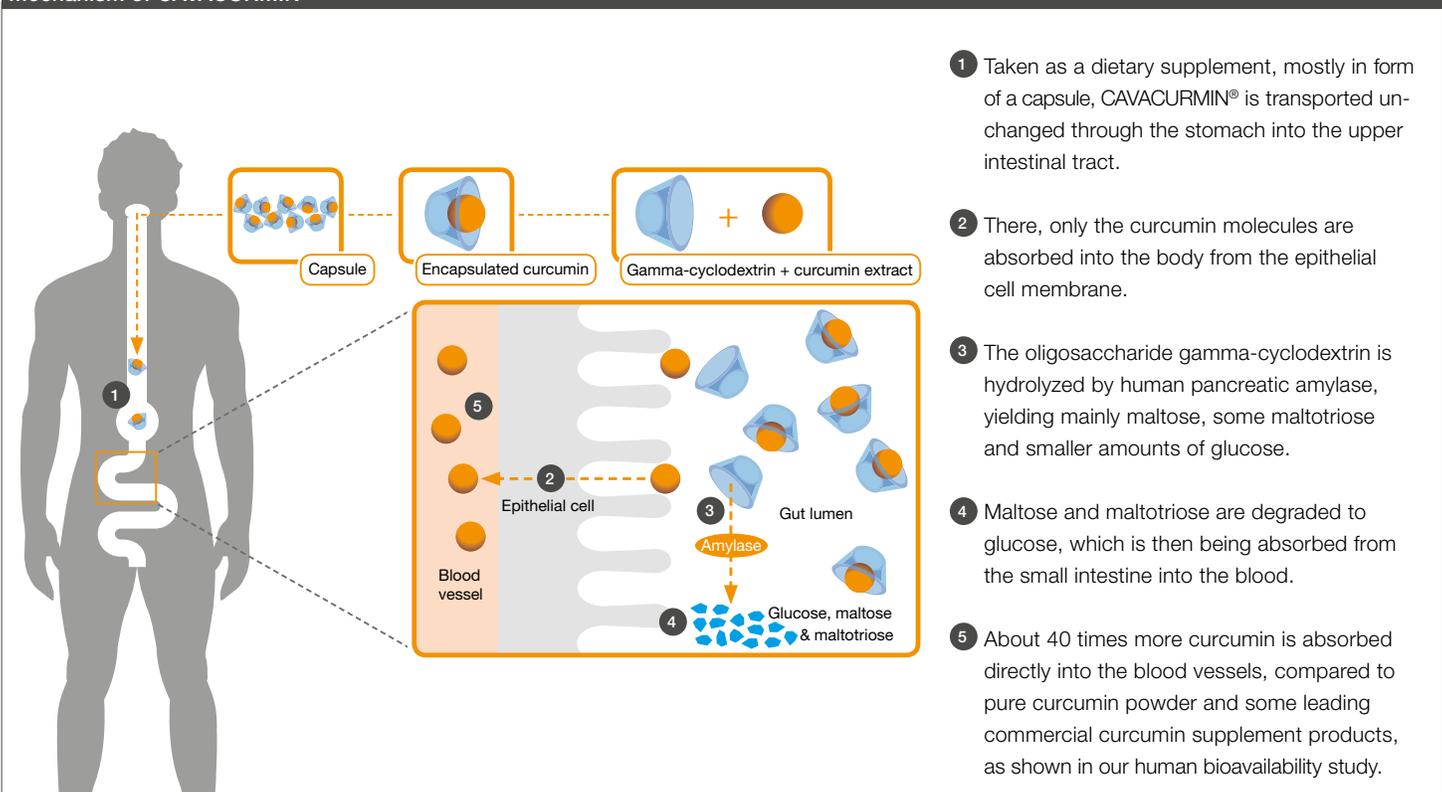
**For a Variety of Applications**

CAVACURMIN® comes as a dry, free-flowing powder. It is thus especially well suited for use in dry or powdery dietary supplement products, such as tablets, capsules and nutritional bars. Since it disperses easily in aqueous systems, it is also available for

use in beverages. CAVACURMIN® is produced using a naturally occurring oligosaccharide (not chemically produced) as a hydrophilic carrier: CAVAMAX® W8 gamma-cyclodextrin.

Our experts look forward to partnering with you to help you create the healthy and bioavailable products of tomorrow.

**Mechanism of CAVACURMIN®**



- 1 Taken as a dietary supplement, mostly in form of a capsule, CAVACURMIN® is transported unchanged through the stomach into the upper intestinal tract.
- 2 There, only the curcumin molecules are absorbed into the body from the epithelial cell membrane.
- 3 The oligosaccharide gamma-cyclodextrin is hydrolyzed by human pancreatic amylase, yielding mainly maltose, some maltotriose and smaller amounts of glucose.
- 4 Maltose and maltotriose are degraded to glucose, which is then being absorbed from the small intestine into the blood.
- 5 About 40 times more curcumin is absorbed directly into the blood vessels, compared to pure curcumin powder and some leading commercial curcumin supplement products, as shown in our human bioavailability study.

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