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# Liposomal Curcumin 600mg

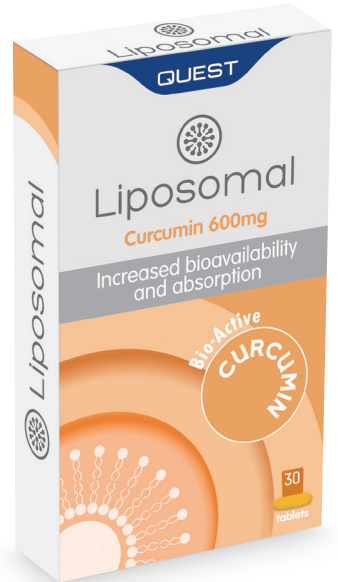
Increased bioavailability and absorption

## Nutritional Information

### One tablet provides:

Liposomal curcumin	600 mg
Providing:	
Curcuminoids	105 mg

Take one tablet daily with food. Swallow with water.



## SUMMARY

- Advanced delivery of oral curcumin.
- High bioavailability and absorption of curcumin.
- Increased cellular delivery of curcumin.
- Highly stable curcumin and protected from degradation.
- Liposomal curcumin is well tolerated.
- Supported by studies and advanced manufacturing processes.

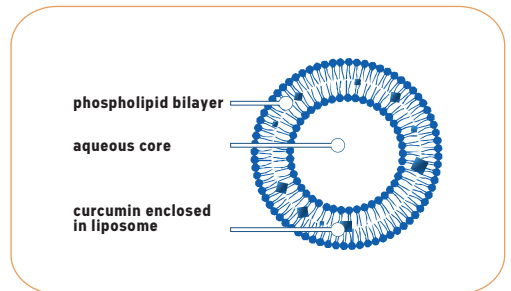
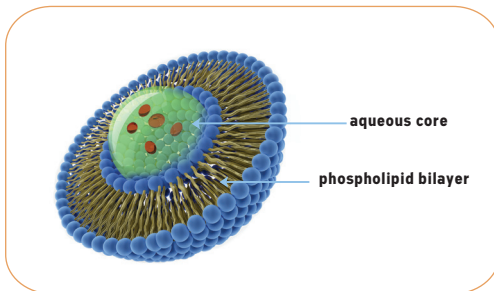
## LIPOSOMES & LIPOSOMAL DELIVERY

Liposomes are a form of lipid-based delivery that promote intestinal absorption, intracellular uptake and bioavailability of active nutrients, such as curcumin. Liposomes are microscopic-sized spherical envelopes or pockets containing an aqueous core. The phospholipids are arranged into a spherical cell membrane like lipid bilayer, known as a phospholipid bilayer.

Liposomes structures can be used for advanced delivery of curcumin, which is then described as liposomal curcumin. The liposomal curcumin is created through a careful manufacturing process resulting in an innovative delivery form of the nutrient with significant advantages for the consumer.

In the case of hydrophobic (oil-soluble) nutrients, such as curcumin, the active nutrient is enclosed within the phospholipids bilayer membrane of the liposome.

### Illustrations of liposomal curcumin structure



## ADVANTAGES OF LIPOSOMAL DELIVERY OF CURCUMIN

The advantages of liposomal nutrients are derived from the liposome structure itself. Curcumin is contained within the phospholipid bilayer and is sealed and enclosed. Liposomal encapsulation provides a barrier around the active curcumin, increasing resistance to digestive enzymes, acidity, intestinal flora, and oxidation.<sup>1</sup> This results in the protection of the curcumin from degradation and oxidation as well as protecting the digestive tract from potential irritation, thereby improving delivery and bioavailability. In addition, interactions between the liposome's phospholipid bilayer membrane and the body's cell membranes offer enhanced cellular uptake through endosomal mechanisms.

- High bioavailability and absorption of curcumin compared with conventional oral forms of curcumin.
- Protection of curcumin against the acid environment of the stomach, oxidation, and degradation.
- Protection of the digestive tract from potential irritation by curcumin.
- Increased transmucosal (oral) uptake and absorption of curcumin.
- Increased intracellular delivery of curcumin.
- High stability of curcumin.
- Cost effective by being able to take a lower dose of curcumin for the same effect.

## LIPOSOMAL MANUFACTURING PROCESS

The Liposomal nutrients used by Quest are supplied by Lipsovit® and manufactured using a carefully controlled manufacturing process and the liposome structures are additionally verified using cryogenic transmission and scanning electron microscopy. Particle size plays a vital role in nanoparticle adhesion to and interaction with biological cells in the body.<sup>2,3</sup> At Quest we use Liposomal nutrients within a particle size of 200-400 nanometres (nm), ensuring they are a highly effective delivery system. The size of the liposomes and their particle size distribution are determined using a LUMiSizer® 651 particle size analyzer.

Image of Lipsovit® liposome structures using cryogenic transmission electron microscopy.

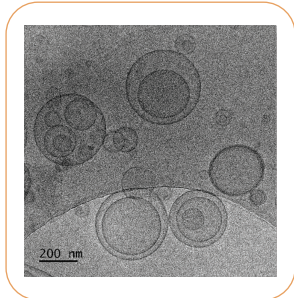
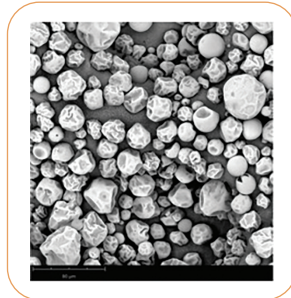


Image of Lipsovit® liposome structures using x1000 magnification under scanning electron microscope.



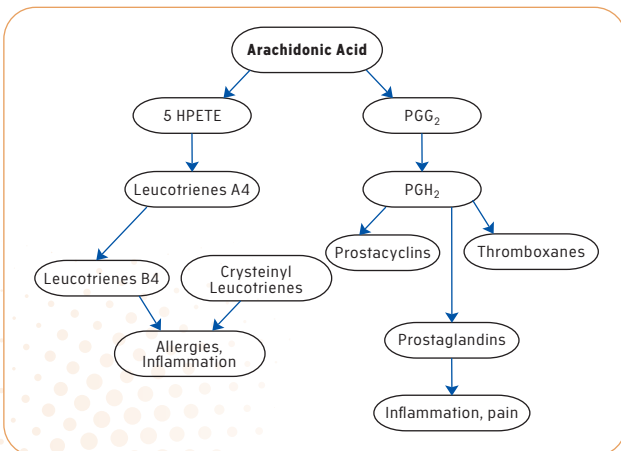
## BENEFITS OF CURCUMIN SUPPLEMENTATION

Curcumin is highly active polyphenolic compound found in turmeric spice, a natural ingredient used for centuries in Asia for medicinal purposes. The most recent scientific interest in curcumin has focused on its anti-inflammatory and antioxidant properties.

### Anti-inflammatory

Curcumin has proven anti-inflammatory properties through its effect on inflammatory pathways in the body.<sup>4,5,6,7,8</sup> Inflammation has been identified in the development of many chronic diseases and conditions.

Curcumin causes a reduction in inflammation in a number of ways. It inhibits NF-κB expression. NF-κB controls transcription of DNA, cytokine (interferon and interleukin) production and cell survival and is the master regulator of inflammation. Curcumin controls the expression of lipoxygenase (5-LOX), cyclooxygenase-2 (COX-2) which are greatly involved in the inflammatory process.



Curcumin also reduces acute and chronic inflammation by mopping up free radicals including reactive oxygen species and reactive nitrogen species. Curcumin regulates the expression of glutathione S-transferase which increases the production of glutathione, the body's primary antioxidant.

## Joint pain & arthritis

A key disease associated with inflammation, both chronic and acute, is osteoarthritis, a chronic joint condition. Osteoarthritis is now recognized as having inflammatory aspects, including elevated cytokine levels, as well as potentially being connected with systemic inflammation.<sup>9,10</sup>

Pre-clinical studies and initial clinical trials have shown that curcumin may help in the management of a wide-range of inflammatory diseases, for example improving joint pain and function in rheumatoid and osteoarthritis patients.<sup>11,12,13,14,15,16</sup>

## Antioxidant and detoxification of liver

Curcumin's antioxidant effects have been the most widely explored in the literature. Various in vitro and in vivo studies have been conducted, and the antioxidant potential of curcumin has been attributed to its chemical structure.<sup>17,18</sup> Given that oxidative stress triggers chronic inflammation, there is a close relationship between curcumin's antioxidant properties and its anti-inflammatory effects.

Studies also suggest that curcumin induces phase 2 liver detoxification enzymes and facilitates the detoxification process.<sup>19</sup> A fully functioning phase 2 detoxification pathway is essential to maintain equilibrium of the liver and toxic load. Many external factors increase phase 1 detoxification pathway, however it is important that phase 2 detoxification pathway can effectively detoxify the toxic load it is presented.

## Anti-ageing

Inflammation plays a huge role in the ageing process. Curcumin controls NF-κB signalling system and regulates the immune response in conditions associated with ageing and age-related diseases.

## Allergies

Due to the ability of curcumin to snip the 5-LOX chain and prevent the cascade of inflammation, curcumin may be beneficial in reducing allergic responses. This may be particularly beneficial for those with environmental allergies such as asthma, hay fever, dust and animal allergies. Curcumin causes a marked decrease in histamine release in the body.<sup>20</sup>

## HEALTH NEEDS



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DETOX & CELL  
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