

## References

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# C3 Curcumin Complex

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C3 Curcumin Complex is a patented, unique composition of three bioactive, health-promoting curcuminoids: curcumin, bisdemethoxy curcumin, and demethoxy curcumin. These are the strongest, most protective and best-researched constituents of the turmeric root.

Naturally occurring turmeric root powder contains only 5-7% curcumin, while the C3 Curcumin Complex extract is concentrated to contain 95% curcuminoids, among which curcumin represents 70% of the total extract. This means supplementing with C3 Curcumin Complex is far more therapeutic than simply adding turmeric to foods. The crystalline structure of curcumin renders it difficult to absorb in the GI tract, similar to CoQ10. For this reason Designs for Health included lecithin (from sunflower), a powerful emulsifier, to enhance absorption and bioavailability of this formulation. We recommend taking this with a meal that contains fat or with Designs for Health's OmegAvail™ Marine softgels, which act synergistically on inflammation.

Excessive inflammation is a common risk factor for disease occurrence and progression. Inflammation may lead to joint tissue destruction, cancer, cardiovascular events, insulin resistance/diabetes and brain/liver/kidney degenerative diseases. Research shows curcumin helps support a healthy inflammatory response.<sup>8</sup> It was shown to reduce both acute and chronic inflammation caused by physical injury, joint wear and tear (as in osteoarthritis), chronic infections or inadequate antioxidant protection.<sup>1-4, 8, 14, 15, 18, 56</sup>

Curcumin was shown to be more effective than certain NSAIDs in reducing inflammation and pain associated with rheumatoid arthritis<sup>15</sup> or post-operative trauma.<sup>52</sup> It has a better cardiovascular safety profile than aspirin because unlike aspirin, it does not inhibit the arterial protective factor prostacyclin.<sup>18</sup> Curcumin acts on the mother compound NF Kappa beta. By suppressing this inflammatory marker, curcumin has a domino effect that reduces the entire cascade of inflammatory compounds that would be produced thereafter.

Curcumin has an advantage over pharmacological anti-inflammatory agents because it is a powerful antioxidant so it can also reduce COX expression along with being a COX 1 and COX 2 inhibitor. Where NSAIDs are known to have potential GI side effects such as GI bleeding, one study showed that curcumin was able to heal GI injury caused by the NSAID indomethacin.<sup>4</sup> Amazingly, curcumin and resveratrol have been proven to be even stronger anti-inflammatories than ibuprofen and aspirin.<sup>3</sup>

Supplement Facts	
Serving Size 1 capsule	
Amount Per Serving	% Daily Value
Curcumin C3 Complex® ( <i>Curcuma longa</i> )(rhizomes) (containing three curcuminoids: curcumin, bisdemethoxy curcumin, demethoxy curcumin)[standardized to contain 95% curcuminoids]	400 mg *
Sunflower Lecithin	100 mg *

\*Daily Value not established.

**Other Ingredients:** Microcrystalline cellulose, stearates (vegetable source), silicon dioxide.

## Benefits shown in research using curcumin extracts:

### IMMUNE SYSTEM REGULATION

- Inflammation<sup>8</sup> - injury, post-operative<sup>52</sup>, joint wear and tear (osteoarthritis)<sup>56</sup>
- Allergic reactions - asthma<sup>5</sup>
- Autoimmune activity reduction<sup>15, 28</sup> - rheumatoid arthritis and multiple sclerosis in animals
- NK cell activity increase<sup>2</sup>
- Anti-cancer properties - breast<sup>19</sup>, prostate<sup>35</sup>, colon<sup>24</sup>, pancreatic [25], glioma<sup>29</sup>, ovarian<sup>49</sup>

### ANTIMICROBIAL

- Antiviral<sup>6</sup>, Epstein Barr<sup>2</sup> and HIV virus <sup>22,23</sup>
- Antibacterial, antiparasitic<sup>1</sup>

### GI PROTECTION & HEALING

- Stomach ulcer, Crohn's or proctitis<sup>5</sup>

### CARDIOVASCULAR PROTECTION

- Reduces cholesterol oxidation and levels, increases HDL<sup>26</sup>
- Reduces fibrinogen<sup>34</sup>
- Reduces platelet aggregation<sup>18, 37</sup>

### BRAIN PROTECTION

- Reduces brain damage following ischemia (reduced blood flow)<sup>47</sup>
- Reduces development and regression of Alzheimer's disease progression in animal models<sup>46</sup>
- Reduces gliomas (brain tumors)<sup>29</sup>
- Antidepressant effects<sup>16</sup>

### LIVER PROTECTION from alcohol and aflatoxin (peanut fungus)<sup>54, 55</sup>

### TOXIC METAL CHELATOR<sup>53</sup>

- Effective chelator of copper and iron

### ANTIOXIDANT<sup>27</sup>

### BILE SUPPORT

- Enhances bile flow and solubility<sup>39</sup>

## Lowers histamine and improves allergies<sup>5,6</sup>

Curcumin has been shown to decrease histamine release, suggesting that it plays a significant role in exerting both antioxidative and anti-allergic activities.<sup>5</sup> Research shows that curcumin's potential beneficial effect on the allergic response works by inhibiting the production of cytokines affecting eosinophil function and IgE synthesis.<sup>6</sup>

## Curcumin may be helpful for autoimmune conditions.

Curcumin downregulates mediators characteristic of rheumatoid arthritis<sup>15</sup>, reduces disease activity in Crohn's<sup>9</sup> and was shown to reduce disease activity in a model of multiple sclerosis in animals.<sup>28</sup> “*These findings highlight the fact that curcumin inhibits experimental encephalomyelitis by blocking IL-12 signaling in T cells and suggest its use in the treatment of MS and other Th1 cell-mediated inflammatory diseases.*”<sup>28</sup>

Also, by boosting NK cell activity increase,<sup>2</sup> curcumin may enhance the body's ability to fight infections.

There are many studies on curcumin and cancer. For patients undergoing chemotherapy, curcumin does not need to be avoided as it has been shown to enhance chemotherapy effectiveness.<sup>48</sup> Curcumin is the highlight of human clinical trials being performed at the M.D. Anderson Cancer Institute in Houston, Texas.

*“In addition to antioxidation, curcumin could also induce apoptosis by targeting mitochondria, affecting p53-related signaling and blocking NF-kappaB activation. To further dissect its anticarcinogenic mechanisms, a number of curcumin targets were identified. These included the aryl hydrocarbon receptor, cytochrome P450, glutathione S-transferase, serine/threonine kinases, transcription factors, cyclooxygenase, ornithine decarboxylase, nitric oxide synthase, matrix metalloproteinases and tyrosine kinases.”*<sup>40</sup>

Many spices protect the body from bacteria and parasites in food, while boosting the bodies' antioxidant abilities. Research shows curcumin to have antimicrobial activities. Curcumin was shown to reduce transcription of Epstein Barr<sup>21</sup> and HIV virus.<sup>22,23</sup> Curcumin may work to inhibit the growth of Staphylococcus aureus, Staphylococcus albus, and Bacillus typhosus, and is also effective against nematocidal parasite and certain protozoa.<sup>1</sup>

## GI Protection

Curcumin may benefit ulcer, proctitis (inflammation of the rectum common in ulcerative colitis and Crohn's disease) and may reduce leaky gut syndrome.

*“We conclude that antiulcer activity of curcumin is primarily attributed to matrix metalloproteinases -9 inhibition, one of the major path-ways of ulcer healing.”*<sup>4</sup> *“A pure curcumin preparation was administered in an open label study to five patients with ulcerative proctitis and five with Crohn's disease. All proctitis patients improved, with reductions in concomitant medications in four, and four of five Crohn's disease patients had lowered CDAI scores and sedimentation rates.”*<sup>9</sup>

## Cardiovascular Protection

Curcumin may lower total cholesterol, fibrinogen and platelet aggregation, while increasing HDL and decreasing lipid peroxidation.<sup>26, 34, 18, 37</sup>

In one study, “*The effect of curcumin administration in reducing the serum levels of cholesterol and lipid peroxides was studied in ten healthy human volunteers, receiving 500 mg of curcumin per day for 7 days. A significant decrease in the level of serum lipid peroxides (33%), increase in HDL Cholesterol (29%), and a decrease in total serum cholesterol (11.63%) were noted.*”<sup>26</sup> According to another study, “*Our reviewed data show that, in human healthy subjects, the daily intake of 200 mg of the above extract results in a decrease in total blood lipid peroxides as well as in HDL and LDL-lipid peroxidation. This anti-atherogenic effect was accompanied by a curcuma antioxidant-induced normalization of the plasma levels of fibrinogen and of the apo B/apo A ratio, that may also decrease the cardiovascular risk.*”<sup>34</sup>

## Brain Protection

Curcumin pretreatment reduced brain damage following ischemia/stroke<sup>47</sup> and from heavy alcohol intake.<sup>50</sup> Curcumin reduced development and severity of Alzheimer's disease in animal models by reducing plaque aggregation and plaque induced oxidative stress and was even capable of dissociating existing plaque.<sup>17</sup> Its chelating ability for iron and copper ions is also believed to play a beneficial role in reducing the progression of the disease.<sup>53</sup>

*“Initially, we reported the impact of non-steroidal anti-inflammatory drugs (NSAIDs), notably ibuprofen, which reduced amyloid accumulation, but suppressed few inflammatory markers and without reducing oxidative damage. Safety concerns with chronic NSAIDs led to a screen of alternative NSAIDs and identification of the phenolic anti-inflammatory/antioxidant compound curcumin, the yellow pigment in turmeric that we found targeted multiple AD pathogenic cascades. The dietary omega-3 fatty acid, docosahexaenoic acid (DHA), also limited amyloid, oxidative damage and synaptic and cognitive deficits in a transgenic mouse model. Both DHA and curcumin have favorable safety profiles, epidemiology and efficacy, and may exert general anti-aging benefits (anti-cancer and cardioprotective.)”*<sup>46</sup>

## Liver Protection

Curcumin pretreatment was shown to reduce the liver damage induced by alcohol<sup>54</sup> and aflatoxin<sup>55</sup> (the fungal toxin often found along with peanuts/peanut butter).

## How to Take

- Take one capsule per day, or as directed by your health care practitioner.
- There is no upper level of toxicity established for turmeric or curcumin. A range of 200-1200mg/day was used for various applications with significant benefits. The effective dose may depend on the severity of inflammation. One factor that affects inflammation and proliferation is the AA/EPA ratio in cell membranes. The higher the AA/EPA ratio the higher the demand for the inhibition of COX and LOX enzymes, so a higher dose of curcumin may be beneficial.

## Interactions

Individuals on blood thinning therapy<sup>10</sup>, or anyone with gallstones (stimulates bile flow), ulcers, and GI inflammatory conditions should be monitored closely. Not recommended during pregnancy. Inhibits various P450 enzymes.<sup>43</sup> Inhibits growth of lactobacillus<sup>1</sup> so supplementation with probiotics is recommended.