Optimized Curcumin: Myth Versus Fact

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**Introduction:**
Curcumin, the active compound from turmeric, has shown tremendous promise to strengthen the health of millions of people. However, confusion regarding ‘enhanced’ curcumin has recently rose to the top of discussion within the medical research and integrative health communities. With hundreds of curcumin products on the market, it is critical for all of us who impact consumer health to understand why all curcumin supplements are not created equal.

Several factors contribute to the confusion. The myopic view that bioavailability is the end goal, when in fact it is simply a means to achieve efficacy, is one shared by many. This view needs to change. The technical challenges of accurately and precisely measuring curcumin in biological fluids; the lack of experimental and clinical data on most curcumin products; and the efforts of marketers unversed in the objectives and methods of science – all of these are the yarn from which myth is spun.

This publication attempts to clarify some of the conflicting information responsible for the confusion. Supporting information herein is based on a substantial body of published literature on curcumin, in addition to scientific insights sometimes hidden from plain view and reams of data on a specific curcumin product known as Longvida®.

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**Myth #1: All ‘enhanced’ curcumin is bioavailable**

Surprisingly, multiple studies on various ‘enhanced’ curcumin products result in **zero curcumin detected in the blood.** These studies actually measured a different compound -- curcumin glucuronide -- which is an inactive metabolite on its way to be excreted out of the body.

Most curcumin is converted to its inactive glucuronide conjugates in the intestine. However, several studies looking at the bioavailability of ‘enhanced’ forms of curcumin do not actually detect curcumin in the blood. In some cases, only curcumin glucuronide is detected (Baum 2007, Baum 2008, Cuomo 2011).

“There is no evidence that glucuronidated curcumin will cross the blood-brain barrier and in fact, all available evidence suggests that it will be free curcumin that will have the most efficacy,” says Dr. Greg Cole Ph.D., Professor of Medicine and Neurology at UCLA.

“‘There have been two 6-month studies with an ‘enhanced’ curcumin using a dosage of 2-4 grams per day that resulted only in high glucuronidated curcumin in blood; free curcumin levels were below 0.02 uM and too low for the target dose range,’” Dr. Cole said. “Neither trial showed clinical efficacy and there was no impact on inflammation or oxidative damage markers in CSF. We hypothesize that this is because blood levels of free curcumin were too low.” (Baum 2007, Baum 2008)

**Key takeaway:** Curcumin glucuronide is the inactivated form of free curcumin, and is not likely to significantly impact health. Carefully review study publications and watch out for the fine print.

Next page: Myth #2: Improved bioavailability means improved efficacy
Key takeaway: Look for forms of curcumin supported by established efficacy in humans, preferably at a reasonable dose and duration of time.

Fact: Many ‘enhanced’ curcumin products claim higher bioavailability, but have not demonstrated efficacy in humans.

While many products claim to offer increased bioavailability, few may be able to match the promise this should represent.

Clinical results observed in a recent 30-day placebo-controlled randomized clinical trial performed at The Ohio State University. In this study, one capsule of Longvida® Optimized Curcumin containing just 80mg curcumin significantly improved a number of markers, including plasma amyloid-beta and a range of inflammatory and oxidative stress endpoints.

“I think what was interesting about this study is that we saw a number of effects, not just one thing,” said Dr. Robert DiSilvestro, Ph.D, Professor at Ohio State and collaborator on the study. “The kinds of effects we saw for the intervention could conceivably help people of different ages and health status.”

“We looked at beta-amyloid protein, which is thought to be involved with aging and possibly Alzheimer’s disease. We found that it was actually lowered a little bit with Longvida®,” he said. “The effect was not tremendously large, but it was statistically significant and I think important because we gave such a small dose for a relatively short time in a healthy population.”

“One of the big issues when you are talking about any curcumin product is how much actually gets in and does something. In this case, when we gave Longvida at a low dose, we observed a variety of effects. So obviously, a good amount of active ingredient is getting into the bloodstream,” said Dr. DiSilvestro.

“Seemingly, the way Longvida is prepared, which is quite different than most curcumin products, seems to give a very active product that has effects.”

Key takeaway: Stick with products backed by the most stringent standards for quality control and made in a facility certified to conform to Good Manufacturing Practices by a recognized, independent agency. Look for curcumin which fulfills all three critical requirements for bioavailability: solubility, permeability, and stability.

Myth #2: Improved bioavailability means improved efficacy

In fact, most ‘enhanced’ curcumin formulations are not optimized, nor are scientifically studied for bioavailability, efficacy or safety.

Certainly, small increases of bioavailability may be observed when dissolving curcumin or other compounds into fats or oils. This addresses the solubility requirement for bioavailability, yet ignores the other two requirements: permeability and stability inside the body.

“For science-driven technologies, such as the Solid-Lipid Curcumin Particle (SLCPTM) Technology used to make Longvida®, we are simply relying on a precise, natural composition which allows curcumin to do what it does best,” says Blake Ebersole, Technical Director of Verdure Sciences.

“In fact, the inspiration for Longvida is a traditional remedy used in India using turmeric dissolved into warm milk’s suspension of lipid droplets. The whole idea is to optimize and stabilize what nature has already given us – not to change it.”

On the other hand, products containing curcumin with unpurified crude soy lecithin or unknown turmeric volatile aids have not resulted in ‘free’ curcumin in the blood, and only low levels of glucuronidated (inactivated) curcumin (Baum et al 2007, Baum et al 2008, Cuomo et al 2011).

Quality control, especially relating to shelf stability, impurities such as synthetic components, residual solvents and heavy metals, may also impact efficacy and safety. Every batch of material should be independently tested to conform to the most stringent standards, and facilities must be certified to comply with Good Manufacturing Practices.

“A crucial problem I see, seems to be the inability for quality control/standardization of ‘oils’ and lipids added to curcumin, says Dr Sally Frautschy Ph.D., Professor of Neurology at UCLA. “Mixing just any oil or any phospholipid, at any dose, isn’t going to get you the correct complex or the correct ratio that maximizes free curcumin delivery.”

“Curcumin is not a ‘one-size-fits-all’ compound. To be truly optimized, trial and error with different approaches proved to be essential, in our experience. In our experience we have seen no effective ‘turnkey’ technology that appears to be optimized for curcumin,” added Ebersole. “Longvida® Optimized Curcumin is the result of nearly 200 different formulas tested in live bioavailability models. As we have observed, lots of lipid-curcumin formulas that were tested while developing Longvida simply did not perform well.”

Key takeaway: Stick with products backed by the most stringent standards for quality control and made in a facility certified to conform to Good Manufacturing Practices by a recognized, independent agency.
Myth #4: Safety studies are not necessary for ‘enhanced’ curcumin

Fact: Systematic safety trials along with markers evaluating safety in clinical trials should be performed to understand whether ‘enhanced’ forms are safe.

Curcumin has a long history of use. It is an approved food additive and coloring by the U.S. FDA and equivalent global health agencies, and has undergone hundreds of studies supporting its safety during continuous dosing.

However, long-term safety studies should be performed on ‘enhanced’ forms of curcumin to understand whether increased absorption is safe. Unfortunately, few ‘enhanced’ curcumin formulations are backed by supporting long-term safety studies, such as chronic dosing trials and placebo-controlled human trials.

“If you go high enough in dosing with more bioavailable curcumin, you may be able to produce some toxic effects. This should be expected of any drug with any real potency,” says Dr. Cole. “All of the new formulations claiming higher bioavailability will need to produce toxicology data.”

“Longvida contains all generally recognized as safe (GRAS) ingredients, and is one of the few ‘enhanced’ curcumin products available that is supported by chronic-dosing toxicity data,” explained Ebersole. “Further, clinical research, in addition to numerous case reports, has consistently demonstrated its very strong safety profile.” (Dadhaniya et al 2011, DiSilvestro 2011).

“The main advantage of Longvida® is that high doses of curcumin are no longer needed,” he said.

Key takeaway: Ask for systematic, chronic-dosing safety studies of any ‘enhanced’ supplement.

Myth #5: If a study is “peer-reviewed”, then the data is reliable

Just because data is published in peer review, does not make it authoritative — or even accurate. In fact, much of the published literature on bioavailability of ‘enhanced’ curcumin products is lacking in the use of basic scientific method.

The following examples illustrate this point:

- Statistical analysis is at the root of good science. However, multiple papers evaluating the bioavailability of ‘enhanced’ curcumin do not perform even the most basic statistical analysis such as the Student’s T-test. Without statistics there can be no reliable conclusions made about an observation.

  “We have found variation in different subjects’ blood level responses to the same dose, which means you have to look at statistics and group responses in order to report anything meaningful,” said Dr. Cole.

- While in vivo absorption models may not directly reflect what happens in humans, animal absorption data typically approximates human absorption data based on dosing relative to body weight. However, animal data available on some ‘enhanced’ formulations differ exponentially from accompanying human data, calling into question the credibility of results.

  “In another study, ‘negative control’ groups who ingested regular curcumin powder (typically undetectable in plasma) exhibit plasma levels exponentially higher than those found by most any other research groups.

- In some of the published papers on ‘enhanced’ curcumin, the study material allegedly used was not named in the publication.

These observations call into question the validity of the scientific methodology and interpretation of the data.

Key takeaway: Scientific findings are only meaningful when interpreted correctly, using sound statistical analysis and strong scientific principles.
Conflict of Interest Statement:
University researchers conducting peer-reviewed research on Longvida® Optimized curcumin have no financial or commercial interest in Longvida® or Verdure Sciences. Rigorous scientific research on Longvida® continues to be conducted by highly qualified scientists at top universities, and funded by public health agencies such as NIH and private collaborators.

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