

## Review of Dr. Mercola® Liposomal Vitamin C by LivOn Laboratories Inc.

Over the years, Dr. Joseph Mercola has done a commendable job of promoting natural ways to maintain good health. He is highly regarded by millions of people for the information he has shared with the public regarding the dangers of vaccines and fluoride, the benefits of proper nutrition and supplements, and more.

This is why we were disappointed to see the deceptive information Dr. Mercola recently released in promotion of his company's new Liposomal Vitamin C dietary supplement.

The fact is: The product is NOT liposomal. In other words, there are NO liposomes in it.

### To explain...

The webpage promoting Dr. Mercola® Liposomal Vitamin C<sup>1</sup> leads with one of Dr. Mercola's famous fear-inducing headlines: **"Beware: Many Vitamin C Supplements Contain These 6 'Red Flags'" No Matter how good your vitamin C is, if it contains any of these red flags you may not be getting the full benefits of vitamin C. Try my new supplement instead...**

This is clearly the start of a sales pitch, but we have come to expect reasonably good information from Dr. Mercola, and we continue reading.

The actual discussion starts with good information on the benefits of the different types of antioxidants, the fact that people have lost their ability to produce their own vitamin C, and how to get the 'grandfather' of antioxidants – vitamin C – into your body.

So far, so good.

Then the site goes into information on Liposomes – what they are, how they work in the body, and the advantages of liposomal absorption. Dr. Mercola even says *"the research is now quite clear that one of the best and most practical ways to supplement your diet with oral vitamin C is with a liposomal form of vitamin C."*

We couldn't agree more!

Next there is a section titled: **My Uncompromising Checklist for the 'Grandfather' of Antioxidants.**

This is where we start to see the good information unravel. While Dr. Mercola typically gets it right, it's clear his team – and his manufacturer - have a lot to learn when it comes to the proper use of liposome technology.

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<sup>1</sup>Vitamin C page of Dr. Mercola's website was last visited on May 30, 2013.

## Does Dr. Mercola® Liposomal Vitamin C Get a ‘Checkmark’ Next to “Be produced using liposomal technology”?

When we received our first order of Dr. Mercola® Liposomal Vitamin C, we immediately sent a bottle to the experts at a leading liposome technology laboratory.<sup>2</sup> We asked the lab to conduct a characterization analysis, and test the product’s liposome encapsulation efficiency. These analyses would give us more information about the physical characteristics of the product, and tell us if Dr. Mercola® Liposomal Vitamin C truly is a liposomal product.

In the final report, the lab described the material inside of the capsule as a “thick, non-running paste” and not characteristic of a liposomal product because of one surprising thing: there does not appear to be any significant amount of water in Dr. Mercola® Liposomal Vitamin C, if any at all. This lack of water can be seen in the texture of the paste, which is coarse and gritty. If the vitamin C crystals were properly dissolved and encapsulated in liposomes, the material inside the capsule would be smooth.

This lack of water is critical, because the first and most basic rule of Liposome Encapsulation Technology is this: *“In order to produce liposomes (of whatever kind) lipid molecules must be introduced into an aqueous environment.”*<sup>3</sup>

The most commonly used aqueous material in the formulation of liposomal dietary supplements is water. But water is not listed anywhere on the label for Dr. Mercola® Liposomal Vitamin C, and neither is any other solution containing water.

So while the sunflower lecithin gives Dr. Mercola® Liposomal Vitamin C the *potential* to be a liposomal product, mixing the lecithin with vitamin C is not enough to create liposomes. There must also be a sufficient amount of water and a bona fide liposomal manufacturing process.

Large scale liposomal manufacturing processes are time consuming, expensive and require a high degree of sophisticated technology and equipment. This is one reason why real liposomal products cost 2-3 times more than non-liposomal supplements. This may also be why Dr. Mercola chose not to distribute a real Liposomal Vitamin C product.

### Soy vs Sunflower – What Dr. Mercola Doesn’t Tell You...

If it wasn’t enough to sell a product as “liposomal” when it is not liposomal, Dr. Mercola then goes on to attack the safety of ingredients used in actual liposomal products. The third bullet point in **My Uncompromising Checklist for the ‘Grandfather’ of Antioxidants** is, **Include a non-soy emulsifier**, and

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<sup>2</sup> Per LivOn’s confidentiality agreement with the laboratory, we are unable to disclose the name of the laboratory that analyzed Dr. Mercola® Liposomal Vitamin C.

<sup>3</sup> Torchilin, V. & Weissig, V. (2003) *Liposomes, Second Edition*. Oxford: Oxford University Press. p.4

Dr. Mercola details his reasoning in the section headed **Why I Recommend Avoiding Soy-Based Emulsifiers**.

In this section, Dr. Mercola uses general statements about the phytochemicals contained in unfermented soy as his reasons for why *“soy lecithin has a plethora of potential health risks.”*

We understand that a very high intake of soy ingested as food *may* contain small amounts of debatably undesirable substances. But these substances are not often found in high quality, non-GMO soy lecithin or highly purified phospholipids derived from soy lecithin. A moderate intake of high quality soy lecithin or highly purified phospholipids does not pose any of the health risks Dr. Mercola® lists. In fact, the benefits of the phospholipids found in lecithin, which have been heavily documented since the early 1900’s, far outweigh any potential risk associated with the ingestion of soy lecithin.<sup>4</sup>

Perhaps the most telling part of this section is what Dr. Mercola doesn’t say: most of the natural chemicals he is concerned about in soybeans are also in sunflower kernels, the source of the sunflower lecithin used in Dr. Mercola® Liposomal Vitamin C. Like soybeans, sunflower kernels are well known to have protease inhibitors, phytates (phytic acid), saponins, isoflavones, oxalates and more.<sup>5</sup>

If Dr. Mercola believes soy-based emulsifiers present a “plethora of potential health risks” because of the natural chemicals listed on his website, wouldn’t the same risks apply to sunflower-based emulsifiers?

### **Soy Lecithin is Not Simply Used as an Emulsifier in Liposomal Products.**

We’ve established Dr. Mercola® Liposomal Vitamin C is not a liposomal product, and the information on the website related to soy and sunflower lecithin is less than complete. There is one last thing we would like to clear up...

In the Section titled **Why I Recommend Avoiding Soy-Based Emulsifiers**, Dr. Mercola says *“Many supplement manufacturers use soy lecithin as an emulsifier in their vitamin C formulas.”* Then he goes on to say *“sunflower lecithin was used in the formula [Dr. Mercola® Liposomal Vitamin C] as an emulsifier...”*

The truth is that many liposomal manufacturers use soy lecithin as a source of phospholipids, which are necessary for the formation of liposomes, and not merely as an emulsifier.

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<sup>4</sup> Kullenberg et al.: Health effects of dietary phospholipids. *Lipids in Health and Disease* 2012 11:3

<sup>5</sup> Dr. Katherine Phillips of the Virginia Polytechnic Institute and State University compiled a comprehensive paper that covers the range of phytochemicals found in sunflower kernels in her Final Report on the “Phytochemicals in Sunflower (*Helianthus annuus*)” from April 2000. This paper can be downloaded from the National Sunflower Association at <http://www.sunflowernsa.com/seed/sunflower-kernels-in-bakery-foods/phytochemicals-in-sunflower-kernel/>.

We have analyzed many commercial and homemade products over the years, and have found that many of them are emulsions. An emulsion is simply a suspension of tiny droplets of one liquid in a second liquid. By making an emulsion, one can mix two liquids that ordinarily do not mix well, such as oil and water. An emulsifier is used to stabilize the emulsion, which prevents the liquids from separating. When we refer to a “liposomal” product as an emulsion, we are referring to the fact that nutrients are simply mixed with a small amount of phospholipids or lecithin, and water. There are very few liposomes in emulsions, if any at all.

One indicator of an emulsion is the amount of phospholipids or lecithin in the product. For proper liposome encapsulation, it’s ideal to have at least an equal amount of phospholipids and nutrients. In the case of Dr. Mercola® Liposomal Vitamin C, sunflower lecithin is listed as “Other Ingredients,” and is not quantified.

This listing, along with the lab analysis of Dr. Mercola® Liposomal Vitamin C, tells us there is not enough phospholipid material to create a significant number of liposomes, even if water was included and the production process was otherwise appropriate. So it looks like Dr. Mercola is telling the truth about the purpose of the sunflower lecithin – it was merely used as an *emulsifier*.

### **The Bottom Line**

As a leading provider of liposomal supplements since 2004, LivOn Labs stands by this Review and the statements we’ve made. We know liposomal supplements have the potential to help people all over the world maintain good health. We believe in the positive effects of fair competition, and we support the efforts of companies who provide high-quality liposomal dietary supplements at a fair price.

But Dr. Mercola® has done a great disservice to his followers and the entire dietary supplement industry by completely misrepresenting Dr. Mercola® Liposomal Vitamin C as a liposomal supplement. Users of Dr. Mercola® Liposomal Vitamin C will pay an above-average price for a basic ascorbic acid/lecithin supplement and they will not experience the potentially exceptional health benefits offered by products that use real Liposome Encapsulation Technology (LET).

To learn more about what real liposomal supplements look like, and why they cost around \$1/dose, we encourage you to check out **LivOn’s Guide to Identifying High-Quality Liposomal Supplements** at [www.livonlabs.com](http://www.livonlabs.com).