

# Nano-Sized Emulsions

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A clinician asked me the other day if I had any insights on why Bio-DK Mulsion or any other Biotics Research emulsified nutrients are better than competitive nano technology brands. My immediate response was that doctors have shared with me for years that when re-testing blood levels, they have never seen a vitamin D level that did not increase when using Biotics emulsified products.

We know that due to the American diet, at least 30% of the patients that walk in your door have biliary stasis, biliary insufficiency, or a fatty liver. Even if people are getting high-quality fat-soluble nutrients, can they emulsify them to the point where they can be absorbed by the body?

So, I thought it might be a good idea to review some concepts on why emulsification is not only more cost effective for the patient, but emulsification is more consistent with nature. In nature, we know that the oils in seeds, nuts, fruits, and mother's milk are in an emulsified form. Once in that emulsified form, the oils can then go into the



lymph system where every cell in the body is bathed. Biotics' emulsified particles are small enough to go directly into the lymph system but not so small that they may create cellular membrane disruption.

So, let's talk about size for a moment. Biotics uses natural food grade gums as their emulsifying agents. By using food as the emulsifying agent, the average particle size is 0.5 microns. To give you perspective, Biotics' particle size is approximately 1/10 the size of a red blood cell. 0.5 microns is also the same as 500 nanometers (nm). The visible light spectrum is from

400-700nm. This is significant because emulsified oil particles 500nm and above will reflect light and are not clear. Whereas, the emulsified droplets are white in appearance in solution. Particles below 400nm will not reflect visible light. Visible light will pass through those solutions and appear clear.

Commercial companies give us the option to use the oil itself, or micellized, emulsification, liposomal, and micro-emulsification processes. Micelles are created by mixing substances, in this case oil, with a detergent-like substance which creates a nano-sized particle. This smaller

than light sized particle is clear and invisible to the eye and goes directly into the blood stream. Theoretically, this is a great way to raise blood levels. However, the bigger question is, "What are the side effects of this detergent-like substance?" Many companies use a substance called carboxymethylcellulose (CMC) or Polysorbate 80 commonly known as Tween. An in vivo study in nature found Tween consumption induced low grade inflammation and obesity or metabolic syndrome in mice and promoted robust colitis in mice predisposed to this disorder. Tween dramatically altered the microbiota composition in both facial and intestinal bacteria. Another study showed Tween lowered the antibacterial efficacy of several antimicrobials as well as the fat-soluble antibacterial compounds. Also, "Tween can stimulate biofilm growth for staphylococcus aureus when added to mature biofilms." Some studies have shown that Tween can cause leaky gut by dysregulating or affecting the permeability of cell membranes.

So yes, they may increase blood levels but at what cost? Unfortunately, all emulsions are not created equal! To ensure that Biotics' Bio-AE Mulsion contained the smallest emulsion particles, Biotics purchased all available emulsified vitamin A products on the professional market to check particle size. You can see by the samples, that there is a big difference in particle size and consistency. The Biotics emulsion is consistent throughout the entire slide. This consistent small particle allows the emulsions to bypass the biliary system and go directly into the lymph system where every cell is bathed.

One of the concerns with nano-sized particles is that if they are too small, they can get into cellular areas that may not be prepared to handle large quantities of a concentrated substance. You can see a link to a study about comparing 100,000 I.U. of emulsified vitamin A and 100,000 I.U in a micellized form. With this amount of vitamin A, obviously all groups of

mice died. However, the defense systems of the mice taking the micellized forms of vitamin A were completely overwhelmed. Diarrhea ensued, and they died. The mean survival time for the micellized vitamin A group was less than a day compared to 6 days for the emulsified group. The particle size of Biotics' emulsions consistently hover right around 0.5 microns which technically makes them a micro-emulsion. This means the emulsified particles are small enough to go directly into the lymph system but not so small that they may create cellular membrane disruption.

The emulsification technology Biotics employed has been safely and effectively utilized for over 40 years. The philosophy at Biotics Research has been to emulsify with food grade materials any fat-soluble vitamin, botanical, or food that has therapeutic value. So, vitamins A, D, E, K, Coenzyme Q10, ADP, and curcumin are all in emulsified forms. We know Coenzyme Q10 must be emulsified by the liver to be absorbed. For example, 30mg of emulsified CoQ10 raised blood levels equal to 90mg of a dry form of CoQ10.

Biotics Research's emulsified fat-soluble nutrients possess the smallest particle sizes of commercial emulsions tested. They have equal or greater uptake and bioavailability than micellized products. More importantly, Biotics micro-emulsions do not contribute to toxicity issues. As a bonus, Biotics' emulsions are the most cost-effective forms of fat-soluble nutrients on the market. And since researchers estimate at least 30% of the patients that walk in your door have biliary stasis, biliary insufficiency, or a fatty liver, your patients will feel the difference in their health and in their wallet.

Thanks for watching. I look forward to being with you again next Tuesday.