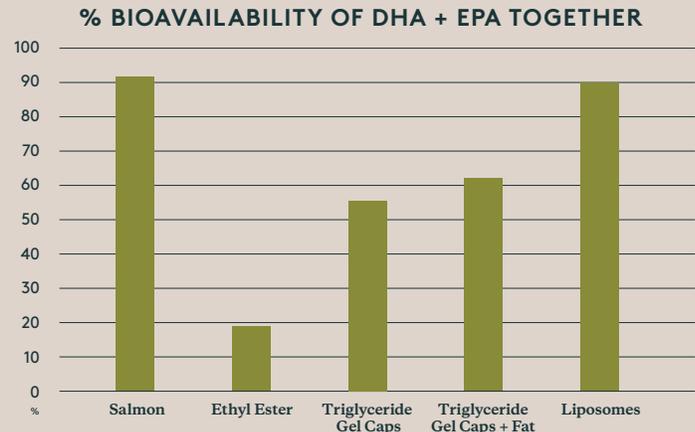


Bioavailability of Needed's Omega-3 Liposomal Powder mimics the best natural sources, far exceeding that of gel caps.

A recently completed long chain fatty acid plasma PK study with Huntington Medical Research Institute evaluated the absorption benefits of Needed's liposomes against triglyceride gel caps. Both the liposomes and the gel caps contained Omega-3 DHA and EPA triglycerides from algae (i.e. where fish naturally get their DHA and EPA). The study also compared the absorption of DHA and EPA from the liposomes against published norms for DHA and EPA uptake from whole oily fish and ethyl ester gel caps.

The study demonstrates that liposomes improve the uptake of DHA and EPA:

- to nearly match the DHA and EPA absorption when consumed in whole oily fish like salmon
- to nearly 1.7x the absorption of DHA and EPA together from the best triglyceride gelpcaps
- to nearly 5x the absorption of DHA and EPA together from the most common ethyl ester gel caps gelpcaps



LIPOSOMES ENHANCED ABSORPTION OF DHA AND EPA IN PLASMA CONCENTRATION

When analyzing absolute changes in plasma concentration, the liposomes enhanced absorption of DHA by almost 80% and EPA by 35%, as compared to triglyceride gel caps. This held true for both Cmax and AUC to 8 hours. For each dose form, the relative concentrations of DHA and EPA were 2/3 and 1/3. Thus, for the liposomes compared to the triglyceride gel caps, there is a weighted average 1.65x increase in absorption of these long chain fatty acids.

LIPOSOMES GENERATED RAPID APPEARANCE OF DHA AND EPA IN PLASMA

Additionally, the liposomes generated a rapid appearance of the DHA and EPA in plasma as compared to the triglyceride gel caps. For DHA and EPA, respectively, the rate of increase in plasma (as % over baseline) is almost 3.0x and 1.4x greater.

LIPOSOMAL ABSORPTION EXCEEDS HIGH-FAT DIETARY COMPARISONS

Previous attempts to improve uptake of triglycerides to match levels in oily fish have relied on high potency triglyceride gel caps consumed with 300+ calories of fat (44 grams, equivalent to 3 tablespoons of butter). For EPA, but not DHA, consumption with this high fat meal provided enhanced uptake to achieve plasma levels close to those seen with intake of natural food based sources (i.e. the oily fish). For, DHA, even taking with the high fat meal could not replicate natural absorption rates.

Needed's liposomes are made in partnership with BioUp, the leading experts in liposomal delivery

¹ Lawson and Hughes 1988 (a) Human Absorption of Fish Oil Fatty Acids as Triacylglycerides, Free Fatty Acids or Ethyl Esters BBRC (1988) 152(1) 328-335

² Lawson and Hughes 1988 (b), Absorption of Eicosapentaenoic Acid and Docosahexaenoic Acid from Fish Oil Triacylglycerides or Fish Oil Ethyl Esters Co-ingested with a High Fat Meal BBRC (1988) 156(2) 960-963

³ Harris et al (2013) Comparative effects of an acute dose of fish oil on omega-3 fatty acid levels in red blood cells vs plasma: Implications for clinical utility. Journal of Clinical Lipidology (2013) 7, 433-440

⁴ Lawson and Hughes 1988 (b), Absorption of Eicosapentaenoic Acid and Docosahexaenoic Acid from Fish Oil Triacylglycerides or Fish Oil Ethyl Esters Co-ingested with a High Fat Meal BBRC (1988) 156(2) 960-963

To learn more about Needed's Omega-3 Liposomal Powder, email practitioners@thisisneeded.com

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