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Acids and Health in Frankfurt, May 2005.

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“It is tiring to hear claims that omega-3-acid triglycerides are more bioavailable than omega-3-acid ethyl esters”, Prof. Richter says. “These claims come exclusively from companies which are selling omega-3-acid triglycerides and which are now increasingly losing ground against the ethyl ester products which are available in higher concentrations and greater purity.”

Background: Omega-3 acid ethyl esters and triglycerides – what are they?

1. Ordinary fish oil

The important long-chain omega-3-fatty acids (often just called ‘omega-3’) are found almost exclusively in fish in the form of triglycerides. This means that three fatty acids are attached to one molecule of glycerol to form one large molecule. Unfortunately, there are not only omega-3-fatty acids attached in such a molecule, but also unwanted fatty acids such as saturated fats or even omega-6 fats which are opponents of omega-3 in the body. Cholesterol is also present in triglycerides, and depending on the source of fish and its quality, some unwanted contaminants may also be present at undesirable levels, including pesticides, dioxins, PCB’s and heavy metals. The total omega-3 content of normal fish oil is 30% - 35%. The remaining 65% - 70% is unnecessary, unwanted fat.

2. Purified fish oil: ethyl esters

During the last few years, the wealth of data showing the beneficial effects of omega-3 has caused a boom in the sales of these supplements. Manufacturers have wanted to improve the quality by removing the unhealthy components from the fish oil, but this was only possible by splitting the omega-3-fatty acid triglyceride. Fortunately, this process – called re-esterification – is a well-tried, simple process which does not involve the omega-3-acid itself, but only the triglyceride to which it is attached. This is a process which happens in the human body all the time, as fats are digested, absorbed, transported around the body and recycled. Humans are equipped with special enzymes to do just this in our own body; it is nothing new.

It is now possible to physically separate the unhealthy fatty acids from the beneficial omega-3-acids. Separation can be carried out by either, molecular distillation or by Supercritical Fluid Chromatography (SFC), which is the gentler and more environmentally protective process. Both these processes can also remove potentially harmful impurities that might be found in the ordinary fish oil.

After this purification, the content of omega-3 in the oil increases, varying from 50% to more than 90% of omega-3, and there are also differences in the ratio of the two most important omega-3-acids EPA and DHA in the oil. These differences make some ethyl ester oils more expensive than others. In ethyl ester oils, each fatty acid is attached to a simple ethyl molecule. They are now called omega-3-acid ethyl esters.

Ethyl esters are one of the most common forms of fatty acids. The human body knows how to deal with them and has enzymes whose only purpose it is to work with such an ester-connection. Our body can, all by itself, convert triglycerides to ethyl esters and back again. To our body, omega-3-acid ethyl esters are nothing new. Our body may, however, be surprised to get the benefits of omega-3 without the problem created by the impurities.

3. Modified triglycerides

Some companies claim that for the human body, it is easier to absorb triglycerides than ethyl esters. These companies take an omega-3 ethyl ester concentrate and re-esterify it back to the triglyceride form. The result is a triglyceride containing two or three omega-3 fatty acids, or maybe just one omega-3 acid in a place where our body doesn't expect it, and this is something that very rarely occurs in nature.

Are modified triglycerides a natural product?

No. It has been treated in the same way as the ethyl esters, and then an additional chemical step has been added.

Is the product itself more natural than omega-3 ethyl esters?

No. Natural triglycerides usually only contain one omega-3-acid in the middle position of the molecule and two other fatty acids on the sides. Saying that modified omega-3-acid triglycerides are natural is misleading, to put it mildly.

Fact: Most recent studies have been conducted with omega-3-acid ethyl esters. They proved effective. They proved safe.

Fact: There is no convincing data that omega-3-acid triglycerides are more bioavailable than ethyl esters.

But what kind of omega-3 is the best for me?

Any kind of omega-3 is better than no omega-3 at all. The scientific proof for this is overwhelming. Ordinary fish oil may contain contaminants (as explained above), and you will need far more capsules to reach the same amount of omega-3 than with a concentrate (purified fish oil). The most important factor for the quality of an oil is the content of omega-3. It should be at least 60 per cent or higher if possible.

Scientific data indicates that for various health benefits, different compositions of EPA and DHA may be most beneficial. Therefore, to be sure that the product you are buying comes from a respectable company, **do not buy an omega-3 product without clear and understandable declaration of content of omega-3, EPA and DHA!**

Usually, you will fare best with a product which contains equal concentrations of EPA and DHA or a **higher amount of EPA**. Products with a high DHA content may be well suited for pregnant mothers and very small children.

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