



Essential & Non-Essential Fatty Acids

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Literature Education Series On Dietary Supplements

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Chemically, a fatty acid is an organic acid that has an acid group at one end of its molecule, and a methyl group at the other end.¹ Fatty acids are typically categorized in the omega groups 3, 6 and 9 according to the location of their first double bond (there's also an omega 7 group, but these are less important to human health).² Now don't panic if you're not up on your chemistry; this isn't going to be a chemistry lesson. I just wanted you to understand why a fatty acid might be called an omega 3 or omega 6 fatty acid.

The term *essential fatty acid* refers to a fatty acid which the body cannot manufacture, and must obtain from dietary sources. These essential fatty acids were originally designated as Vitamin F, until it was realized that they must be classified with the fats.³ There are two fatty acids designated as essential fatty acids: linoleic acid and alpha-linolenic acid. This does not mean that the other 15 or so fatty acids found in the omega 3, 6 and 9 groups aren't important, just that a healthy body can manufacture them as long as it gets enough

linoleic acid and alpha-linolenic acid. Nevertheless, research demonstrates that there are health benefits to be had by obtaining some of the other *non-essential* fatty acids directly; more on this later. Now let's discuss the roles of essential fatty acids (EFAs) in the body, as well as sources of EFAs

Roles and sources of essential fatty acids

The body uses essential fatty acids (EFAs) for the formation of healthy cell membranes, the proper development and functioning of the brain and nervous system, and for the production of hormone-like substances called eicosanoids (thromboxanes, leukotrienes, prostaglandins). These chemicals regulate numerous body functions including blood pressure, blood viscosity, vasoconstriction, immune and inflammatory responses.⁴

Dietary sources of the omega 6 fatty acids include some leafy vegetables, seeds nuts, grains, vegetable oils and meats. Dietary sources of the omega 3 fatty acids include some vegetable oils, nuts and seeds, shellfish and fish.⁵ Dietary supplement sources of essential fatty acids and non-essential fatty acids include Evening Primrose oil, Borage oil, Flax seed oil and Fish oils (marine lipid concentrate). Now let's take a look at some of these individual dietary supplement sources of essential fatty acids, and the benefits they have to offer.

Evening Primrose & Borage Oils: Sources of GLA

The oils from the Evening Primrose plant and Borage seed are rich in the omega 6 fatty acid, gamma linolenic acid (GLA); as well as EFAs. Although fatty acids are found in significant quantities in a variety of plants, GLA is only found in a few. GLA is a precursor to various natural chemicals found in the body. Among these are prostaglandins, a type of short-term hormone-like substances, which play a variety of roles in the body. Published research on these sources of GLA have demonstrated them to be useful in PMS^{6 7 8 9}, pregnancy and lactation^{10 11}, inflammatory conditions^{12 13}, rheumatoid arthritis^{14 15}, skin conditions^{16 17 18}, stress and performance^{19 20 21 22 23 24}, stress and performance^{25 26 27 28 29 30 31 32 33 34}, as well as migraine headaches.^{35 36} Furthermore, the unique balance of GLA to EFAs in any one of these sources may have a distinct benefit over another source depending on the condition in question. For more detailed information on EPO and BO, read the *Intelligent Supplementation* article “GLA: Gamma Linolenic Acid from Evening Primrose & Borage Oils.”

Fish Oils: Sources of EPA/DHA Omega 3 fatty acids

Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are omega 3 fatty acids (O3FA). O3FA supplements are mostly derived from the oils of coldwater species of fish like salmon, sardines, herring, and mackerel. There are many therapeutic applications for O3FA, primarily due to its cardiovascular-enhancing and anti-inflammatory benefits. Research has shown that O3FA cardiovascular benefits include reducing the risk of atherosclerosis^{38 39 40 41}, modifying cholesterol levels (i.e., increasing “good” HDL cholesterol, while decreasing “bad” LDL cholesterol) and decreasing triglycerides^{42 43 44}, and decreasing high blood pressure.^{45 46 47 48 49} O3FA have also been shown to block the production of certain inflammatory

chemicals in our body. Consequently, studies have demonstrated the ability of O3FA to reduce inflammation in such disorders as rheumatoid arthritis^{51 52 53 54}, asthma^{55 56 57 58}, colitis^{59 60 61 62 63}, Crohn’s disease^{64 65 66}, and Lupus.^{67 68 69} In addition, O3FA have shown to reduce the symptoms of other disorders including angina^{70 71}, migraine headaches^{72 73 74 75}, psoriasis^{76 77 78}, and tinnitus.^{79 80} For more detailed information on O3FA, read the *Intelligent Supplementation* article “Omega 3 Fatty Acids.”

Flax Seed Oils: Sources of Omega 3, 6 & 9 fatty acids

Flax seed naturally contain a complex of different categories of fatty acids, including alpha-linolenic acid (omega-3), linoleic acid (omega-6), and oleic acid (omega-9). Much of Flax seed’s benefits are a function of its alpha linolenic acid (ALA) content, and the fact that ALA can be converted by the body into EPA—the same omega-3 found in fish oil. As a matter of fact research has found that supplementation with Flax seed oil can effectively increase EPA concentrations in tissues.⁸³ Lignans, also found in Flax seed, account for various benefits offered by this plant. Studies involving Flax seed have been conducted on its anti-inflammatory properties⁸⁴, its anti-lupus properties⁸⁵, and its cardiovascular enhancing properties.^{86 87 88 89 90 91}

Just a quick note to mention that the omega 9 fatty acid oleic acid has been shown in research to lower heart attack risk and arteriosclerosis⁹², and aids in the prevention of breast cancer.⁹³

Conclusion

In addition to the two essential fatty acids, there are other fatty acids whose consumption may have benefits for human health. Both the essential and non-essential fatty acids can be obtained from dietary supplement sources including Evening Primrose oil, Borage oil, Flax seed oil and Fish oils (marine lipid concentrate). Each of

these sources has their own potential advantages. Perhaps a combination of all of them may yield the broadest spectrum of both essential and non-essential fatty acids.

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