

Omega-3 Fatty Acids Are They Essential?

By David Ogilvie

Introduction

There has been considerable promotion in recent years of the health benefits of consuming an adequate intake of Omega-3 fatty acids, particularly from fish and fish oils. Some of the benefits touted include the alleviation of asthma, the prevention of arthritis and cancer, and the reduction in the risk of heart disease. But what are the real benefits, and what role do these fatty acids play in the vegetarian and vegan diet?

What are "fatty acids?"

To start with, "fatty acids" are the hydrocarbons found in most fats in the body and in fats and oils in food. The location and type of bonds between the atoms in fatty acids makes a big difference in how they are metabolised by the body. The body's cells can modify the structure of fatty acids to suit their particular requirements, but only to a certain degree. Some of the fatty acid building blocks required can only be obtained from the diet, and these are referred to as "essential fatty acids". There are two essential fatty acids: Omega-3 and Omega-6. In food, alpha-linolenic acid is the major Omega-3 fatty acid, and linoleic acid is the major Omega-6 fatty acid.

Why do I need essential fatty acids?

Essential fatty acids are needed because they form parts of vital body structures, perform important roles in immune system function and vision, help form cell membranes, and produce hormone-like substances called eicosanoids. Eicosanoids, which include prostaglandins, are important regulators of vital body functions, such as blood pressure, blood clotting, temperature regulation, immune responses, inflammatory responses, and stomach secretions. For these reasons alone it is advisable to ensure an adequate dietary intake of essential fatty acids.

Due to its role in the regulation of blood pressure and blood clotting, and its ability to reduce blood cholesterol, numerous studies have investigated the ability of Omega-3 fatty acids to reduce the risk of heart disease. The results have been positive. This is of particular relevance to people who eat large quantities of meat and who therefore have higher saturated fat and cholesterol intakes. Vegetarians and vegans generally have a reduced risk of developing heart disease, but in

any case adequate intake of Omega-3 is still advisable for the reasons outlined in the previous paragraph. In regard to the alleviation of asthma and the prevention of arthritis and cancer, there is little supporting evidence.

What happens if my diet is deficient?

A deficiency of essential fatty acids, although rare, can result in profound physiological consequences and ultimately poor health. A deficiency in Omega-6 is highly unlikely as it makes up a large proportion of most of the vegetable oils present in the diet, for example, 76% of safflower oil, 71% of sunflower oil, and even 32% of some margarines. Omega-3, however, is present in much lower proportions (only 1-2% of many vegetable oils) and does warrant concern.

Dietary guidelines for Omega-3 have not been formally developed but ensuring an adequate intake of Omega-3 is generally recommended mainly due to a low ratio of Omega-3 to Omega-6 being linked to increased risk of heart disease. Recommendations vary from a dietary ratio of Omega-3 to Omega-6 as high as 1:4, to very conservative recommendations suggesting that we only need about one tablespoon of polyunsaturated plant oil a day (consumed as part of normal food intake) to meet essential fatty acid needs. Most people would consume at least this much.

To ensure adequate intake of Omega-3, VegVic recommends that vegetarians and vegans regularly consume flaxseed (linseed) oil in their diet, about 1 dessert spoon full each day. Flaxseed oil, although relatively expensive, is an excellent source of Omega-3 (55%) and can be included in the diet in a variety of ways (e.g. in salad dressing, in smoothies, added to breakfast cereal, or dribbled lightly over stir-frys, casseroles etc.), but it must be added after cooking. Heating above 160° C changes the shape of the fatty acids from the cis (bent) form to the trans (straight) form. The presence of trans fatty acids, rather than cis, fatty acids in cell membranes makes the membranes stiffer, which may reduce the function of the cell-membrane receptors that clear cholesterol from the bloodstream.

If you are concerned that your intake of Omega-3 may not be adequate we recommended that you see an Accredited Practising Dietitian who specialises in vegetarian nutrition (refer to the Dietitians page on our website).

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What about animal sources?

Animal fats are generally very poor sources of both Omega-3 and Omega-6 fatty acids (see table below). Animal fats also tend to be high in saturated fat which elevates blood cholesterol.

Fish oils, derived from cold water fatty fish such as salmon, herring, mackerel, sardines and trout, do contain higher levels of Omega-3 but they contain only about half that of flaxseed oil. Flaxseed oil also has the benefit of containing no cholesterol, is lower in saturated fat, and does not contain the often high levels of toxic chemicals, such as mercury, that can bio-accumulate in

fish. A study published in the November 2002 issue of the New England Journal of Medicine showed mercury levels to be directly associated with the risk of myocardial infarction (heart attack) and that high mercury content may diminish the cardioprotective effects of Omega 3 fatty acids found in fish.

Some evidence also suggests that Omega-3 fatty acids in fish can be more unstable and more likely to break down and release destructive free radicals. They also more readily turn rancid which places a stress on the liver during their metabolism. Omega-3 fatty acids from plants sources are in a more stable form.

Comparison of Dietary Fats

- Table shows proportions (%) of fatty acids (saturated, polyunsaturated and monounsaturated) making up total fat composition of various fats and oils.
- The oils/fats have been listed in order of increasing saturated fat ("bad fat") content.

NAME OF FAT/OIL	SATURATED	POLYUNSATURATED		MONO-UNSATURATED
		Linoleic Acid (Omega 6)	Alpha-Linolenic Acid (Omega 3)	
Canola Oil	7	22	10	61
Hempseed	8	55	25	12
Flaxseed Oil	10	17	55	18
Safflower Oil	10	76	trace	14
Sunflower Oil	12	71	1	16
Corn Oil	13	57	1	29
Olive Oil	15	9	1	75
Soybean Oil	15	54	8	23
Peanut Oil	19	33	trace	48
Cottonseed Oil	27	54	trace	19
Lard	43	9	1	47
Beef Tallow	48	2	1	49
Palm Oil	51	10	trace	39
Butterfat	68	3	1	28

As well as the above table, you may be interested in the tables of fatty acid composition of various plant oils, grains, vegetables, fruits and nuts on the Power-Pak website (www.powerpak.com).