

The Essential Omega-6 and Omega-3 Fatty acids in Food

Fats are composed of fatty acids, three of them in each fat molecule. All fatty acids are made of a spine of carbon atoms, bearing hydrogen atoms all along and with two oxygen atoms at one extremity of the carbon spine. The two oxygens give the molecule an acid value and the hydrogen atoms repelling water its “fatty” quality. Fatty acids come in a large variety of length and structure.

Human make all kind of fatty acids from carbohydrates except for two types we can not synthesize and have to find in food. Hence, their name Essential Fatty Acids (EFAs). There are two types of EFAs the omega-6 fatty acids and the omega-3 fatty acids. How the two type differ from each other is extensively explained in Newsletter13 at the Longevity Institute Website <<http://www.longevinst.org>. The importance of the EFAs derives from their exclusive involvement in the activity of our cells and from their obligatory supply in food.¹

Among other things, we use EFAs to make two classes of hormones—the prostaglandins. The two classes have opposed. Prostaglandins derived from Omega-6 EFAs stimulate the functions of cells, while prostaglandins derived from Omega-3 EFAs reduce their activity. This applies particularly to the cells of the immune system and to the cells responsible of coagulation. Prostaglandins derived from Omega-6 EFAs stimulate the immune system and help forming blood clots. Prostaglandins derived from Omega-3 EFAs down regulate an immune response, and maintain blood fluidity.

It is of particular interest that the American diet contains much more Omega-6 EFAs than Omega-3 EFAs. In the American diet the Omega-6 EFAs to Omega-3 EFAs ratio is around 12 to 1. Which is to say there is about 12 times more Omega-6 EFAs in the diet than Omega-3 EFAs. In Australia the ratio is 18 to 1. A good diet should contain only twice as much omega-6 EFAs than omega-3 EFAs. That proportion of 2 to 1 is the ideal ratio recommended by the Cloister Workshop².

The actual Omega-6 EFAs to Omega-3 EFAs imbalance in the American diet contribute to many health deteriorations The Omega-6 EFAs to Omega-3 EFAs imbalance exaggerates immune response and blood coagulation. Hence the ample use in our Omega-3 EFAs deprived society of pharmaceutical products opposing an overactive immune system (cortisone and NSAIDs) and undue coagulation (anticoagulants).

From the above one can see it makes goods sense to supply the diet with omega-3 EFAs containing food and supplements.

It makes equally good sense to reduce the consumption of Omega-6 EFAs rich food.

Sorting Foods By Its Omega-6 EFAs Content

Table 1 lists some foods sorted by their decreasing Omega-6 EFAs content in grams per 100 grams edible portion. The table also indicates to Omega-3 EFAs contents and the Omega-6 EFAs to Omega-3 EFAs ratios.

Some of the foods listed contain Omega-6 EFAs only. Sunflower oil, safflower margarine, apricot kernel oil, avocado oil, and almond oil belong to that group. Some other of the foods listed do not much better. The content of Omega-3 EFAs is negligible in corn oil, sesame oil, safflower seeds, brazil nuts, corn margarine, soybean margarine, pumpkin seeds, squash seeds, peanuts, peanuts butter, pistachio nuts, palm oil, and crackers.

Some other foods listed in table one have their relative high Omega-6 EFAs content balanced by their Omega-3 EFAs content. Examples are borage oil and canola oil, with their respectively

Omega-6 EFAs content of 38 grams, and 20 grams per hundred grams, and their 25 and 9.3 grams of Omega-3 EFAs. Borage oil and canola oil have the favorable Omega-6 EFAs to Omega-3 EFAs ratios of 1.5 and 2.18. However if consuming borage oil and canola oil does not increase the omega-6 to omega-3 ratio of your diet, it shall also not contribute to restore the overall Omega-6 EFAs to Omega-3 EFAs imbalance of the diet. Only the consumption of foods and of supplements with a very low Omega-6 EFAs to Omega-3 EFAs ratio can help restore the overall Omega-6 EFAs to Omega-3 EFAs imbalanced ratio of the diet. It appears that from all the foods listed in table 1 flax seed oil with its content of 59 grams of Omega-3 EFAs per hundred grams and the resulting Omega-6 EFAs to Omega-3 EFAs ratio of 0.24 is the only candidate in the list to do the job.

	Omega-6	Omega-3	O6/O3 ratio
sunflower oil	66	0.00	Omega-6 only
corn oil	58	0.7	83
wheat germ oil	55	6.9	8
soybean oil	51	6.8	8
safflower margarine	45	0.00	Omega-6 only
oil, sesame	41	0.3	138
Nuts, walnuts	38	9.081	4.20
borage oil	38	25	1.50
Oil, apricot kernel	29	0.00	Omega-6 only
oil, avocado	29	0.00	Omega-6 only
safflower seeds	28	0.111	253
italian salad dressing	25	3.3	7
brazilnuts	24	0.062	384
Margarine, regular, corn	24	0.4	59
sesame seeds	21	0.376	57
oil, canola	20	9.3	2.18
soybean margarine	19	1.5	13
pumpkin and squash seeds	19	0.166	115
almond oil	17	0.00	Omega-6 only
Peanuts	16	0.003	5185
flax seed oil	14	59.14	0.24
Peanut butter	14	0.078	176
pistachio nuts	13	0.254	52
almond butter	12	0.423	28
lard	10	1.00	10
palm oil	9	0.2	46
Crackers, standard	9	0.655	14

Table 1 - List of some food sorted by their decreasing omega-6 EFA content. in grams per 100 grams edible portion The table also indicates to omega-3 EFA content in grams per 100 grams edible portion and the omega-6 to omega-3 ratio.

The significance of the Omega-6 EFAs content of the foods listed in table 1 greatly depends on their importance in the diet.

This is of particular interest for the choice of a cooking oil. It appears that canola oil is best, much better than sunflower and corn oil. Canola oil contains 20 grams of Omega-6 EFAs and 9.3 grams of Omega-3 EFAs per 100 grams, while sunflower oil , corn oil, and soybean oil contain 66, 58, and 51 grams of Omega-6 EFAs, and zero, 0.7, and 6,8 grams of Omega-3 EFAs per 100

grams respectively. Canola oil has an Omega-6 EFAs to Omega-3 EFAs ratio of 2.18. The ratio is 8 for soybean, and 83 for corn.

Peanuts and sunflower have little or no Omega-3 EFAs, and accordingly a very high Omega-6 EFAs to Omega-3 EFAs ratio.

Peanuts contain a relatively lower quantity of Omega-6 EFAs per 100 grams than many of the foods listed in table one. Peanuts however are largely used in the food industry, becoming one of the major contributors of the Omega-6 EFAs to Omega-3 EFAs imbalance in the American diet. Furthermore, peanuts contain several allergens (substances that can trigger an immune response). The association of allergens and Omega-6 EFAs turns peanuts into one of the worst foods for people with allergies or autoimmune conditions.

Sorting Foods By Its Omega-3 Content

Table two lists foods sorted by their decreasing Omega-3 EFAs content. The table also indicates to Omega-6 EFAs contents in grams per 100 grams edible portion and the Omega-6 EFAs to Omega-3 EFAs ratios.

From table 2 it comes into view that flax seed oil and cold ocean fish (salmon, sardine, herring, chinook), and shrimps have the best Omega-6 EFAs to Omega-3 EFAs ratios and with the exception of the latter, the highest Omega-3 EFAs content.

	Omega-3	Omega-6	O6/O3 ratio
flax seed oil	59.14	14.00	0.24
salmon oil	35.98	4.34	0.12
sardine oil	25.85	5.04	0.19
borage oil	25.00	37.50	1.50
oil, cod liver	20.67	1.87	0.09
flax seed	18.12	4.32	0.24
oil, canola	9.30	20.30	2.18
Nuts, walnuts	9.08	38.10	4.20
wheat germ oil	6.90	54.80	7.94
soybean oil	6.80	51.00	7.50
italian salad dressing	3.30	24.60	7.45
Salmon, farmed	3.16	0.74	0.24
Salmon	2.29	0.26	0.11
herring	1.98	0.44	0.22
chinook	1.83	0.25	0.14
soybean margarine	1.50	19.40	12.93
anchovy	1.49	0.15	0.10
Butter	1.18	1.83	1.55
lard	1.00	10.20	10.20
halibut	0.85	0.09	0.10
bluefish	0.83	0.23	0.27
shrimp	0.63	0.03	0.05
olive oil	0.60	7.90	13.17

Table 2 - List of some foods sorted by their decreasing omega-3 EFA content in grams per 100 grams edible portion. The table also indicates to omega-6 EFA content in grams per 100 grams edible portion and the omega-6 to omega-3 ratios.

	O-6/O-3	ratio omega-6	omega-3
cod	0.03	0.01	0.22
tuna	0.05	0.01	0.27
shrimp	0.05	0.03	0.63
tuna canned in water	0.07	0.02	0.32
oil, cod liver	0.09	1.87	20.67
anchovy	0.10	0.15	1.49
halibut	0.10	0.09	0.85
Salmon	0.11	0.26	2.29
salmon oil	0.12	4.34	35.98
chinook	0.14	0.25	1.83
Spinach	0.19	0.02	0.12
herring	0.19	0.34	1.79
sardine oil	0.19	5.04	25.85
herring	0.22	0.44	1.98
Salmon, farmed	0.24	0.74	3.16
flax seed oil	0.24	14.00	59.14
flax seed	0.24	4.32	18.12
papayas	0.24	0.01	0.03
bluefish	0.27	0.23	0.83
broccoli	0.29	0.04	0.13
Mangos	0.38	0.01	0.04
Lettuce	0.41	0.03	0.08
kidney beans	0.63	0.02	0.03
green beans	0.64	0.02	0.04
collards	0.75	0.08	0.11
parmesan	0.92	0.32	0.35
mustard	0.97	0.28	0.29
mozzarella	1.06	0.39	0.37
white beans	1.19	0.20	0.17
kelp	1.20	0.02	0.02
Blueberries	1.48	0.10	0.07
borage oil	1.50	37.50	25.00
Butter	1.55	1.83	1.18
Milk, 3.7% milkfat	1.57	0.08	0.05
Bananas, raw	1.70	0.06	0.03
Beef, top sirloin	1.81	0.38	0.21
Beef, heart	1.97	0.61	0.31
Blackberries, raw	1.97	0.15	0.08
beans, lima, raw	2.08	0.28	0.14
oil, canola	2.18	20.30	9.30
Yogurt, plain	2.41	0.07	0.03

Table 3 - List of some foods sorted by their increasing omega-6 to omega-3 ratio. The table also indicates to omega-6 EFA and the omega-3 content in grams per 100 grams edible portion.

Note

Cold ocean fish and fish oils have a great advantage over flax seed and flax seed oil. Cold ocean fish and cold ocean fish oil contain multiple Omega-3 EFAs, among them Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA), while the only omega-3 fatty acid in flax seed and

in flax seed oil is Alpha Linolenic acid (ALA). ALA itself has little or no function in human biochemistry except for its contribution to improve cells membrane fluidity.

ALA however is the raw material cell use to make the essential Omega-3 EFAs with potent functions, like the Omega-3 EFAs EPA and DHA

In good health and in optimal conditions we can make some EPA and DHA from ALA. However that capacity is blocked by the high Omega-6 EFAs content of the American diet. People on the American diet can no longer make EPA and DHA from the scarce ALA supply in their diet. Supplementing their diet with more ALA rich food or with ALA supplements does not improve their capacity to use it. They need a direct EPA and DHA supplementation with EPA and DHA rich food or with EPA and DHA containing supplements.

Sorting Foods By Its Omega-6 To Omega-3 Ratio

Table 3 lists foods sorted by their increasing Omega-6 EFAs to Omega-3 EFAs ratio. The table also indicates the Omega-6 EFAs and the Omega-3 EFAs content in grams per 100 grams edible portion.

Although the variety of food with an Omega-6 EFAs to Omega-3 EFAs favorable ratio appears large, only a few have a sufficient high Omega-3 EFAs content to correct the overall imbalance of the Omega-6 EFAs to Omega-3 EFAs ratio of the American diet.

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² "A workshop on the Essentiality of and Recommended Dietary Intakes (RDIs) for Omega-6 and Omega-3 Fatty Acids was held at The Cloister, National Institute of Health (NIH) in Bethesda, Maryland, USA, 7-9 April 1999. The workshop was sponsored by the National Institute on Alcohol Abuse and Alcoholism-NIH, the Office of Dietary Supplements-NIH, The Centre for Genetic, Nutrition and Health, and the International Society for the Study of Fatty Acids and Lipids: and co-sponsored by several Industry groups."