

FLAX VERSUS FISH – GOOD SOURCES OF OMEGA-3 FATS

Introduction

Many consumers are asking an important question: Are the omega-3 fats in fish the same as those found in flax? The answer is that omega-3 fats are like siblings – they all belong to the same family, but their chemical makeup and some of their health benefits differ.

What Are the Major Omega-3 Fats?

Alpha-linolenic acid or ALA, for short, is the essential omega-3 fat. The word “essential” means that we must eat ALA in our diets because our bodies cannot make it. In other words, ALA is an essential nutrient just like vitamin C and calcium. The human body needs ALA to be healthy. Two other important omega-3 fats are eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). EPA and DHA are not considered “essential” in the strictest sense because our bodies make small amounts of them from ALA. Nonetheless, they are vital for health.

Which Foods Are Rich in Omega-3 Fats?

Omega-3 fats are found in a variety of foods. ALA is found mainly in flax seeds and walnuts and in plant oils like flax oil, canola oil and soybean oil. Flax seeds and flax oil are the richest sources of ALA in the North American diet.¹ Flax-based omega-3-enriched eggs, along with some fish like Atlantic salmon and canned sardine, are good sources of ALA. Small amounts of ALA are found in products made with added flax like cereals, breads, bagels, spaghetti, energy bars and cookies. Beef, pork and chicken also contain small amounts of ALA because livestock and poultry ingest ALA in their daily rations.

EPA and DHA are found mainly in fatty fish like herring, salmon, mackerel and bluefin tuna and the fish oil supplements made from them. Table 1 lists foods that qualify for a nutrient content claim on U.S. food product labels stating that they are “high” in, or excellent sources of, omega-3 fats. Flax oil, flax seeds and flax-based omega-3-enriched eggs qualify for a label claim as a “high” source of ALA omega-3 fat.²

White fish like haddock, cod, flounder, sole and orange roughy, along with the fried fish fillets made from these fish, contain small amounts of EPA and DHA. Because they are relatively low in omega-3 fats, they do not qualify for a nutrient content claim on U.S. food product labels.

Algae are rich sources of DHA, but contain little EPA. Plants do not contain EPA and DHA.

Table 1. Foods Qualifying for a Label Claim of “High” Source of Omega-3 Fats, Ranked by Omega-3 Fat Content^{a,b}

Omega-3 Fat Content per Reference Amount ^c		
ALA	EPA	DHA
Flax oil	Herring	Salmon, Atlantic,
Flax seeds	Salmon, coho, wild	wild
Walnuts	Mackerel	Tuna, bluefin
Walnut oil	Salmon, Atlantic,	Herring
Canola oil	wild	Salmon, coho, wild
Soybean oil	Tuna, bluefin	Striped bass
Flax-based omega-3 enriched egg ^d	Sardine, canned in oil	Mackerel
Atlantic salmon	Menhaden oil capsules ^e	Sea bass
Sardine, canned in oil	Shark	Shark
	Striped bass	Sardine, canned in oil
	Sea bass	Menhaden oil capsules
		Omega-3 enriched egg ^f

^a Source: O’Flaherty MJ (2).

^b Omega-3 fat content ranked from highest to lowest within each column, based on grams of fatty acid per reference amount of food. Values are for cooked fish. Sources of data: flax, flax oil and omega-3 enriched eggs (1); all other foods – U.S. Department of Agriculture, Nutrient Database for Standard Reference, Release 17, available at www.nal.usda.gov/fnic/foodcomp.

^c Reference amount = the amount customarily consumed. For fats and oils like flax oil, the reference amount is 1 tablespoon.

^d Flax-based omega-3 enriched eggs are derived from laying hens fed flax.

^e Values are for 2 capsules; data obtained from www.fishoilcapsules.com.

^f Omega-3 enriched eggs are derived from laying hens fed a variety of feed supplements.

Do All Omega-3 Fats Have the Same Health Benefits?

Just like siblings, omega-3 fats are alike in some ways and different in others. ALA, EPA and DHA are alike in keeping the body’s cell membranes flexible and elastic to help cells work properly. Plus, ALA, EPA and DHA are alike in blocking the actions of some compounds that cause inflammation.³ Most chronic diseases like heart disease, stroke, diabetes, cancer and arthritis are marked by inflammation. By blocking inflammation, omega-3 fats help reduce the risk of chronic disease.

One omega-3 fat – DHA – differs from the others. Because DHA helps the eye, brain and nervous system develop properly, infants have a special need for this omega-3 fat. Aging adults may need DHA, too. A study of 815 elderly people living in Chicago found that those with the highest DHA intake had the most protection against Alzheimer Disease. ALA and total omega-3 fats, but not EPA, were also protective.⁴



Why Eat Flax?

Flax seeds are a rich source of ALA and lignans. Lignans are phytoestrogens, which are plant compounds that can have hormone-like effects in the human body. Lignans are found in the fibre fraction of the flax seed. For this reason, flax oil does not naturally contain lignans, although some processors add purified lignans to the oil to enhance its nutritional value. Flax seeds, but not flax oil, are good sources of dietary fibre.

Flax lowers blood cholesterol levels and helps reduce the risk of heart attacks and stroke. Through the actions of the lignans and ALA, flax blocks tumour growth in animals and may help reduce cancer risk in humans. Flax also promotes laxation and helps the bowel work properly. The pleasant, nutty taste of flax makes it an ideal addition to hot and cold cereals, fruit smoothies, cookies and other baked goods, meatloaf, pasta and soup.

Why Eat Fish?

Fish is called “brain” food because of its high-quality protein and nutrient content, including omega-3 fats. Populations with high fish intakes, like the Japanese and Inuit, have low rates of some chronic diseases like heart disease.⁵ In the Chicago study mentioned previously, elderly people who ate one fish meal per week had 60% less risk of Alzheimer Disease than those who ate fish rarely or never.⁴

Is it safe to eat fish? Federal health agencies in Canada⁶ and the United States⁷ conclude that the benefits of eating fish outweigh concerns about traces of mercury in fish. Both countries advise pregnant and nursing women, women who may become pregnant and young children to avoid eating some fish, especially shark, swordfish, king mackerel and fresh and frozen tuna. Canned tuna fish can be eaten once a week. Other low-mercury fish include salmon, pollock and catfish.

What about fish oil supplements? Fish oil capsules are the most concentrated form of omega-3 fats. They contain all major omega-3 fats – ALA, EPA and DHA. However, a health alert has been raised about the level of polychlorinated biphenyls (PCBs) in fish oil supplements. PCBs are chemicals used in industrial processes and may cause cancer in humans. A consumer who follows the label recommendation on some fish oil supplements can take in up to 43% of the daily upper limit of PCBs.⁸ A consumer who both takes fish oil capsules and eats PCB-contaminated fish may increase his or her risk of PCB toxicity. Besides safety, the main factors to consider are price, convenience and tolerance of a fishy aftertaste experienced with some fish oil supplements. Dietary preference may also be a factor. Vegans, for instance, are not likely to take fish oil capsules.

Flax and Fish – Both Offer Good Nutrition

Flax is rich in ALA, the essential omega-3 fat. Flax also contains dietary fibre and lignans. Fish are sources of high-quality protein and contain omega-3 fats. Fatty fish are rich in DHA. Both flax and fish contain important nutrients and belong in a healthy eating plan.

There is one key difference between the two – sustainability. Flax is a sustainable crop. Fish may not be. For today’s North American consumer, the decision to eat fish is mainly one of personal preference – a situation that may change in the coming years if the global demand for fish continues. The pressures on global fish stocks may eventually force the global community to ration the world’s ocean fish. For the time being, consumers can enjoy both.

References

1. Flax Council of Canada. *Flax—A Health and Nutrition Primer*. Winnipeg, MB, 2003. Available at www.flaxcouncil.ca.
2. O’Flaherty MJ. Notification for a nutrient content claim based on an authoritative statement (letter submitted to the Food and Drug Administration by Olsson, Frank and Weeda, attorneys), January 16, 2004. [NOTE: The proposed nutrient content claim was authorized on May 17, 2004 by FDA inaction (i.e., no objection).]
3. Caughey GE, Mantzioris E, Gibson RA, et al. The effect on human tumor necrosis factor α and interleukin 1 β production of diets enriched in n-3 fatty acids from vegetable oil or fish oil. *Am J Clin Nutr* 1996;63:116-122.
4. Morris MC, Evans DA, Bienias JL, et al. Consumption of fish and n-3 fatty acids and risk of incident Alzheimer disease. *Arch Neurol* 2003;60:940-946.
5. Kris-Etherton PM, Harris WS, Appel LJ, for the Nutrition Committee. Fish consumption, fish oil, omega-3 fatty acids, and cardiovascular disease. *Circulation* 2002;106:2747-2757.
6. Health Canada. Advisory: Information on mercury levels in fish (May 2002). Available at www.hc-sc.gc.ca.
7. Food and Drug Administration. What you need to know about mercury in fish and shellfish (March 2004). Available at www.cfsan.fda.gov.
8. Shim SM, Santerre CR, Burgess JR, Deardorff DC. Omega-3 fatty acids and total polychlorinated biphenyls in 26 dietary supplements. *J Food Sci* 2003;68:2436-2440.