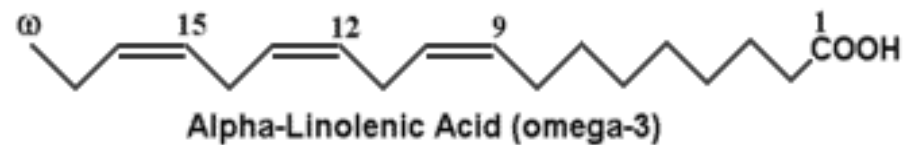
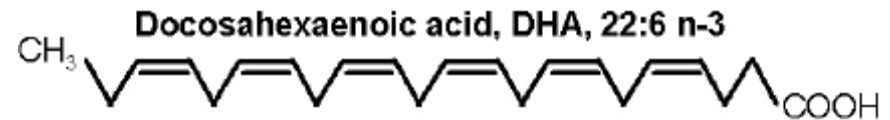
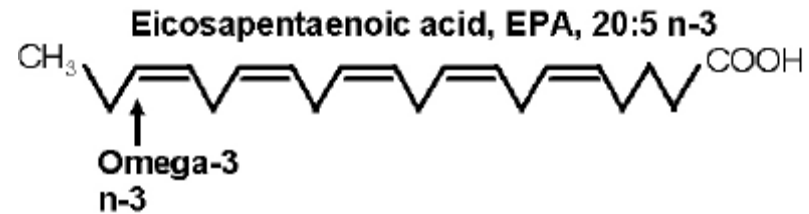


OMEGA 3 REPORT



BACKGROUND INFORMATION

AURI has received several requests for technical assistance related to omega-3 and omega-6 fatty acids and the allowed health claims for products containing these important nutrients. The information in this brochure is meant to guide clients as they investigate the omega-3 and omega-6 content of their products.

WHAT ARE OMEGA-3'S AND OMEGA-6'S?^{1,2,3}

Fatty acids are classified according to the number of double bonds they contain:

- **Saturated** – are found predominantly in animal foods (meats and dairy products) as well as plant derived oils and nut oils
- **Monounsaturated** – can be synthesized within the body, i.e. they are not essential
- **Polyunsaturated** – includes omega-3 and omega-6 fatty acids.



Omega-6 and omega-3 are long chain polyunsaturated fatty acids (PUFAs). Omega-6 and omega-3 fatty acids are made from linoleic acid (LA) and alpha-linolenic acid (ALA), respectively. Humans are not able to synthesize LA or ALA, and they must obtain them from their diet. Therefore, LA and ALA are considered essential fatty acids. They are commonly found in animal fats and vegetable oils.

Alpha-linolenic acid can be metabolized into either eicosapentaenoic acid (EPA) or docosahexaenoic acid (DHA) through the addition of carbon atoms and double bonds. Both EPA and DHA are necessary for proper growth, maintenance and functions of the body. DHA and EPA are considered the two most important omega-3s for cardiovascular health. In fact, tremendous amounts of research have been conducted utilizing DHA and EPA to determine the optimal inclusion levels in diets to improve or promote cardiovascular health.

WHAT FOODS CONTAIN OMEGA-3'S AND OMEGA-6'S?^{4,5}

Alpha-Linolenic Acid (ALA): Flaxseeds, walnuts, and their oils are among the richest dietary sources of ALA. Canola oil is also an excellent source of ALA. Dietary surveys in the U.S. indicate the average adult intake for ALA ranges from 1.2 - 1.6 g/day for men and from 0.9 - 1.1 g/day for women. Some foods that are rich in ALA are listed in the table below.

Some Food Sources of Alpha-linolenic Acid (18:3n-3)⁴

Food	Serving	Alpha-Linolenic acid (g)
Flaxseed oil	1 tablespoon	7.3
Flaxseeds, ground	1 tablespoon	1.6
Walnut oil	1 tablespoon	1.4
Canola oil	1 tablespoon	1.3
Soybean oil	1 tablespoon	0.9
Mustard oil	1 tablespoon	0.8

Eicosapentaenoic Acid (EPA) and Docosahexaenoic Acid (DHA): Oily fish are the major dietary source of EPA and DHA. Dietary surveys in the U.S. indicate the average adult intake of EPA ranges from 0.04 - 0.07 g/day and average adult intake of DHA ranges from 0.05 - 0.09 g/day ⁽¹⁾. Omega-3 fatty acid enriched eggs are also available in the U.S. Some foods that are rich in EPA and DHA are listed in the table below.

Some Food Sources of EPA (20:5n-3) and DHA (22:6n-3)⁴

Food	Serving	EPA (g)	DHA (g)	Amount providing 1 g of EPA + DHA
Herring, Pacific	3 oz*	1.06	0.75	1.5 oz
Salmon, chinook	3 oz	0.86	0.62	2 oz
Sardines, Pacific	3 oz	0.45	0.74	2.5 oz
Salmon, Atlantic	3 oz	0.28	0.95	2.5 oz
Oysters, Pacific	3 oz	0.75	0.43	2.5 oz
Salmon, sockeye	3 oz	0.45	0.60	3 oz
Trout, rainbow	3 oz	0.40	0.44	3.5 oz
Tuna, canned, white	3 oz	0.20	0.54	4 oz
Crab, Dungeness	3 oz	0.24	0.10	9 oz
Tuna, canned, light	3 oz	0.04	0.19	12 oz

*A 3-oz serving of fish is about the size of a deck of cards.

WHAT ARE THE BENEFITS OF OMEGA-3'S AND OMEGA-6'S?^{1,3,6}

Initial reports, from studies conducted as early as 1944, suggested the potential benefits of omega-3 fatty acids. Due to these initial speculations, omega-3 fatty acids have been thoroughly researched for their potential health benefits. This health benefit research has covered:

- Cardiovascular disease
- Autoimmune disorders
- Diabetes
- Arthritis
- Arrhythmia



In addition, DHA is the most abundant omega-3 fatty acid in the grey matter of the brain. It is also found in large amounts in retina and is, therefore, recognized as an essential nutrient for brain and eye retina development. EPA is a precursor for eicosanoids. These eicosanoids affect immune responses and platelet aggregation. Studies have demonstrated that consuming high levels of EPA leads to decreased platelet aggregation and a suppression in immune response coupled with an anti-inflammatory response. These responses are obviously very important especially in people dealing with rheumatoid arthritis or asthma.

HEALTH CLAIMS

Health claims describe a relationship between a food, food component, or dietary supplement ingredient, and the reduction of risk for a disease or health-related condition. A qualified health claim on a conventional food must be supported by credible scientific evidence. Based on a systematic evaluation of the available scientific data, as outlined in FDA's "Interim Procedures for Qualified Health Claims in the Labeling of Conventional Human Food and Human Dietary Supplements", In 2004, FDA announced a qualified health claim for EPA and DHA omega-3 fatty acids. While this research is not conclusive, the FDA intends to exercise its enforcement discretion with respect to the following qualified health claim:

"SUPPORTIVE BUT NOT CONCLUSIVE RESEARCH SHOWS THAT CONSUMPTION OF EPA AND DHA OMEGA-3 FATTY ACIDS MAY REDUCE THE RISK OF CORONARY HEART DISEASE. ONE SERVING OF [NAME OF FOOD] PROVIDES [X] GRAMS OF EPA AND DHA OMEGA-3 FATTY ACIDS. [SEE NUTRITION INFORMATION FOR TOTAL FAT, SATURATED FAT AND CHOLESTEROL CONTENT.]

RECOMMENDED DAILY INTAKES:

In 2002, the Food and Nutrition Board of the U.S. Institute of Medicine established adequate intake (AI) levels for omega-3 fatty acids, which are listed in the table below.

Adequate Intake (AI) for Omega-3 Fatty Acids ⁷				
Life Stage	Age	Source	Males (g/day)	Females (g/day)
Infants	0-6 months	ALA, EPA, DHA*	0.5	0.5
Infants	7-12 months	ALA, EPA, DHA	0.5	0.5
Children	1-3 years	ALA	0.7	0.7
Children	4-8 years	ALA	0.9	0.9
Children	9-13 years	ALA	1.2	1.0
Adolescents	14-18 years	ALA	1.6	1.1
Adults	19 years and older	ALA	1.6	1.1
Pregnancy	All ages	ALA	-	1.4
Lactation	All ages	ALA	-	1.3

*All omega-3 polyunsaturated fatty acids present in human milk can contribute to the AI for infants.

Furthermore, “the American Heart Association currently endorses the use of omega-3 fatty acids at a dose of approximately 1 g/day of combined DHA and EPA, either in the form of fatty fish or fish oil supplements in patients with coronary heart disease.” (3)

SUPPLEMENTING FOODS WITH OMEGA-3'S AND OMEGA-6'S^{2,6,8}

The rate of health disorders, such as cardiovascular disease and inflammatory diseases, in relation to diet has been thoroughly investigated. Numerous studies have supported a linkage between the dietary changes resulting from the current Western diet and a higher rate of cardiovascular disease. The modern diet of western cultures provides a different ratio between omega-6 and omega-3 fatty acids. A higher rate of cardiovascular disease is often attributed to the insufficient amounts of omega-3 fatty acids and the imbalance in the ratio of omega-6 to omega-3 fatty acids. Researchers have shown that the modern diet contains more omega-6 fatty acids due to the widespread use of vegetable oils. Decreasing the amount of omega-6 fatty acids in the diet would require a dramatic change and increasing the omega-3 content of our diet by

supplementation with omega-3's may be more efficient. This has led food manufacturers to begin supplementing foods with omega-3 fish oils. Supplementation refers to substances applied directly into the food product, rather than materials fed to livestock

Since omega-3 oils are highly unsaturated, they are very susceptible to oxidation. Therefore, omega-3 oils require a special refining process to help stabilize them by increasing their shelf stability. In addition, the refining process reduces off-flavors and odors associated with omega-3 oils. Dry powders of microencapsulated oils have been developed and can be utilized to fortify foods. The microencapsulation of the oil provides more shelf stability by creating an oxygen barrier around the oil droplets. However, it is expected that foods supplemented with omega-3's will more than likely have a decreased shelf-life compared to products produced with more saturated fats.

Direct supplementation with EPA and DHA is more efficient than supplementing with the precursor, ALA. Most of the ALA ingested is not converted to EPA and DHA and is utilized by the body for energy. Foods that are often supplemented with omega-3 fatty acids include breads, cereals, and dairy products. Since omega-3 fatty acids tend to degrade more rapidly than other fatty acids, products that are held at refrigeration temperature, such as dairy products, tend to be the best candidates for supplementation.

AURI TECHNICAL ASSISTANCE ^{9, 10}

AURI provides chemical analysis of food products related to fatty acid composition. Prototypes of products under development are frequently tested by AURI for nutritional properties, including fatty acid composition. Lab results are compared to a USDA database or the U of MN food and nutrient database in order to provide confirmation that the numbers from the database are valid for a typical product. This information can be useful in terms of substantiating a valid claim for omega-3 content, i.e. the content is both significant and consistent enough to substantiate a solid claim. Making a claim also assumes that the producer/processor will regularly test their product at a certified laboratory. That said, AURI testing can be seen as the first step in establishing a regular testing program for product characterization and quality control.

It is important to note that the inclusion of omega-3 fatty acids is not part of mandatory nutritional facts on a product label. If a client wishes to include this information, it must be outside of the official facts panel.



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- ⁷ Institute of Medicine. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. Washington, D. C.: National Academies Press; 2002. ([National Academy Press](#))
- ⁸ Supplementation refers to substances applied directly into the food product, not into the feed fed to livestock.
- ⁹ AURI laboratory testing is not certified.
- ¹⁰ FDA Guidance on Nutritional Labeling.