



**RDN Resources for Professionals:**

# Omega-3 Fatty Acids and Vegetarian Diets

**Omega Fatty Acids: Overview**

Adequate consumption of omega-3s are important for cardiovascular health, growth and development, and immunity. There is evidence to suggest increasing consumption of omega-3 fatty acids can help reduce the risk of certain chronic diseases, including coronary heart disease.<sup>1,2</sup> Severe omega-3 deficiencies are rarely reported.<sup>3</sup>

**Types of Omega 3 Fatty Acids**

ALA (alpha-linolenic acid) is the only truly essential omega-3 fatty acid, as it cannot be produced by our bodies and must be consumed via diet. ALA can be endogenously converted by the liver to create longer-chained EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) fatty acids. However, conversion rates from ALA to EPA and DHA are low.

- ALA is required for optimal health,<sup>4</sup> and is primarily found in plant-based foods and oils, such as flax, walnuts, chia, hemp, soy, and canola.
- EPA and DHA also are required for optimal health and are primarily found in marine-sourced foods, such as salmon, sardines, trout, and herring. Fortified foods may also contain EPA or DHA, such as certain brands of eggs, yogurt, juices, milk, soy, and infant formulas. Algae-based supplements also contain significant amounts of DHA.

**Function of Omega-3 Fatty Acids**

Omega-3s play critical roles in cellular and metabolic processes, and are components of the phospholipids which form the structures of cell membranes.<sup>5</sup> A

deficiency of essential fatty acids can cause rough, scaly skin and dermatitis.<sup>6</sup> DHA is particularly high in the retina, brain, and sperm.<sup>6,7</sup> Evidence indicates that higher blood concentrations of EPA and DHA create a less inflammatory environment more conducive to better health outcomes.<sup>8</sup>

**Recommendations for ALA<sup>3</sup>**

The only omega-3 for which experts have established recommended amounts is ALA. See the chart below.

*Recommended intakes of ALA by life stage.*

Life Stage	Recommended Amount of ALA
Birth to 12 months*	0.5 g
Children 1–3 years	0.7 g
Children 4–8 years	0.9 g
Boys 9–13 years	1.2 g
Girls 9–13 years	1.0 g
Teen boys 14–18 years	1.6 g
Teen girls 14–18 years	1.1 g
Men	1.6 g
Women	1.1 g
Pregnant teens and women	1.4 g
Breastfeeding teens and women	1.3 g

*\*As total omega-3s. All other values are for ALA alone*

## RDN Resources for Professionals: Omega-3 Fatty Acids and Vegetarian Diets

### Vegetarian and Vegan Sources of ALA

Food	Grams / Serving
Flaxseed oil, 1 tbsp	7.26
Chia seeds, 1 ounce	5.06
English walnuts, 1 ounce	2.57
Flaxseed, whole, 1 tbsp	2.35
Canola oil, 1 tbsp	1.28
Soybean oil, 1 tbsp	0.92
Black walnuts, 1 ounce	0.76
Mayonnaise, 1 tbsp	0.74
Edamame, frozen, prepared, ½ cup	0.28
Refried beans, canned, vegetarian, ½ cup	0.21
Kidney beans, canned ½ cup	0.10
Baked beans, canned, vegetarian, ½ cup	0.07
Bread, whole wheat, 1 slice	0.04
Milk, low-fat (1%), 1 cup	0.01

### Omega 3's and Chronic Disease Risk

Dietary patterns rich in omega-3s, such as the Mediterranean diet, have been found to have a benefit for the prevention of cardiovascular disease (CVD).<sup>9</sup> However the efficacy of omega-3 fatty acid supplementation has been the topic of debate for over a decade.

Results from large-scale studies featuring omega-3 supplementation and the risk of CVD are mixed.

As of now, there is insufficient evidence to support the effectiveness of omega-3 supplementation for the management of other chronic diseases such as cystic fibrosis<sup>10</sup>, insulin sensitivity<sup>11</sup>, Crohn's disease<sup>12</sup>, bipolar disorder<sup>13</sup>, or other disease states.

### Omega-3 Status of Vegetarians and Vegans

ALA levels tend to be higher, and EPA and DHA levels tend to be lower in vegetarians and vegans when compared to meat-eaters.<sup>14</sup> This is likely because meat eaters consume more EPA and DHA through animal-sourced foods, such as seafood.

### Guidance

The Academy of Nutrition and Dietetics' 2016 position paper on vegetarian diets states that omega-3 needs of healthy individuals can be met with ALA alone, and that endogenous synthesis of EPA and DHA from ALA is sufficient to keep lipid levels stable.<sup>15</sup>

For vegetarians and vegans seeking to increase tissue levels of EPA and DHA, increasing intake of ALA by 2g per day (ex: 1½ teaspoons of flaxseed oil) may help increase EPA and DHA lipid levels through conversion. However, since research is limited surrounding how much ALA is needed for conversion, RDNs may want to share information about vegan-friendly DHA supplements with clients.

### Supplements

Vegan-friendly DHA supplements are created from microalgae. Most microalgae omega-3 supplements provide around 200-300 mg of DHA per serving, and are shown to have favorable results for increasing lipid levels of DHA.<sup>16</sup> FDA has added microalgae DHA supplements to the generally recognized as safe (GRAS) list. Limited research suggests the bioavailability of these supplements are comparable to their fish-based counterparts.<sup>17</sup>

### Conclusion

Omega-3 fatty acids, especially ALA, play an essential role in optimal health. ALA can be obtained by vegetarians through plant-based foods. Increasing ALA intake or adding a microalgae-based supplement can increase levels of EPA and DHA.