

## **Omega-3 Fatty Acids and Health Benefits**

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**Rowida KHALILY**

*Nigde Omer Halisdemir University, Faculty of Agricultural Sciences and Technologies, Nigde, Turkey*

\* Corresponding author: khalilyrowida@gmail.com

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### **Abstract**

Unsaturated fatty acids according to the number of bonds are examined in four groups. Omega-3 is very important for other groups. Because of that the essential fatty acid omega-3 fatty acid is metabolized in the body in the form of EPA and DHA. EPA and DHA accelerate the development of brain, nervous system and eye in infants, slow the development of rheumatoid arthritis in adults, decrease high blood triglyceride values, prevent cardiac arrhythmias, increase the survival rate after infarction long chain fatty acids that reduce clotting, prevent arteriosclerosis, reduce blood pressure and slow Alzheimer's disease and DHA is a key component of all cell membranes and is found in abundance in the brain and retina, reduce triglycerides, slow the development of plaque in the arteries, reduce the chance of abnormal heart rhythm, reduce the likelihood of heart attack and stroke.

**Key words:** omega-3 fatty acid, EPA, DHA, PUFA, health benefits

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### **Review article**

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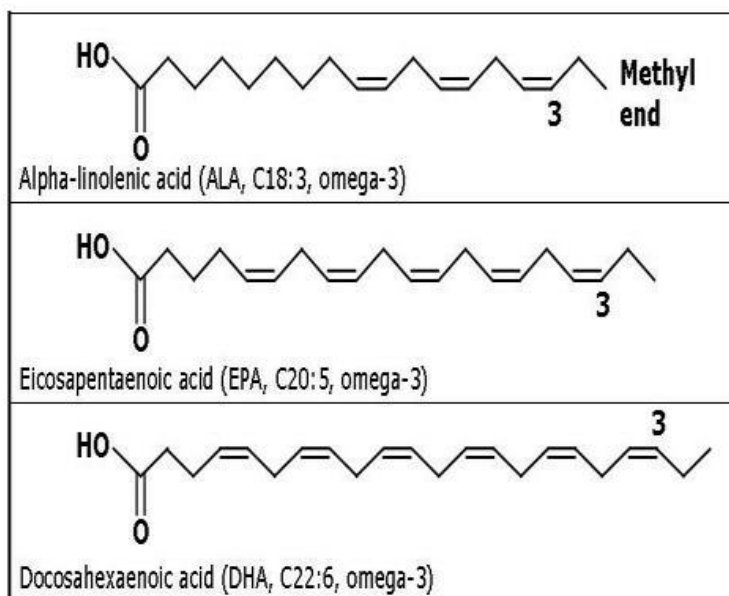
**INTRODUCTION**

Unsaturated fatty acids according to the number of bonds are examined in four groups. These are monoethylenic acids, diethyleneic acids, triethyleneic acids, tetraethyleneic acids. Omega-3 is in the group of monoethylenic acids and Omega-3 ( $\omega$ -3) long-chain polyunsaturated fatty acids (PUFA), including eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) (Su, 2008; Lazzarin, 2009). Omega-3 is very important for other groups. Because of that the essential fatty acid omega-3 fatty acid is metabolized in the body in the form of EPA and DHA. EPA and DHA accelerate the development of brain, nervous system and eye in infants, slow the development of rheumatoid arthritis in adults, decrease high blood triglyceride values, prevent cardiac arrhythmias, increase the survival rate after infarction long chain fatty acids that reduce clotting, prevent arteriosclerosis, reduce blood pressure and slow Alzheimer's disease and DHA is a key component of all cell membranes and is found in abundance in the brain and retina (Krauss-Etschmann, 2007). EPA and DHA are also the precursors of several metabolites that are potent lipid mediators, considered by many investigators to be beneficial in the prevention or treatment of several diseases (Serhan, 2008).

**Description of Omega 3 fatty acids**

**Structural Properties of omega-3 acids**

Important  $\omega$ -3 fatty acids in human physiology are  $\alpha$ linolenic acid (18:3,  $\omega$ -3; ALA), eicosapentaenoic acid (20:5,  $\omega$ -3; EPA), and docosahexaenoic acid (22:6,  $\omega$ -3;DHA). In a carbon chain of 18, 20, or 22 carbon atomsthesepolyunsaturates have either 3, 5, or 6 double bonds, respectively (Kaur et al., 2015). All double bonds are in the cisconfiguration; i.e. the two hydrogen atoms are on the same side of the double bond. EPA and DHA are polyunsaturated fatty acids that are found in marine products (20–40 % of the total fat contents) and algae (40%) (Garg et al., 2006). Both are important fatty acids that enter the body through consumption of marine products, fortification, or as ALA. Several studies have revealed that these fatty acids play an important role in maintaining a healthy mind and body (Garg et al., 2006). Sources of DHA and EPA can be broadly categorized as following.



Structure of ALA, EPA and DHA (Adapted from <https://funfood16.blogspot.com/2016/12/omega-3-means-nothing-in-terms-of.html>).

**Omega-3 Nutritional Resources**

Fish as an animal source (herring, mackerel, sardines, trout and salmon) and a small amount of eggs. Vegetable; green leafy vegetables such as flaxseed oil, canola oil, soybean oil, walnuts, pumpkin seeds, hemp oil and purslane, are rich in legumes and rapeseed ALA. 3 fatty acids are found in human milk. The main source of EPA and DHA are marine fish (Serhan, 2006; Meyer, 2003; Sanders, 1988).

**Table 1. The sources of omega-3.**

<b>Omega-3 resources</b>		
<b>Fish meat sources</b>	<b>Amount required for 1 g EPA + DHA(g)</b>	<b>Essential fatty acid</b>
Fresh Tuna	66-357	DHA, EPE
Canned Tuna	323	DHA, EPE
Pacific Salmon	42.5-70.9	DHA, EPE
Sardine	50-87	DHA, EPE
Trout	323	DHA, EPE
Mackerel	54-250	DHA, EPE
Cod fish	323	DHA, EPE
Whiting	417	DHA, EPE
Flounder	8-213	DHA, EPE
oyster	500	DHA, EPE
<b>Herbal resources</b>	<b>Content</b>	<b>Essential fatty acid</b>
lax seeds	2.2g/5 ml	ALA
Flax seed oil	8.5g/5 ml	ALA
Purslane	Very low	ALA
Hemp oil	3.1g/5 ml	ALA
Canola oil	1.3g/5 ml	ALA
Soy oil	0.9g/5 ml	ALA
Walnut and pine nut oil	0.7g/5 ml	ALA

(Schwalfenberg, 2006; Nordøy, 2001).

**Omega-3s and Health Implications**

The potential health benefits of consuming omega-3s are the focus of a great deal of scientific research. By far, the majority of research has focused on EPA and DHA from foods (e.g., fish) and dietary supplements (e.g., fish oil) as opposed to ALA from plant-based foods. Many observational studies link higher intakes of fish and other seafood with improved health outcomes (Hussein, 2005). However, it is difficult to ascertain whether the benefits are due to the omega-3 content of the seafood (which varies among species), other components in the seafood, the substitution of seafood for other less healthful foods, other healthful behaviors, or a combination of these factors. Data from randomized clinical trials are needed to shed light on these questions (Mcguire, 2011; Swanson, 2012; Schwalfenberg, 2006).

**Findings show omega-3 fatty acids may help to**

- Lower blood pressure
- Reduce triglycerides

- Slow the development of plaque in the arteries
- Reduce the chance of abnormal heart rhythm
- Reduce the likelihood of heart attack and stroke
- Lessen the chance of sudden cardiac death in people with heart disease (Bang, 1972; Dyerberg, 1975).

### **Omega-3 fatty acids and cardiovascular disease**

Omega-3 fatty acids help your heart in different shapes. These fatty acids eliminate inflammation in blood vessels (and other parts of the body). High levels of omega-3s can reduce the risk of irregular heart rhythms and also reduce the level of fasting blood or triglycerides. And finally, omega-3 fatty acids can slow down the formation of blood clots in the veins. The American Heart Association suggests daily 1 g of EPA plus DHA for people with heart disease. Eat fatty fish is better, but your doctor may prescribe a fish oil capsule. If you have a heart attack, the prescription of omega-3 can protect your heart. Some studies have shown that people who consume more omega-3s are less likely to have a heart attack, or fewer deaths from heart attacks. Omega-3 appears to have a stabilizing effect on the heart. Omega 3 can reduce heart rate and prevent arrhythmias, or irregular heartbeats (Ruxton, 2004; Kris-Etherton, 2013). Omega-3s can help lower blood pressure. A good diet plan is to replace red meat on some meals, which is also effective in lowering high blood pressure. For foods containing omega-3, it prevents the accumulation of blood clots in the veins and prevents the rate of circulation of the blood inside the veins. Therefore, omega-3 can prevent stroke caused by blood clots in the veins (Lee, 2003).

### **The effect of omega-3 fatty acids on the fetus during pregnancy**

Omega-3 is essential for the development of the fetal neurological and visual system. Postpartum also is essential for breast milk production. With each pregnancy, the mother's body is cleared of omega-3s. Studies have shown that adding EPA and DHA to a pregnant mother's diet is directly linked to the development of the fetus. Also, increased consumption of omega-3s reduces the risk of allergies in infants. DHA reduces premature pain, reduces the risk of preeclampsia and increases birth weight. Omega-3 deficiency increases the risk of postpartum depression (Ramakrishnan, 2010). The fetus in the mother's womb receives a lot of food from the mother. In fact, the fetus completely removes the nutrients it needs from the mother's body, which is why many mothers who do not receive the necessary nutrients during pregnancy become deficient after giving birth. A mother who has omega-3 deficiency after childbirth may develop postnatal depression (PND) (Helland, 2008).

Therefore, it is essential for mothers to use omega-3s during pregnancy and after birth. Specialists believe that maternal body needs improvement and improvement, especially after childbirth. So the body needs the necessary ingredients. In addition, these substances play a very important role in the growth of a born baby. Omega 3 helps to build the baby's brain, the retina, and the fetal nervous system. In addition, omega-3s influence the growth of the cardiovascular system. Getting enough omega-3s to maintain the balance of hormone-producing products called prostaglandins is essential. Hormones regulate. Depending on the type of dietary fatty acid, a particular type of prostaglandin is produced. The imbalance in these prostaglandins causes the disease (Dunstan, 2008). Omega-3 therefore has many health benefits, preventing heart disease, improving blood coagulation function and controlling inflammation in the body. High doses of omega-3s help treat and prevent mood disorders and broadly prevent diseases such as cancer, inflammatory bowel disease and autoimmune diseases such as lupus and rheumatoid arthritis. Pregnant women are one of the most important people who should pay special attention to proper Omega 3 diet. For pregnant

women apart from prenatal examinations and exercises, eating balanced meals daily is essential to maintaining a healthy pregnancy. Doctors usually prescribe some folic acid or multivitamin supplements during pregnancy. Most women have been aware of the effect of folic acid on accelerating fetal growth, but the benefits and effects of essential fatty acids have not yet been reported (Helland, 2008 ).

Omega-3 acids are important for pregnant women because they help reduce the risk of prenatal seizures. Prenatal seizures are a potentially dangerous complication that may occur late in pregnancy and result in seizures and other dangerous effects if left untreated. Symptoms of prenatal seizures include hypertension, fluid retention, overweight, and protein in the urine ( Judge, 2007).

### **CONCLUSION**

Omega-3 fatty acids are important for human health. However, it is important to note that these fatty acids are taken up at a certain rate and the balance between them is maintained. Essential fatty acid may play a role in inflammatory diseases, neurological, neuropsychiatric diseases, cancer and chronic diseases (such as diabetes, arthritis, colitis) and the positive effects of adding these fatty acids to treatment protocols are observed.

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