

# A Guide to Processed Oils and Fats

Primary source: *Understanding Dietary Fats and Oils: A Scientific Guide to their Health Effects*, Dr. Steve Blake. 2012 LifeLong Press

Oil	Ratio LA:ALA <sup>1</sup>	Contains vit E <sup>2</sup>	Saturated fat <sup>3</sup>	Oleic acid <sup>4</sup>	Heat Stable <sup>5</sup>	Easily Oxidized <sup>6</sup>	GMO <sup>7</sup>	Trans Fats <sup>8</sup>	Contaminated <sup>9</sup>	Endothelial Damage <sup>10</sup>	notes
<b>flax</b>	1:4	yes	v.low	yes	no	yes	no	no	yes		
<b>canola</b>	2:1	yes	v. low	62%	no	no	no	no	yes	no	
<b>olive oil</b>	14:1	yes	low (11%)	70%	medium	moderately stable	no	someformed in extraction process	yes	yes, unless eaten with vegetables	cold pressed may contain trace amounts of antioxidants
<b>soy oil</b>	7:1	low	v. low	25%	no	yes	unless organic	if hydrogenated	yes	yes	most common oil used in US, used to fry french fries and donuts
<b>sunflower</b>	10:1	high	v. low	45-75%	yes	no	no	if hydrogenated	yes	if hydrogenated	
<b>corn</b>	50:1	some	low	25%	yes	no	unless organic	if hydrogenated	yes	if hydrogenated	
<b>safflower</b>	no ALA	high	v. low	75%	yes	no	no	if hydrogenated	yes	if hydrogenated	
<b>peanut oil</b>	no ALA	high	v. low		yes	no	no	no	yes	no data	
<b>seseme oil</b>	low ALA	low	v. low	39%	medium	no	no	no	yes	no data	antioxidant called sesamin
<b>coconut oil</b>	no ALA	none	v. high	low	medium	no	no	no	no	yes	
<b>cocoa butter</b>	no ALA	low	yes	30%			no	no	yes, if not organic	no data	found in more expensive chocolates, not usually eaten in high enough quantities to affect cholesterol
<b>butter</b>	no ALA	none	high (myristic)	low	yes	no	from cows that eat GMO corn and soy	yes, even organic	yes	yes	can have 5-20x amount of pesticide residues as veggie oils. Also contains antibiotic residues. Can also contain hormones
<b>fish oils</b>	no ALA, but do contain DHA and EPA	none	low	low	no	yes	no	no	yes, even if the label says otherwise		even those that claim to be free of mercury and other contaminants have still been found to be contaminated

1. LA (linoleic acid) and ALA (alpha-linolenic acid) are essential fatty acids (i.e. we need to get them from food). ALA sourced from leafy greens, seeds and walnuts, is an omega-3. It is converted to EPA and DHA (which are also omega-3s), thus EPA and DHA are not considered essential (only ALA). EPA and DHA are precursors to anti-inflammatory cytokines and anti-coagulant processes. DHA is also important for brain and eye health. Conversely, LA (an omega-6) is converted into arachidonic acid is a precursor to pro-inflammatory and pro-coagulant eicosanoids. Most diets are overly high in LA (likely due to a high consumption of vegetable oils). A good ratio of LA to ALA is in the 2:1 to 4:1 range. Most diets are 10:1 or 15:1. Those with inflammatory conditions like arthritis and asthma should really limit intakes of oils rich in LA and foods high in pre-formed arachidonic acid (i.e. chicken and fish). Limiting intakes of LA and eating 1-2 tablespoons of ground flax is a good way to improve that ratio and to encourage our own production of EPA and DHA. Eating too much pre-formed EPA (from fish oil) can suppress the immune system.

2. Vit E is actually a family of tocopherols. These are fat soluble, which is why it is sourced from foods higher in fat. Vit E is an important antioxidant and plays a role in protecting us from AD and arterial damage due to oxidative stress. The 'healthier oils' will provide some, although it is best to get Vit E from food, rather than oils or supplements (you don't always get the full complement of tocopherols from supplements). Best sources are sunflower seeds and almonds.

3. The three saturated fatty acids that increase serum cholesterol levels are palmitic, myristic, and lauric. Beef, cheese and chicken are major contributors of palmitic and myristic. Dairy is the major contributors of myristic, thus butter is high in myristic. Coconut oil is rich in lauric. Cocoa butter, while highly saturated has fewer of the artery clogging saturated fats.

4. Oleic acid is a monounsaturated fatty acid that is quite stable and won't contribute to elevated cholesterol levels.

5. Some oils are better for low to moderate heat cooking than others. Most oils don't do well when used at very high temperatures (like deep frying). The most stable oils are the hydrogenated oils, soybean oil is the most common oil used for deep frying. Others are easily destabilized with heat and should not be used in cooking.

6. Some oils are easily oxidized when exposed to heat, air and light. In particular, the omega-3 fatty acids are most susceptible and become oxidized and rancid when extracted from their natural packaging. Fish oil supplements are particularly prone to rancidity. One study tested fish oil fresh from the plant where they were being produced, and found that over 90% of samples were already rancid. Flax oil, while slightly more stable than fish oil, is also delicate. Thus, the best sources of ALA are whole food sources like flax, chia or walnuts. Flax seeds can be stored for years as it is protected by a tough shell. If using flax oil, it should be stored in a dark bottle in the fridge and have an expiration date.

7. Some oils (or foods) are genetically mutated and others are genetically modified (GMO). GMO is a process where genes from other plants or even from animals are inserted into the seed (or bean, as in soy). Organic foods cannot be GMO, but can be genetically mutated. Genetic mutation is when foods are selectively bred or subjected to chemicals that mutate the genes. Over 2,000 foods have been genetically altered. These can still be considered organic. Canola oil, for example, was genetically mutated to reduce erucic acid, a toxic compound, so it can still be organic and it isn't a GMO food. Other seeds like sunflower and safflower have also been mutated to increase their oleic acid content. Probably the biggest concern with GMO crops is that they tend to be heavily sprayed with pesticides.

8. Any oils that are hydrogenated or partially hydrogenated will contain trans fats. Dairy or meat from ruminant animals contain some trans fats (produced in the guts of these animals). Twenty-one percent of trans fats in the US are from meat and dairy, the rest is from hydrogenated oils. Trans fats will damage arteries and elevate serum cholesterol.

9. When oils are extracted and processed toxic solvents like hexane are often used (it increases the extractable oil). It is well documented that hexane is toxic to nerves. The EU and Canada have a residue limit for hexane in food, but the US does not. Coconut, palm, cocoa butter, virgin olive oil and sesame oil are not normally extracted with hexane. Oils that are routinely extracted with hexane are soy, flax, canola, peanut, safflower, corn, non virgin olive and cottonseed oils. When hexane is used, the ground up seeds or beans are bathed in hexane for 30-45 minutes at a temperature of around 300 degrees. While attempts are made to remove most of the hexane from the oil, residues remain. The best way to avoid oils with hexane is to buy cold pressed or expeller pressed. Cold pressed is more expensive to produce and the oils are not heated in the process. Expeller pressing exerts great pressure on the ground seeds or beans and increases temperatures to 200 to 250 degrees F. This can result in various degrees of oxidative damage depending on the oil. In modern day processing, bleaching (using clay) is also used to remove any color (heat is also used in this process). Bleaching also removes antioxidants such as chlorophyll, beta-carotene, and polyphenols. Trace minerals such as iron and copper are also removed. Other crops used to make oils, like cottonseed, cocoa, or soybeans, unless organically grown, are typically grown with lots of pesticides.

10. Endothelial function (EF) is a measure of the ability of an artery to respond to increased blood flow. Impaired EF is a good predictor of future cardiac risk. EF has been measured post ingestion of various foods and oils. Oils used in frying and fast food meals for example show almost an immediate decline in EF upon ingestion. Trans fats and saturated fats have also been shown to negatively impact EF. Whole plant foods, like walnuts, which are high in fat don't negatively impact EF (they can actually positively impact EF). Consumption of anti-oxidant rich foods positively impacts EF. Olive oil has been shown to negatively impact EF, unless eaten with antioxidant rich vegetables.

**Author's note:** At the end of the day, there really is no such thing as a 'healthy oil'. They are all highly processed, low in nutrients, contain no fiber and are the most calorically dense foods that we eat, 4,000 cal per pound. They don't engage our mechanisms of satiety and can thus lead to weight gain or, at the very least, can hamper weight loss efforts. It's been estimated that we consume 300-500 calories per day just from the oil that is added to our foods. But, if I had to pick a cooking oil I would choose sesame oil and/or cold pressed canola or some olive oil for my salad. I mostly use nut based dressings for my salad which are oil free.