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What Are Industrial Seed Oils?

Unlike traditional fats such as [olive oil](#), [coconut oil](#), [butter](#), ghee, and lard, industrial seed oils **are a very recent addition to the [human diet](#)**.

In fact, industrial seed oils, the highly processed oils extracted from soybeans, corn, rapeseed (the source of canola oil), cottonseed, and safflower seeds, were only introduced into the American diet in the early 1900s. How, then, did these oils come to occupy such an influential position not only in the Standard American Diet but in “Westernized” diets around the world? The story is strange indeed.

In 1870s Cincinnati, two soapmakers—William Procter and James Gamble—decided to enter into business together. While soap had historically been made from rendered pork fat, Procter and Gamble were an innovative pair and decided to create a new type of soap from vegetable oils. Around the same time, oil was discovered in Pennsylvania; it quickly displaced cottonseed oil, which had long been used for lighting, as a fuel source. Cottonseed oil was consigned to the status of “toxic waste” until the enterprising Procter & Gamble realized that all that unwanted cottonseed oil could be used to produce soap. But there was another plus that appealed to their business sensibilities: the oil could be chemically altered via a process called “hydrogenation” to turn it into a solid cooking fat that resembled lard. That’s how an oil formerly classified as “toxic waste” became an integral part of the American diet when Crisco was introduced to the market in the early 1900s. (1)

Soon, other vegetable oils followed. Soybeans were introduced to the United States in the 1930s, and by the 1950s, it had become the most popular vegetable oil in the country. Canola, corn, and safflower oils followed shortly after that. The low cost of these cooking oils, combined with strategic marketing on the part of the oil manufacturers, made them wildly popular in American kitchens even though their use was unprecedented in human history.

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How Are Industrial Seed Oils Made?

The general process used to create industrial seed oils is anything but natural. The oils extracted from soybeans, corn, cottonseed, safflower seeds, and rapeseeds must be refined, bleached, and

deodorized before they are suitable for human consumption.

1. **First, seeds are gathered** from the soy, corn, cotton, safflower, and rapeseed plants.
2. **Next, the seeds are heated to extremely high temperatures;** this causes the unsaturated fatty acids in the seeds to oxidize, creating byproducts that are harmful to human and animal health.
3. **The seeds are then processed with a petroleum-based solvent,** such as hexane, to maximize the amount of oil extracted from them.
4. **Next, industrial seed oil manufacturers use chemicals to deodorize the oils, which have a very off-putting smell once extracted.** The deodorization process produces trans fats, which are well known to be quite harmful to human health.
5. **Finally, more chemicals are added** to improve the color of the industrial seed oils.

Altogether, industrial seed oil processing creates an energy-dense, nutrient-poor oil that contains **chemical residues, trans fats, and oxidized byproducts.**

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From Toxic Waste to “Heart Healthy”: The History of Seed Oils

How did industrial seed oils go from being classified as “toxic waste” to enjoying the title of “heart healthy” fats? The story involves a scandalous combination of donations to medical organizations, dubious scientific research, and unsubstantiated marketing claims.

In the late 1940s, a small group of cardiologists who were members of the still somewhat new American Heart Association received a \$1.5 million donation from Procter & Gamble; thanks to this generous infusion of cash from the makers of Crisco, the AHA now had sufficient funding to grow its national profile as a physician’s organization dedicated to heart health. It also were quick to endorse industrial seed oils, more kindly referred to by now as “vegetable oils,” as a healthier alternative to traditional animal fats.

Around the same time, an ambitious physiologist and researcher named Ancel Keys introduced his diet–lipid hypothesis, in which he presented data that seemed to suggest a link between saturated fat and cholesterol intake and heart disease. Since animal fats are a rich source of dietary saturated fat and cholesterol, they quickly became the object of his derision. Citing animal fats as “unhealthy,” Keys instead recommended the consumption of polyunsaturated fatty acids (PUFAs), which preliminary research had associated with reductions in cholesterol and the risk of heart disease. Keys’ conclusions were in line with the industrial seed oil industry’s motives—to get people to eat more seed oils! Soon,

ads for “heart healthy” margarine (a solid form of vegetable oil) and other seed oils became commonplace, and healthy, traditional fats were all but forgotten.

While Keys’ lipid hypothesis is now understood to be based upon faulty research, his ideas nonetheless permeated the medical community. (2) Soon, many medical organizations, including the National Cholesterol Education Program and the National Institutes of Health, had hopped aboard the anti-animal fat train, echoing the AHA’s advice that people should avoid animal fat and instead consume polyunsaturated vegetable oils such as Crisco and other shortenings, soybean oil, and corn oil. This confluence of events and mutual interests led to the sweeping replacement of natural dietary fats such as lard and butter with unsaturated industrial seed oils, indelibly changing the shape of the American (and eventually, the global) food landscape.

Only in recent years has the validity of the health claims associated with industrial seed oils been seriously called into question. A 2014 meta-analysis found no benefit to overall health from reducing saturated fats or increasing PUFAs from vegetable oils. (3) Furthermore, the evidence does not support current dietary guidelines urging people to replace saturated fats with vegetable oils. (4, 5)

In fact, a growing body of research indicates that **the consumption of industrial seed oils has significant adverse effects on our health.**

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Six Reasons Industrial Seed Oils Are Terrible for Your Health

There are six main problems with industrial seed oils:

1. The consumption of industrial seed oils represents an evolutionary mismatch.
2. Eating industrial seed oils raises our omega-6-to-omega-3 fatty acid ratios, with significant consequences for our health.
3. Industrial seed oils are unstable and oxidize easily.
4. They contain harmful additives.
5. They’re derived from genetically modified crops.
6. When industrial seed oils are repeatedly heated, even more toxic byproducts are created.

1. They’re an Evolutionary Mismatch

Evolutionary mismatch, a mismatch between our genes and the modern environment, is the primary driver of chronic disease today. In few areas is evolutionary mismatch more apparent than in the Standard American Diet; the high amounts of refined carbohydrates and calories of this diet work against our ancestral biology, causing us to become overweight and sick.

Industrial seed oils, like refined sugar and excess calories, also represent an evolutionary mismatch. Up until the 1900s, humans did not consume industrial seed oils. From 1970 to 2000, the average consumption of one industrial seed oil, soybean oil, skyrocketed from a mere four pounds per person per year to a whopping 26 pounds per person per year! (6)

Today, linoleic acid, the primary fatty acid in industrial seed oils, accounts for 8 percent of our total calorie intake; in our hunter–gatherer ancestors, it accounted for only 1 to 3 percent of total calories. (7) Researchers who are wise on the topic of evolutionary mismatch posit that our bodies just aren't designed to handle such a massive consumption of linoleic acid. As a result, our high levels of industrial seed oil consumption are causing our health to suffer.

2. They Have an Imbalanced Omega-6-to-Omega-3 Ratio

Essential fatty acids are polyunsaturated fats that we humans cannot make ourselves and must, therefore, consume in our diets. They come in two varieties: omega-6 fatty acids and omega-3 fatty acids. Upon consumption, omega-6 fatty acids give rise to arachidonic acid and potent metabolites that are primarily pro-inflammatory in nature, including prostaglandin E2 and leukotriene B4. Omega-3 fatty acids such as ALA, EPA, and DHA, on the other hand, give rise to anti-inflammatory derivatives.

A delicate balance between omega-6 and omega-3 fatty acids must be maintained in the body to promote optimal health. The ancestral ratio of omega-6 to omega-3 is 1 to 1. Westernized diets, however, greatly exceed this balance, with omega-6 to omega-3 ratios in the range of 10 to 1 to 20 to 1. (8) A high intake of omega-6 fatty acids, combined with low omega-3 intake, leads to an imbalance in pro-inflammatory and anti-inflammatory mediators. **This imbalance produces a state of chronic inflammation that contributes to numerous chronic disease processes.**

Industrial seed oils are perhaps **the most significant contributor to the imbalanced omega-6-to-omega-3 ratio** characteristic of Westernized diets and thus **play a significant role in chronic inflammatory diseases.**

3. Industrial Seed Oils Are Highly Unstable

The polyunsaturated fatty acids in industrial seed oils are highly unstable and oxidize easily upon

exposure to heat, light, and chemical inputs. **When industrial seed oils are exposed to these factors, two harmful substances—trans fats and lipid peroxides—are created.** Trans fats are well known for their role in the development of cardiovascular disease and type 2 diabetes; in fact, for every 2 percent increase in calories from trans fats, your risk of heart disease is nearly doubled! (9) Lipid peroxides, on the other hand, are toxic byproducts that damage DNA, proteins, and membrane lipids throughout the body. The accumulation of lipid peroxides in the body promotes aging and the development of chronic diseases.

4. They're Full of Additives

Because the fatty acids in industrial seed oils are so unstable, **synthetic antioxidants are added in an attempt to prevent oxidation and rancidity.** Unfortunately, these synthetic antioxidants come with problems of their own. The synthetic antioxidants BHA, BHT, and TBHQ have endocrine-disrupting, carcinogenic, and immune-disrupting effects. (10, 11, 12, 13) Also, TBHQ has been found to increase the IgE (immunoglobulin E) response to food allergens, setting off a release of antibodies, and may thereby promote the development of food allergies. (14)

5. Industrial Seed Oils Come from Genetically Modified Plants

In addition to being nutrient poor and full of unsavory chemicals and toxic byproducts, the overwhelming majority of industrial seed oils are derived from genetically modified plants. **In fact, the plants used to make industrial seed oils comprise the top genetically modified crops—corn, soy, cotton, and rapeseed.** In the United States, 88 percent of corn, 93 percent of soy, 94 percent of cotton, and 93 percent of rapeseed crops are genetically modified. (15, 16, 17) Few studies have been conducted on the long-term safety of consuming genetically modified foods, giving us yet another reason to avoid consuming industrial seed oils.

6. They're Often Repeatedly Heated (And Extra Toxic)

As if industrial seed oils weren't already bad enough for our health, restaurants and home cooks frequently engage in a practice that further magnifies their harmful effects—they repeatedly heat industrial seed oils. While the habit of reusing industrial seed oils over and over (typically in large deep-fryers, in the case of restaurants) reduces costs, **it results in an oil that is chock-full of toxic byproducts.**

The repeated heating of industrial seed oils depletes vitamin E, a natural antioxidant, while inducing the formation of free radicals that cause oxidative stress and damage DNA, proteins, and lipids throughout the body. These harmful effects explain why repeatedly heated industrial seed oils are associated with high blood pressure, heart disease, and intestinal and liver damage. (18, 19, 20)

How So-Called “Healthy” Seed Oils Are Making Us Sick

Contrary to what many health organizations have been telling us for years, **industrial seed oils are not healthy foods**. Rather, their consumption is associated with a variety of health problems.

Asthma

Eating industrial seed oils may increase your risk of [asthma](#). A high intake of omega-6 fatty acids, such as those present in industrial seed oils, relative to omega-3 fatty acids increases pro-inflammatory mediators associated with asthma. ([21](#))

Autoimmune Disease

Industrial seed oils may promote [autoimmunity](#) by raising the body’s omega-6-to-omega-3 ratio and by increasing oxidative stress and chronic inflammation. ([22](#))

Cognition and Mental Health

Industrial seed oils are particularly harmful to the brain. A high omega-6-to-omega-3 fatty acid ratio predisposes individuals to [depression](#), [anxiety](#), cognitive decline, and dementia. ([23](#), [24](#)) Canola oil consumption is linked to worsened memory and impaired learning ability in [Alzheimer’s disease](#). ([25](#)) Trans fats, which end up in industrial seed oils unintentionally, as a consequence of chemical and heat processing, and intentionally, during the process of hydrogenation, are associated with increased risks of dementia and, interestingly, aggression. ([26](#), [27](#))

Diabetes and Obesity

Are industrial seed oils making us [overweight and diabetic](#)? The science certainly seems to suggest so. Research in mice indicates that consuming high levels of linoleic acid, the primary fatty acid in industrial seed oils, alters neurotransmitter signaling, ultimately increasing food consumption and fat mass. ([28](#)) In mice, a diet high in soybean oil induces obesity, insulin resistance, diabetes, and fatty liver disease. ([29](#), [30](#)) Animal research also suggests that canola oil may cause insulin resistance. ([31](#))

Human studies also point to the effects of industrial seed oils on diabetes and obesity, especially in children. A [maternal diet](#) high in omega-6s compared to omega-3s is associated with an increased risk of obesity, a major risk factor for diabetes, in children. ([32](#)) A childhood diet with a high omega-6-to-omega-3 ratio may also lead to insulin resistance, prediabetes, and obesity in adulthood. ([33](#), [34](#))

Heart Disease

Contrary to what the AHA has been telling us for the past 100 years, industrial seed oils are *not* good for our hearts! **In fact, oxidized fatty acids from industrial seed oils appear to play a pivotal role in the development of cardiovascular disease.** Researcher James DiNicolantonio has presented a theory called the “oxidized linoleic acid theory of coronary heart disease” that links the consumption of linoleic acid-rich industrial seed oils with cardiovascular disease. (35) His theory goes like this:

- Dietary linoleic acid from industrial seed oils is incorporated into blood lipoproteins.
- The instability of linoleic acid increases the likelihood of lipoproteins oxidizing.
- Oxidized lipoproteins are unable to be recognized by their respective receptors throughout the body and instead activate macrophages, which initiate foam cell formation, atherosclerosis, and cardiovascular disease.

Industrial seed oils also contribute to cardiovascular disease by increasing the omega-6-to-omega-3 ratio. A high omega-6-to-omega-3 ratio is an established risk factor for cardiovascular disease because excess omega-6 has pro-inflammatory and prothrombotic effects on the vascular system. (36) Finally, another emerging theory suggests that canola and soybean oils may contribute to cardiovascular disease by inhibiting processes involving vitamin K2, which is essential for heart health. (37)

IBS and IBD

Research suggests that industrial seed oils may harm gut health, contributing to conditions such as irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD). In one study, mice fed a diet high in omega-6 fatty acids from corn oil experienced increases in pro-inflammatory gut bacteria; these changes favor the development of gastrointestinal pathologies, among many other chronic diseases. (38)

Human studies also suggest a link between industrial seed oils and GI conditions. Women with IBS demonstrate significantly elevated levels of arachidonic acid, an omega-6 fatty acid abundant in industrial seed oils, and pro-inflammatory PUFA metabolites, compared to healthy controls. (39) Furthermore, an imbalance between omega-6 and omega-3 fatty acids is correlated with IBD. (40)

These findings suggest that consuming high levels of omega-6 fatty acids alters the gut microbiota and promotes gastrointestinal inflammation, thereby contributing to the development of IBS and IBD. Since industrial seed oils are the most abundant source of omega-6 fatty acids in the Standard American Diet, it stands to reason that **people with IBS and IBD should avoid these oils and instead consume natural fats from olive oil, coconut oil, wild seafood, nuts and seeds, and healthy animal fats.**

Inflammation

A high omega-6 intake from industrial seed oils promotes chronic inflammation. The consumption of

both partially hydrogenated industrial seed oils and non-hydrogenated soybean oil is associated with elevations in C-reactive protein, TNF-alpha, and interleukin-6, which are biomarkers of systemic inflammation. ([41](#), [42](#))

Infertility

Approximately 9 percent of men and 11 percent of women in the United States have impaired fertility. ([43](#)) While many factors are contributing to soaring rates of infertility, one overlooked cause may be our high consumption of industrial seed oils. Infertile men exhibit a significantly elevated omega-6-to-omega-3 fatty acid ratio compared to fertile men. ([44](#)) In animal studies of female mammals, a high intake of omega-6 fatty acids causes poor reproductive outcomes. ([45](#))

Macular Degeneration

Industrial seed oils may be harmful to the eyes. A high intake of omega-6 fatty acids **increases the risk of age-related macular degeneration**, an eye disease that causes progressive vision loss and eventual blindness. ([46](#)) Imbalanced levels of omega-6 consumption may contribute to eye problems by promoting inflammation and by displacing the omega-3 fatty acid DHA, which is crucial for vision.

Osteoarthritis

In individuals with osteoarthritis, there's an association between omega-6 fatty acids and the presence of synovitis, an inflammation of the membrane that lines joint cavities. Conversely, an inverse relationship has been found between omega-3 fatty acid consumption and cartilage loss in the knee as indicated by MRI. ([47](#)) Since industrial seed oils contribute a large amount of omega-6 fatty acids to the diet, **avoiding these oils may be beneficial for those with or at risk of osteoarthritis.**

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How to Avoid Industrial Seed Oils

The first step in banishing industrial seed oils from your diet is to clean out your pantry and **get rid of any bottles of canola, corn, cottonseed, soybean, sunflower, safflower, or peanut oils you have in your kitchen.** These oils are not “healthy,” despite misleading claims that may appear on their labels.

Step number 2 is to **stop eating processed foods**, as these are a significant source of industrial seed oils. Also try to reduce your consumption of restaurant foods, which are typically cooked in repeatedly heated industrial seed oils.

Finally, step 3 is to **avoid eating grain-fed meat**, to the extent you can. There is evidence to suggest that grain-fed animals may accumulate the toxic byproducts of industrial seed oils, which comprise a large

part of their diet, in their meat; when you eat this meat, you too may become a repository for lipid peroxides and other harmful byproducts of industrial seed oils.

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When It Comes to Omega-6, Quality Matters

While industrial seed oils are high in omega-6, there are also plenty of whole, fresh foods that naturally contain omega-6 fatty acids, including **nuts, poultry, and avocados**. When consumed as part of a balanced, real-food diet containing abundant omega-3 fatty acids from seafood, omega-6 from whole foods is not a problem. These whole-food sources of omega-6 fatty acids include nutrients that protect omega-6 from becoming oxidized, and they are also not exposed to the chemicals and industrial treatments that make industrial seed oils so toxic.

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Six Fats You *Should* Be Cooking With

Now that you've eliminated industrial seed oils from your kitchen, what fats should you use instead? **Look to the types of fats our ancestors have used for thousands of years**—olive oil, coconut oil, and animal fats are natural, wholesome sources of fatty acids for nourishing our bodies.

Here's a quick breakdown of the types of fats I recommend.

1. Extra Virgin Olive Oil

Olive oil has been a part of the human diet for literally thousands of years. It is rich in the antioxidant vitamin E and polyphenols with a wide range of health-promoting properties, including cardioprotective and anti-diabetic properties. One tablespoon of olive oil contains 1.9 grams of saturated fatty acids (SFAs), 9.8 grams of monounsaturated fatty acids (MUFAs), and 1.4 grams of PUFAs.

2. Coconut Oil

Coconut oil is a superfood with many health-promoting properties. It contains medium-chain triglycerides such as lauric acid, a fatty acid that is readily used by the body for energy and has antifungal, antibacterial, and antiviral properties. Coconut oil contains 90 percent saturated fat, which makes it very heat stable.

3. Butter and Ghee

If you tolerate dairy, butter and ghee may be great additions to your diet. Butter and ghee from grass-fed animals contain conjugated linoleic acid, a type of fatty acid with anti-cancer and metabolic health-promoting properties. While butter may contain traces of milk proteins, ghee is usually a safe option even for dairy-sensitive people because all milk constituents are removed in its creation.

Both butter and ghee are comprised mainly of saturated fat. One tablespoon of butter contains 7.2 grams of SFAs, 2.9 grams of MUFAs and 0.4 grams of PUFAs, while one tablespoon of ghee contains 8 grams of SFAs, 3.7 grams of MUFAs, and 0.5 grams of PUFAs.

4. Pastured Lard

This may come as a surprise, but it turns out that lard is mostly composed of monounsaturated fat, the type of fat in olive oil that has been promoted as “heart healthy” by the conventional medical community for decades! Lard, the fat rendered from pigs, is high in saturated fat and is a good substitute for butter in recipes if you can’t tolerate dairy.

One tablespoon of lard contains 5 grams of SFAs, 6 grams of MUFAs, and 1.6 grams of PUFAs. Lard also contains 500 to 1000 IU of vitamin D per serving, depending on what the pigs ate and whether they were exposed to sunlight. If you are interested in getting a nice dose of vitamin D from lard, choose lard produced from pastured pigs that have been allowed to roam outdoors.

5. Pastured Tallow

Tallow is fat rendered from meat other than pork, such as beef and bison. It has a high smoke point that makes it great for high-heat cooking. In fact, most restaurants used tallow in their deep fryers until the 1970s, when the industrial seed oil industry usurped the position of traditional fats in our diets. Tallow contains 6.4 grams of SFAs, 5.3 grams of MUFAs, and 0.5 grams of PUFAs in a one-tablespoon serving.

6. Duck Fat

Duck fat is a delicious traditional cooking oil that also has great versatility. It has a high smoke point, making it great for high-heat cooking, but a delicate flavor and similar fatty acid profile to olive oil. One tablespoon of duck fat has 4 grams of SFAs, 6 grams of MUFAs, and 1.6 grams of PUFAs. Try using pastured duck fat for roasting potatoes—you’ll never want to use anything else for cooking potatoes once you’ve given it a try!

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Finally, be sure to incorporate plenty of healthy fats from whole foods into your diet. Soaked and

sprouted nuts, avocado, coconut, wild-caught fatty fish, grass-fed meats, and wild game are all excellent sources of healthy fats and can be incorporated into your diet in countless ways. Note: When you're choosing animal fats for cooking, **remember to choose pasture-raised sources** because conventional alternatives are significantly higher in omega-6s.

If optimal health is your goal, then **industrial seed oils have no place in your diet**. Instead, cook with traditional animal fats, get your omega-6s from whole food sources such as nuts and poultry, and balance things out with omega-3 fatty acids from seafood, shellfish, and fish oil.

Now, I'd like to hear from you. Do you avoid industrial seed oils? What types of fats do you eat? Let me know in the comments below.

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kem johnson

FEBRUARY 23, 2019 AT 3:54 PM

Hmmm, no mention of the Minnesota Heart Study or the The Sydney Diet Heart Study, both of which compared a reasonable number of participants over a reasonable length of time. Both of which, also, had experimental arms people that were switched from normal dietary saturated fats to "vegetable oil". Both of those arms fo the studies showed a marked increase in mortality. Yum. both studies were only reluctantly published long after completion, I reckon, because they killed people.

Malcom Gladwell has a nice podcast regarding the Minnesota Study here: <http://revisionisthistory.com/episodes/20-the-basement-tapes>

Reply

JohnD

FEBRUARY 21, 2019 AT 9:04 AM

Most people consume way too much n-6, it is certainly a large contributor to health problems. But almost all Sunflower and Safflower oils you will find on the store shelf in 2019 are Oleic Acid fractions low in n-6, high in monounsaturated fat, essentially the same FA profile as Olive and Avocado oils. The decades old research demonizing Sunflower and Safflower are based on the high n-6 Linoleic Acid fractions sold at the time. Oleic acid is also more stable and heat resistant than Linoleic Acid.

Reply

Lisa

FEBRUARY 23, 2019 AT 2:49 PM

John, do you have any references for that? I'd love to see it. Thanks!

Reply

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