The Dangers of Industrial Vegetable Oils

There are many fallacies that guide our beliefs in human nutrition today and often prevail until long-term studies indicate otherwise. Here are just a few:

- *If vegetables are healthy, anything that comes from a vegetable is nutritive.*
- *Fats are linked to obesity and disease; therefore all fats are bad and should be avoided.*
- *All calories are created equal.*
- *Nutritional supplements are not necessary if an individual eats a healthy balanced diet.*

About Vegetable Oils

Vegetable oil is a product consumed worldwide. Production skyrocketed with advances made in agricultural farming from the industrial revolution. Soybeans, palm plant, and corn are just a few crops that have since been mass produced.

Vegetable oils are popular in modern cuisine because they can be used in different techniques in restaurants and home cooking. Oils are utilized based on smell, color, taste, and the potential stability at high cooking temperatures. Vegetable oils dominate an overwhelming amount of processed foods found in dressings, marinades, spreadable cheeses, packaged baked goods, and the list continues.

Statista collects information from over 18,000 studies worldwide. Data collected reveals that there has been a steady increase in the consumption of vegetable oils from 2005 to 2015. Currently, people are consuming 172.99 million metric tons of vegetable oil a year. Most popular in demand is palm oil followed by soybean, canola, a generalized “other”

category and lastly sunflower oil. (1)

Heart Healthy Myths

Food manufacturers deserve most of the blame for such faulty thinking. Health-conscious consumers are targeted by the vegetable oil industry. For example, canola oil is advertised as a good source of heart-healthy omega-3 fatty acids and a nutritive food source for frying or other cooking purposes. Health-conscious consumers are targeted in this marketing approach because omega-3 fatty acids are typically deficient in the average American diet.

Nutritionists and dieticians recommend the consumption of plant sterols (cholesterol-like structure) daily to help regulate cholesterol levels. When healthy plant sterols are provided in vegetables and nuts, the body's cholesterol has to compete for recognition that ultimately leads to a reduction in harmful low-density lipoprotein cholesterol. Hopping on the pro-plant sterol bandwagon too quickly, food manufacturers created a new booming product in the form of margarine. (20)

False Marketing

False marketing stimulated a lure from individuals trying to eat nutritiously. "I Can't Believe It's Not Butter" products were advertised as free of cholesterol. According to the product's label, ingredients contained liquid and partially hydrogenated soybean oil amongst several other ingredients known to raise human health concerns.

"I Can't Believe It's Not Butter" products have been redesigned and relabeled today to no longer include partially hydrogenated oils and trans fats. Unfortunately, the product is still produced from health hazardous vegetable oils such as canola and palm (21).

Learning the Fat Terminology

The term “fat” has received a blemished reputation across most cultures in the world. Rising obesity and heart disease rates provoked the assumption that *fats consumed equals pounds added*. This belief is indeed misunderstood. Without a solid understanding of nutrition, consumers remain susceptible to manipulative food industry claims. It is as if the blind is leading the blind.

Fat is essential for brain function and overall health and well-being. Generally speaking, fats are categorized based on their chemical structure and their physical appearance at room temperature.

Saturated Fats: Naturally found in meat, dairy and coconut products. Solid at room temperature. Looks like a straight chain linked fence. Contains as many hydrogen bonds as it could possibly hold.

Monounsaturated Fats: Examples are olive oil, lard, and canola. Typically liquid at room temperature but possibly solidifies when cooled. Looks like your bicycle chain when it has a kink in one link that causes the chain to bend. Has just a slightly bit fewer hydrogen bonds structurally attached.

Polyunsaturated Fats: Found in several plant-based oils including flaxseed oil and also found in fatty fish such as salmon. Remains liquid at cold temperatures. Looks like your bent gold chain with multiple kinks after you untangled it from the jewelry box. Has the least percentage of hydrogen bonds attached to the chain compared to saturated or monounsaturated fats. (4, 20)

Vegetable Oils Are a Source of

Trans Fats

As a result of their structures, straight chain linked saturated fats are readily available to link up with other biological compounds. Increased saturated fat consumption promotes a greater concentration of fat storing triglycerides harmful to the body. So what does the structure of the fat have to do with trans fats?

Trans fatty acids are artificially created when the saturated fat structure is altered to resemble the chemical composition of unsaturated fat. Even though a few hydrogen bonds are removed from the chain, hence the name “partially hydrogenated”, the problem remains because the chain remains straight. As a result, only 20% of trans fats in an individual’s diet is sourced from nature whereas 80% originates from these man designed and technology produced partially hydrogenated vegetable oils (4).

A lax standard from food regulating agencies, especially in the United States, allows food manufacturers too much wiggle room for vegetable oil use. Despite having been entirely banned in other countries, foods loaded with trans fats flood the American food supply. The Federal Drug Administration (FDA) did, however, pass a regulation in 2003 requiring food labels to disclose trans fats as an ingredient that has been in effect since 2006. (4, 5)

What Are Hydrogenated Oils?

Partially hydrogenated oils (trans fats) are a cheap and effective tool to increase shelf life and melting temperatures of food products (20). As exemplified over and over again, food companies are intelligent, manipulative and always a step ahead of you to bulk up their wallets.

Margarine and vegetable shortening are engineered foods that

have increased melting points. Remember what types of fats remain solid at room temperature because of straight linked chains? Genetically modified and mass produced soybean or safflower oil are chemically made into these solid fats and have been marketed since the 1930s (4).

The FDA considered the product Generally Recognized As Safe (GRAS) in 1977 due to the lack of scientific evidence correlating trans fats to human health problems (4). Isn't it interesting how the lack of information could be used to justify rationale?

Trans Fats Found in Tissue Samples

Costa Rican studies have since shown insight on the relationship between vegetable oil consumption and trans fat accumulation in the body. Costa Rica serves as an ideal location for nutrition based experimentation because of low dairy and meat consumption which may influence saturated fat levels.

Trans fats were calculated from tissue samples taken from the Costa Rican population. Researchers concluded that the primary sources of trans fat was soybean oil. Popular in cuisine to prepare beans, rice, eggs and fried foods, soybean oil accounted for 30% of sourced trans fats followed by margarine and baked goods. (4,17)

If enough supporting evidence did not exist in the 1930s when the product was introduced or in 1977 when the FDA ruled that trans fats were safe for human consumption, there is clearly enough evidence today for the FDA to readdress the safety of vegetable oils in food.

Avoiding Vegetable Oils

In 2014, The Center for Science in the Public Interest (CSPI)

recognized that artificial trans fat in food has declined by approximately 75% since 2005. A few popular examples of products that remain on the market and contain trans fats are:

- Turkey Hill Party Cake ice cream
- Sara Lee Classic New York Cheesecake
- Pop-Secret Kettle Corn
- Betty Crocker Pie Crust Mix
- Popeye’s breakfast hash browns (5)

Despite this seemingly optimistic statistic, the United States, Australia, Canada and Japan are consuming more canola oil than they have in previous decades (12). For a culture with everything but time, the dinner table has become a staple for prepackaged, processed foods fortified with vegetable oils.

Dietary Omega-3 Fatty Acids and Omega-6 Fatty Acids

Dietary recommendations promote consuming a greater intake of omega-3 fatty acids found in marine life, eggs, plants as well as vegetable oils. One might assume that the benefits from the omega-3 content alone make vegetable oil worth consuming. However, the idea that vegetable oils contain healthy omega-3s is also misunderstood.

Beneficial omega-3 fatty acids contain alpha-linolenic acid (ALA) and have heart protective properties (6). The problem with getting the recommended requirements of omega-3 fats from vegetable oils is that there is an even higher concentration of omega-6 fats available. Although omega-6 fats are an essential dietary need, the balance between the two types of fatty acids is delicate.

Problems With Omega-6 Diets

Omega-6 fats contain linolenic acid (LA). Scientific evidence reveals that the two fatty acid types biologically compete for metabolism. With the average human's diet now deficient in omega-3s and overloaded with omega-6 fatty acid sources, the healthy ALA simply cannot compete with our rich LA diets. Resulting health consequences are glycemic problems in individuals with diabetes, cholesterol issues, inflammation and cardiovascular related degeneration and disease. (6, 11)

The average American diet now has a ratio of 10 omega-6 fatty acids for every one omega-3 fatty acid consumed and vegetables oils are certainly a major culprit (6). A better source to get ALA for health benefits is from salmon, flaxseed, chia seeds, or whole English walnuts.

Refinement Is Not Always a Good Thing

The question then remains, where did all of the heart healthy promoting factors go? Refining vegetable oil is required to remove compounds not safe for human consumption. A series of high temperatures and chemicals are used to extract, bleach, and deodorize vegetable oil. Avocados are a great source of healthy fat, and we don't have to bathe them before consumption. (20)

The entire refinement process is responsible for destroying and depleting the oil of its beneficial omega-3 content and antioxidants. The result is a legally marketed biological poison with concentrated amounts of trans fats and an unbalanced omega-3 and omega-6 fatty acid ratio.

Environmental friendly researchers don't even suggest the use of these same vegetable oils in engineering. Due to the same reasons that contribute to inadequate chemical stability when

influenced by raising temperatures, biolubricants such as vegetable oil increase corrosion and acidity when used in engine oils (15). If it isn't recommended for engine use, how can it be recommended for human use?

Vegetable Oil: A Toxic Source of Chemicals and Pesticides

The danger of pesticides and other chemical food contaminants is becoming increasingly unavoidable and does not exclude vegetable oil. Cold-pressed is considered the "healthier" form of refined vegetable oil. With no added heat, liquid is isolated and the chemical properties of oil are not structurally altered. (14)

In 2012, researchers in Poland published their findings of known human carcinogens and common pesticides in refined and cold-pressed vegetable oils (14). Levels of the following synthetic compounds were discovered.

Polychlorinated biphenyls (PCBs): Associated with hormonal defects and disease. Researchers identified 18 types.

Polycyclic Aromatic Hydrocarbons (PAHs): Known to cause skin, lung and stomach cancer. Researchers identified 15 types.

Polybrominated Diphenyl Ethers (BPDEs): Flame retardant chemicals known to cause birth defects, cancer and neurobehavioral changes. Researchers identified 14 types (16).

As if these chemicals listed are not harmful enough, 74 classifications of pesticides were also measured. The Stockholm Convention sets guidelines for the allowance of persistent organic pollutants in food. The chemical levels measured exceeded the maximum permitted concentration under the guidelines of the Stockholm Convention. (14)

If fallacy originates from the concept that anything comes

from a vegetable is nutritive, whatever happened to *if you cannot pronounce what is in your food, don't eat it?*

Freshness Counts

The development of hypertension is linked to the oxidative (chemical altering) process of heating vegetable oils. Fast food chains most especially are known for their use of reheating vegetable oils simply because it is a cost effective approach in food production. With repetitive heating, the chemical structure of the oil ages and eventually depletes the antioxidants available such as vitamin E. As a consequence, free radicals increase in concentration, the toxicity of the oil increases and any possible health benefits are destroyed. (13)

Compared to fresh vegetable oil, heated vegetable oils have been indicated to raise blood pressure and promote various factors which increase the risk of hypertension. Researchers believe that part of the problem is because the networks for blood travel are altered.

Changes have been observed in the concentration of biological compounds that affect these pathways. Free radicals produced from heated vegetable oils not only causes disturbances in blood regulation but this oxidation process contributes to pathogenesis, or the development of disease. (13, 20)

Vegetable Oil Increases Risk of Coronary Heart Disease

Changes in the biological concentration of lipids, nitric oxide, nitrite and acetylcholine from vegetable oil consumption require long term human testing. The following factors contribute to an increase risk of coronary heart disease (11,18).

Cholesterol: In a Nurses' Health Study, researchers concluded that trans fatty acids increase the ratio of harmful low density lipoprotein cholesterol (LDL-c) and decrease beneficial high density lipoprotein cholesterol (HDL-c) concentrations (9). The study analyzed results collected from over 85,000 women. Women whom consumed margarine and other food sources containing trans fats had a significantly higher risk of coronary heart disease.

Blood Pressure: A study released in 2011 brought further attention to risks for cardiovascular related illnesses. Experimental rodents that consumed heated vegetable oils exhibited a significant increase in blood pressure. After only 24 weeks of consumption, blood pressure increased by over 25%. (13)

Nitric Oxide: Nitric oxide helps blood flow by expanding blood vessels. This mechanism is especially important during exercise when the brain and heart require an increased oxygen supply. The same experimental rodents had less nitric oxide available. Instead, an altered form of nitric oxide increased by up to 23.1% (13). Nitrite poses a health hazard; it is usually found in deli meats and bacon.

Acetylcholine: Acetylcholine is a neurotransmitter involved in biological functions such as stimulating nervous system activity involving arousal and learning. The reduction of acetylcholine levels were measured and correlated to the increase in heated vegetable oil consumption (13).

Vegetable Oil Elevates Risk of Cancer & Other Illnesses

In 2004, another Nurses' Health Study performed an experiment analyzing the intake of trans fatty acids in a group of 823 women (7). A linear association was found between increased trans fatty acid intake and higher risk of coronary artery

disease and diabetes.

Higher than normal biological compounds correlated to increased cancer risks, heart failure mortality, insulin resistance, lipid abnormalities, increased inflammation and immune infection.

Gut Changes Promote Inflammation

Researchers analyzed the effects of oil on metabolism in a study released in 2011 (11). They observed an altered gut environment with increased intestinal permeability as well as high concentrations of proinflammatory cytokines associated with cancer. The study concluded that vegetable oils have varying degrees of inflammatory properties on the body.

One inflammatory response includes an increase in endotoxin metabolism (11). Endotoxins are known to cause botulism. Until more human intervention studies are performed, it is too risky to assume that vegetable oils are safe for consumption because of the lack of supporting data accepted by the United States FDA.

Vegetable Oil Increases Women's Risk for Infertility

The Department of Nutrition, Brigham Women's Hospital and Harvard Medical School in Boston, MA underwent a study that assessed the relationship between ovulatory infertility and risks factors such as fat, cholesterol, and fatty acid intake. A high BMI is often associated with infertility issues in women. Researchers in this study concluded that most fatty acid types are actually not related to ovulatory infertility but rather a significant correlation exist with trans unsaturated fats. A 73% greater risk of ovulatory infertility was recorded for every 2% increase in trans unsaturated fats compared to other fat sources. (8)

Researchers dating back to 1999 understood the risk associated with vegetable oil and disease. An article published in *Plant Foods for Human Nutrition* warned of dangers linked to vegetable oil, specifically palm oil. Associated risks included toxicity in the kidneys, lungs, liver, heart, and even disorders such as Tay-Sachs and Gaucher's disease (2, 3). The FDA no longer permits the use of vegetable oil in infant formula because it has been linked to inhibiting growth and vitamin E deficiency amongst other health risks (20).

Revoke Authority from the Food Industry

Dr. Michael Jacobson, Executive Director at CSPI, petitioned the United States FDA in 2004 to revoke any authority given to the food industry to use partially hydrogenated vegetable oils. In the request, CSPI urged the FDA to encourage the use of the healthiest ingredients possible in replacement of partially hydrogenated oils from food manufacturers and restaurants. Cited research includes studies from health councils in other countries and research on the correlation of heart disease from the Institute of Medicine. An overwhelming amount of evidence from the most recent studies was also provided refuting the FDA's previous comments from 1976 that:

"There is no evidence in the available information on hydrogenated soybean oil that demonstrates, or suggests reasonable grounds to suspect, a hazard to the public when it is used as a direct or indirect food ingredient at levels that are now current or that might reasonably be expected in the future."(4)

Now, in a full reversal, the FDA has finally announced new regulations to prohibit trans-fats in processed foods beginning in 2016.

Recommendations & Alternatives to Vegetable Oils

By removing sources of vegetable oil in food, human health and wellbeing will improve. The following is a summary of foods containing vegetable oils that should be avoided:

1. Cooking foods with vegetable oils like canola, palm, peanut, sesame, canola or shortening.
2. Processed goods such as coffee creamers, canned frosting, pastries and frozen meals.
3. Fast food chains like McDonald's, Dunkin' Donuts and Burger King.
4. Alternative fat sources such as margarine.
5. All products containing trans fats or partially hydrogenated oils.

If vegetable oil cannot be entirely avoided, The Heart & Vascular Team with the Cleveland Clinic does not recommend deep frying for any oil including those with a high smoke point (19). It is also best to purchase organic oils whenever possible and reduce the intake of GMOs and chemical pollutants.

A more nutritious alternative to vegetable oils is organic coconut oil. Studies currently attribute several possible benefits to consuming coconut oil such as providing protection from Alzheimer's disease and heart-related illness.

Recommended Reading:

- *Healthy Fat Recipes*
- *What is a Cyclic Ketogenic Diet?*
- *Everything You Should Know About Fat*
- *Budwig Cancer Cure*
- *Health Benefits of Coconut Oil*
- *Avoid These Common Mistakes To Optimize Your Health Quickly*

- *Scientists Against GMOs*

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Additional Sources Include:

Healthiest Cooking Oil Chart with Smoke Points – Baseline of Health Foundation

New Alzheimer's Drugs Continue to Fail Where Coconut Oil Shines – Health Impact News