

## **POLYUNSATURATED VEGETABLE OILS: TOXIC by Ray Peat, Ph.D**

Immunodeficiency (weakness of the immune system) can take many forms. AIDS, for example, refers to an immunodeficiency which is "acquired," rather than "inborn." Radiation and vegetable oils can cause "acquired immunodeficiency." Unsaturated oils, especially polyunsaturates, weaken the immune system's function in ways that are similar to the damage caused by radiation, hormone imbalance, cancer, aging, or viral infections. The media discuss sexually transmitted and drug-induced immunodeficiency, but it isn't yet considered polite to discuss vegetable oil-induced immunodeficiency.

Unsaturated oils: When an oil is saturated, that means that the molecule has all the hydrogen atoms it can hold. Unsaturation means that some hydrogen atoms have been removed, and this opens the structure of the molecule in a way that makes it susceptible to attack by free radicals.

Free radicals are reactive molecular fragments that occur even in healthy cells, and can damage the cell. When unsaturated oils are exposed to free radicals they can create chain reactions of free radicals that spread the damage in the cell, and contribute to the cell's aging.

Rancidity of oils occurs when they are exposed to oxygen, in the body just as in the bottle. Harmful free radicals are formed, and oxygen is used up.

Essential fatty acids (EFA) are, according to the textbooks, linoleic acid and linolenic acid, and they are supposed to have the status of "vitamins," which must be taken in the diet to make life possible. However, we are able to synthesize our own unsaturated fats when we don't eat the "EFA," so they are not "essential." The term thus appears to be a misnomer. [M. E. Hanke, "Biochemistry," *Encycl. Brit. Book of the Year*, 1948.]

**Q: You say vegetable oils are hazardous to your health. What vegetable oils are you talking about?**

Mainly, I'm referring to soybean oil, corn oil, safflower oil, canola, sesame oil, sunflower seed oil, palm oil, and any others that are labeled as "unsaturated" or "polyunsaturated." Almond oil, which is used in many cosmetics, is very unsaturated.

Chemically, the material that makes these oils very toxic is the polyunsaturated fat itself. These unsaturated oils are found in very high concentrations in many seeds, and in the fats of animals that have eaten a diet containing them. The fresh oils, whether cold pressed or consumed as part of the living plant material, are intrinsically toxic, and it is not any special industrial treatment that makes them toxic. Since these oils occur in other parts of plants at lower concentration, and in the animals which eat the plants, it is impossible to eat a diet which lacks them, unless special foods are prepared in the laboratory.

These toxic oils are sometimes called the "essential fatty acids" or "vitamin F," but this concept of the oils as essential nutrients was clearly disproved over 50 years ago.

Linoleic and linolenic acids, the "essential fatty acids," and other polyunsaturated fatty acids, which are now fed to pigs to fatten them, in the form of corn and soy beans, cause the animals' fat to be chemically equivalent to vegetable oil. In the late 1940s, chemical toxins were used to suppress the thyroid function of pigs, to make them get fatter while consuming less food. When that was found to be carcinogenic, it was then found that corn and soy beans had the same antithyroid effect, causing the animals to be fattened at low cost. The animals' fat becomes chemically similar to the fats in their food, causing it to be equally toxic, and equally fattening.

These oils are derived from seeds, but their abundance in some meat has led to a lot of confusion about "animal fats." Many researchers still refer to lard as a "saturated fat," but this is simply incorrect when pigs are fed soybeans and corn.

**Q: How are these oils hazardous to your health?**

Ultimately, all systems of the body are harmed by an excess of these oils. There are two

reasons for this. One is that the plants produce the oils for protection, not only to store energy for the germination of the seed. To defend the seeds from the animals that would eat them, the oils block the digestive enzymes in the animals' stomachs. Digestion is one of our most basic functions, and evolution has built many other systems by using variations of that system; as a result, all of these systems are damaged by the substances which damage the digestive system.

The other reason is that the seeds are designed to germinate in early spring, so their energy stores must be accessible when the temperatures are cool, and they normally don't have to remain viable through the hot summer months. Unsaturated oils are liquid when they are cold, and this is necessary for any organism that lives at low temperatures. For example, fish in cold water would be stiff if they contained saturated fats. These oils easily get rancid (spontaneously oxidizing) when they are warm and exposed to oxygen. Seeds contain a small amount of vitamin E to delay rancidity. When the oils are stored in our tissues, they are much warmer, and more directly exposed to oxygen, than they would be in the seeds, and so their tendency to oxidize is very great. These oxidative processes can damage enzymes and other parts of cells, and especially their ability to produce energy.

The enzymes which break down proteins are inhibited by unsaturated fats, and these enzymes are needed not only for digestion, but also for production of thyroid hormones, clot removal, immunity, and the general adaptability of cells. The risks of abnormal blood clotting, inflammation, immune deficiency, shock, aging, obesity, and cancer are increased. Thyroid and progesterone are decreased. Since the unsaturated oils block protein digestion in the stomach, we can be malnourished even while "eating well."

Plants produce many protective substances to repel or injure insects and other animals that eat them. They produce their own pesticides. The oils in seeds have this function. On top of this natural toxicity, the plants are sprayed with industrial pesticides, which can concentrate in the seed oils.

It isn't the quantity of these polyunsaturated oils which governs the harm they do, but the relationship between them and the saturated fats. Obesity, free radical production, the

formation of age pigment, blood clotting, inflammation, immunity, and energy production are all responsive to the ratio of unsaturated fats to saturated fats, and the higher this ratio is, the greater the probability of harm there is.

There are interesting interactions between these oils and estrogen. For example, puberty occurs at an earlier age if estrogen is high, or if these oils are more abundant in the diet. This is probably a factor in the development of cancer.

All systems of the body are harmed by an excess of these oils. There are three main kinds of damage: one, hormonal imbalances, two, damage to the immune system, and three, oxidative damage.

**Q: How do they cause hormonal imbalances?**

There are many changes in hormones caused by unsaturated fats. Their best understood effect is their interference with the function of the thyroid gland. Unsaturated oils block thyroid hormone secretion, its movement in the circulatory system, and the response of tissues to the hormone. When the thyroid hormone is deficient, the body is generally exposed to increased levels of estrogen. The thyroid hormone is essential for making the "protective hormones" progesterone and pregnenolone, so these hormones are lowered when anything interferes with the function of the thyroid. The thyroid hormone is required for using and eliminating cholesterol, so cholesterol is likely to be raised by anything which blocks the thyroid function. [B. Barnes and L. Galton, Hypothyroidism, 1976, and 1994 references.]

**Q: How do they damage the immune system?**

Vegetable oil is recognized as a drug for knocking out the immune system. Vegetable oil emulsions were used to nourish cancer patients, but it was discovered that the unsaturated oils were suppressing their immune systems. The same products, in which vegetable oil is emulsified with water for intravenous injection, are now marketed specifically for the purpose of suppressing immunity in patients who have had organ transplants. Using the oils in foods has the same harmful effect on the immune system. [E. A. Mascioli, et

al.,Lipids 22(6) 421, 1987.] Unsaturated fats directly kill white blood cells. [C. J. Meade and J. Martin, Adv. Lipid Res., 127, 1978.]

**Q: How do they cause oxidative damage?**

Unsaturated oils get rancid when exposed to air; that is called oxidation, and it is the same process that occurs when oil paint "dries." Free radicals are produced in the process.

This process is accelerated at higher temperatures. The free radicals produced in this process react with parts of cells, such as molecules of DNA and protein and may become attached to those molecules, causing abnormalities of structure and function.

**Q: What if I eat only organically grown vegetable oils?**

Even without the addition of agricultural chemicals, an excess of unsaturated vegetable oils damages the human body. Cancer can't occur, unless there are unsaturated oils in the diet. [C. Ip, et al., Cancer Res. 45, 1985.] Alcoholic cirrhosis of the liver cannot occur unless there are unsaturated oils in the diet. [Nanji and French, Life Sciences. 44, 1989.] Heart disease can be produced by unsaturated oils, and prevented by adding saturated oils to the diet. [J. K. G. Kramer, et al., Lipids 17, 372, 1983.]

**Q. What oils are safe?**

Coconut and olive oil are the only vegetable oils that are really safe, but butter and lamb fat, which are highly saturated, are generally very safe (except when the animals have been poisoned). Coconut oil is unique in its ability to prevent weight-gain or cure obesity, by stimulating metabolism. It is quickly metabolized, and functions in some ways as an antioxidant. Olive oil, though it is somewhat fattening, is less fattening than corn or soy oil, and contains an antioxidant which makes it protective against heart disease and cancer.

Israel had the world's highest incidence of breast cancer when they allowed the insecticide lindane to be used in dairies, and the cancer rate decreased immediately after the government prohibited its use. The United States has fairly good laws to control the use of

cancer-causing agents in the food supply, but they are not vigorously enforced. Certain cancers are several times more common among corn farmers than among other farmers, presumably because corn "requires" the use of more pesticides. This probably makes corn oil's toxicity greater than it would be otherwise, but even the pure, organically grown material is toxic, because of its intrinsic unsaturation.

In the United States, lard is toxic because the pigs are fed large quantities of corn and soy beans. Besides the intrinsic toxicity of the seed oils, they are contaminated with agricultural chemicals. Corn farmers have a very high incidence of cancer, presumably because of the pesticides they use on their crop.

**Q: But aren't "tropical oils" bad for us?**

In general, tropical oils are much more healthful than oils produced in a cold climate. This is because tropical plants live at a temperature that is close to our natural body temperature. Tropical oils are stable at high temperatures. When we eat tropical oils, they don't get rancid in our tissues as the cold-climate seed oils, such as corn oil, safflower oil and soy oil, do. [R.B. Wolf, J. Am. Oil Chem. Soc. 59, 230, 1982; R. Wolfe, Chem 121, Univ. of Oregon, 1986.]

When added to a balanced diet, coconut oil slightly lowers the cholesterol level, which is exactly what is expected when a dietary change raises thyroid function. This same increase in thyroid function and metabolic rate explains why people and animals that regularly eat coconut oil are lean, and remarkably free of heart disease and cancer.

Although I don't recommend "palm oil" as a food, because I think it is less stable than coconut oil, some studies show that it contains valuable nutrients. For example, it contains antioxidants similar to vitamin E, which lowers both LDL cholesterol and a platelet clotting factor. [B. A. Bradlow, University of Illinois, Chicago; Science News 139, 268, 1991.] Coconut oil and other tropical oils also contain some hormones that are related to pregnenolone or progesterone.

**Q: Isn't coconut oil fattening?**

Coconut oil is the least fattening of all the oils. Pig farmers tried to use it to fatten their animals, but when it was added to the animal feed, coconut oil made the pigs lean [See Encycl. Brit. Book of the Year, 1946].

**Q: What about olive oil? Isn't it more fattening than other vegetable oils?**

In this case, as with coconut oil, "fattening" has more to do with your ability to burn calories than with the caloric value of the oil. Olive oil has a few more calories per quart than corn or soy oil, but since it doesn't damage our ability to burn calories as much as the unsaturated oils do, it is less fattening. Extra virgin olive oil is the best grade, and contains an antioxidant that protects against cancer and heart disease. [1994, Curr. Concs.]

**Q: Is "light" olive oil okay?**

No. Now and then someone learns how to make a profit from waste material. "Knotty pine" boards were changed from a discarded material to a valued decorative material by a little marketing skill. Light olive oil is a low grade material which sometimes has a rancid smell and probably shouldn't be used as food.

**Q: Is margarine okay?**

There are several problems with margarine. The manufacturing process introduces some toxins, including a unique type of fat which has been associated with heart disease. [Sci. News, 1974; 1991.] There are likely to be dyes and preservatives added to margarine. And newer products contain new chemicals that haven't been in use long enough to know whether they are safe.

However, the basic hardening process, hydrogenation of the oils, has been found to make the oils less likely to cause cancer. If I had to choose between eating ordinary corn oil or corn oil that was 100% saturated, to make a hard margarine, I would choose the hard margarine, because it resists oxidation, isn't suppressive to the thyroid gland, and doesn't cause cancer.

**Q: What about butter?**

Butter contains natural vitamin A and D and some beneficial natural hormones. It is less fattening than the unsaturated oils. There is much less cholesterol in an ounce of butter than in a lean chicken breast [about 1/5 as much cholesterol in fat as in lean meat on a calorie basis, according to R. Reiser of Texas A & M Univ., 1979.].

**Q: Are fish oils good for you?**

Some of the unsaturated fats in fish are definitely less toxic than those in corn oil or soy oil, but that doesn't mean they are safe. Fifty years ago, it was found that a large amount of cod liver oil in dogs' diet increased their death rate from cancer by 20 times, from the usual 5% to 100%. A diet rich in fish oil causes intense production of toxic lipid peroxides, and has been observed to reduce a man's sperm count to zero. [H. Sinclair, Prog. Lipid Res. 25, 667, 1989.]

**Q: What about lard?**

In this country, lard is toxic because the pigs are fed large quantities of corn and soybeans. Besides the natural toxicity of the seed oils, the oils are contaminated with agricultural chemicals. Corn farmers have a very high incidence of cancer, presumably because corn "requires" the use of more pesticides. This probably makes corn oil's toxicity greater than it would be otherwise. but even the pure, organically grown material is toxic, because of its unsaturation.

Women with breast cancer have very high levels of agricultural pesticides in their breasts [See Science News, 1992, 1994].

Israel had the world's highest incidence of breast cancer when they allowed the insecticide lindane to be used in dairies, and the cancer rate decreased immediately after the government prohibited its use. The United States has fairly good laws to control the use of cancer-causing agents in the food supply, but they are not vigorously enforced. [World Incid. of Cancer, 1992]



**Q: I have no control over oils when eating out. What can I do to offset the harmful effects of polyunsaturated oils?**

A small amount of these oils won't kill you. It is the proportion of them in your diet that matters. A little extra vitamin E (such as 100 units per day) will take care of an occasional American restaurant meal. Based on animal studies, it would take a teaspoonful per day of corn or soy oil added to a fat-free diet to significantly increase our risk of cancer. Unfortunately, it is impossible to devise a fat-free diet outside of a laboratory. Vegetables, grains, nuts, fish and meats all naturally contain large amounts of these oils, and the extra oil used in cooking becomes a more serious problem.

**Q Why are the unsaturated oils so popular if they are dangerous?**

It's a whole system of promotion, advertising, and profitability.

50 years ago, paints and varnishes were made of soy oil, safflower oil, and linseed (flax seed) oil. Then chemists learned how to make paint from petroleum, which was much cheaper. As a result, the huge seed oil industry found its crop increasingly hard to sell. Around the same time, farmers were experimenting with poisons to make their pigs get fatter with less food, and they discovered that corn and soy beans served the purpose, in a legal way. The crops that had been grown for the paint industry came to be used for animal food. Then these foods that made animals get fat cheaply came to be promoted as foods for humans, but they had to direct attention away from the fact that they are very fattening. The "cholesterol" focus was just one of the marketing tools used by the oil industry. Unfortunately it is the one that has lasted the longest, even after the unsaturated oils were proven to cause heart disease as well as cancer. [Study at L.A. Veterans Hospital, 1971.]

I use some of these oils (walnut oil is very nice, but safflower oil is cheaper) for oil painting, but I am careful to wash my hands thoroughly after I touch them, because they can be absorbed through the skin.

## **SUMMARY**

Unsaturated fats cause ageing, clotting, inflammation, cancer, and weight gain.

Avoid foods which contain the polyunsaturated oils, such as corn, soy, safflower, flax, cottonseed, canola, peanut, and sesame oil.

Mayonnaise, pastries, even candies may contain these oils; check the labels for ingredients.

Pork is now fed corn and soy beans, so lard is usually as toxic as those oils; use only lean pork.

Fish oils are usually highly unsaturated; "dry" types of fish, and shellfish, used once or twice a week, are good. Avoid cod liver oil.

Use coconut oil, butter, and olive oil.

Unsaturated fats intensify estrogen's harmful effects.

## **REFERENCES**

1. C. F. Aylsworth, C. W. Welsch, J. J. Kabora, J. E. Trosko, "Effect of fatty acids on junctional communication: Possible role in tumor promotion by dietary fat," *Lipids* 22(6), 445-54, 1987.
2. J. M. Bell and P. K. Lundberg, "Effects of a commercial soy lecithin preparation on development of sensorimotor behavior & brain biochemicals in the rat," *Dev. Psychobiol.* 8(1), 59-66, 1985.
3. R. S. Britton and B. R. Bacon, "Role of free radicals in liver diseases and hepatic fibrosis," *Hepatogastroenterology* 41(4), 343-348, 1994.

4. M. S. Brown, et al., "Receptor mediated uptake of lipoprotein-cholesterol and its utilization for steroid synthesis," *Recent Progress in Hormone Res.* 35, 315-257, 1979.
5. P. A. Cerutti, "Oxy-radicals and cancer," *Lancet* 455(8926), 862-863, 1994.
6. I. Davies and A. P. Fotheringham, "Lipofuscin--Does it affect cellular performance?" *Exp. Gerontol.* 16, 119-125, 1981.
7. K. L. Erickson, et al., "Dietary lipid modulation of immune responsiveness," *Lipids* 18, 468-74, 1983.
8. V. A. Folcik and M. K. Cathcart, "Predominance of esterified hydroperoxy-linoleic acid in human monocyte-oxidized LDL," *J. Lipid Res.* 35(9), 1570-1582, 1994.
9. Fuller, C. J. and I. Jialal, "Effects of antioxidants and fatty acids on low-density-lipoprotein oxidation," *Am. J. Clin. Nutr.* 60(6 Suppl.), S1010-S1013, 1994.
10. M. C. Galli, et al., "Peroxidation potential of rat thymus during development and involution," *Comp. Biochem. Physiol (C)* 107(3), 435-440, 1994.
11. J. M. Gaziano, et al., "Supplementation with beta-carotene in vivo and in vitro does not inhibit low density lipoprotein oxidation," *Atherosclerosis* 112(2), 187-195, 1995.
12. M. B. Grisham, "Oxidants and free radicals in inflammatory bowel disease," *Lancet* 344(8926), 859-861, 1994.
13. J. M. C. Gutteridge, "Antioxidants, nutritional supplements and life-threatening diseases," *Brit. J. Biomed. Sci.* 51(3), 288-295, 1994.
14. D. Harman, et al., "Free radical theory of aging: effect of dietary fat on central nervous system function," *J. American Geriatrics Soc.* 24(1), 292-98, 1976.
15. W. S. Hartroft and E. A. Porta, "Ceroid pigments," chapter VIII in *Present Knowledge in Nutrition*, 3rd Edition, Nutrition Foundation, N.Y., 1967.
16. H. J. Helbock, et al., (Univ. of Calif. Berkeley) January, 1993 *Pediatrics*; in *Science*

News 143, 78, 1993. "Toxic 'fats' in preemie supplement."

H. R. Hirsch, "The waste-product theory of aging: Cell division rate as a function of waste volume," *Mech. Ageing Dev.* 36, 95-107, 1986.

17. S. G. Imre, et al., "Increased proportion of docosahexanoic acid and high lipid peroxidation capacity in erythrocytes of stroke patients," *Stroke* 25(12), 2416-2420, 1994.

18. Clement Ip, et al., "Requirement of essential fatty acids for mammary tumorigenesis," *Cancer Res.* 45(5), 1997-2001, 1985.

19. P. V. Johnston, "Dietary fat, eicosanoids, and immunity," *Adv. in Lipid Res.* 21, 103-41, 1985.

20. S. Kasayna, et al., "Unsaturated fatty acids are required for continuous proliferation of transformed androgen-dependent cells by fibroblast growth factor family proteins," *Cancer Research* 54(24), 6441-6445, 1994.

21. H. A. Kleinveld, et al., "Vitamin E and fatty acid intervention does not attenuate the progression of atherosclerosis in watanabe heritable hyperlipidemic rabbits," *Arterioscler. Thromb. Vasc. Biol.* 15(2), 290-297, 1995.

22. J. K. G. Kramer, et al., *Lipids* 17, 372, 1983.

23. I. A. Kudryavtsev, et al., "Character of the modifying action of polyunsaturated fatty acids on growth of transplantable tumors of various types," *Bull. Exp. Biol & Med.* 105(4), 567-70, 1986.

24. R. D. Lynch, "Utilization of polyunsaturated fatty acids by human diploid cells aging in vitro," *Lipids* 15(6), 412-20, 1967.

25. M. Martinez and A. Ballabriga, "Effects of parenteral nutrition with high doses of linoleate on the developing human liver and brain," *Lipids* 22(3), 133-8, 1987.

26. R. S. Mehta, et al., "High fish oil diet increases oxidative stress potential in mammary gland of spontaneously hypertensive rats," *Clin. Exp. Pharmacol. Physiol.* 21(11), 881-

889, 1994.

27. A. A. Nanji and S. W. French, "Dietary linoleic acid is required for development of experimentally induced alcoholic liver-injury," *Life Sciences* 44, 223-7, 1989.

28. J. A. Lindsay, et al., "Fatty acid metabolism and cell proliferation," *Lipids* 18, 566-9, 1983.

29. M. L. Pearce and S. Dayton, "Incidence of cancer in men on a diet high in polyunsaturated fat," *Lancet* 1, 464-467, 1971.

30. Pryor, W. A., "Free radicals and lipid proxidation--what they are and how they got that way," *Natural Antioxidants in Human*, pp. 1-24, 1994.

31. P. Purasiri, et al., "Modulation of cytokine production in vivo by dietary essential fatty acids in patients with colorectal cancer," *Clin. Sci.* 87(6), 711-717, 1994.

32. S. Rapoport and T. Schewe, "Endogenous inhibitors of the respiratory chain," *Trends in Biochemical Sci.*, Aug., 1977, 186-189.

33. H. Selye, "Sensitization by corn oil for the production of cardiac necrosis...", *Amer. J. of Cardiology* 23, 719-22, 1969.

34. D. A. Street, et al., "Serum antioxidants and myocardial infarction--Are low levels of carotenoids and alpha-tocopherol risk factors for myocardial infarction?" *Circulation* 90(3), 1154-1161, 1994.

35. M. Takei, et al., "Inhibitory effects of calcium antagonists on mitochondrial swelling induced by lipid peroxidation or arachidonic acid in the rat brain in vitro," *Neurochem. Res.* 29(9), 1199-1206, 1994.

36. J. P. Thomas, et al., "Involvement of preexisting lipid hydroperoxides in Cu<sup>2+</sup>-stimulated oxidation of low-density lipoprotein," *Arch. Biochem. Biophys.* 315(2), 244-254, 1994.

37. C. W. Welsh, "Review of the effects of dietary fat on experimental mammary gland

tumorigenesis: Role of lipid peroxidation," Free Radical Biol. Med. 18(4), 757-773, 1995.

### **Essential Fatty Acids ("EFA"): A Technical Point**

Those fatty acids, such as linoleic acid and linolenic acid, which are found in linseed oil, soy oil, walnut oil, almond oil, corn oil, etc., are essential for the spontaneous development of cancer, and also appear to be decisive factors in the development of age pigment, alcoholic cirrhosis of the liver, diabetes, obesity, stress-induced immunodeficiency, some aspects of the shock reaction, epilepsy, brain swelling, congenital retardation, hardening of the arteries, cataracts, and other degenerative conditions. They are possibly the most important toxin for animals.

The suppression of an enzyme system is characteristic of toxins. The "EFA" powerfully, almost absolutely, inhibit the enzyme systems--desaturases and elongases--which make our native unsaturated fatty acids.

After weaning, these native fats gradually disappear from the tissues and are replaced by the EFA and their derivatives. The age-related decline in our ability to use oxygen and to produce energy corresponds closely to the substitution of linoleic acid for the endogenous fats, in cardiolipin, which regulates the crucial respiratory enzyme, cytochrome oxidase.

Although the fish oils are less effective inhibitors of the enzymes, they are generally similar to the seed oils in their ability to promote cancer, age-pigment formation, free radical damage, etc. Their only special nutritional value seems to be their vitamin A and vitamin D content. Since vitamin A is important in the development of the eye, it is interesting that claims are being made for the essentiality of some of the fatty acid components of fish oil, in relation to the development of the eye.

The polyunsaturated oils from seeds are recommended for use in paints and varnishes, but skin contact with these substances should be avoided.

