



Hydrogenated Vegetable Oils and Trans Fatty Acids

Functional ingredients are used in manufactured foods to provide other benefits in addition to nutrition or product quality.

FDA-Approved Use

Generally recognized as safe or “GRAS.”

Purpose

Vegetable oils contain a mix of saturated, monounsaturated, and polyunsaturated fatty acids. The mono- and polyunsaturated fatty acids have double bonds, all in the normal “cis” formation. These bonds can easily be broken down by oxygen. This produces compounds that make the oil rancid. Rancidity produces off-flavors in foods. To control this, food manufacturers use hydrogenated vegetable oils. These are not as likely to break down and will produce a product with a longer shelf life. Hydrogenation is a chemical process that adds hydrogen atoms to the available double bonds in the vegetable oil. As the degree of hydrogenation increases, the amount of saturated fats increases and mono- and polyunsaturated fats decrease. Completely hydrogenated fat is solid at room temperature. Moderately hydrogenated fats are liquid at room

temperature and contain more saturated fatty acids than the original oil.

Content

Hydrogenation will convert “cis” double bonds to “trans” double bonds, producing *trans* fatty acids. Hydrogenated vegetable oil that is solid at room temperature can contain 15–25 percent trans fatty acids. Partially hydrogenated oils are lower in trans fatty acids. Margarines are often mixtures of both hydrogenated fats and unhydrogenated vegetable oils.

Benefits

Hydrogenated fats prevent rancidity. This gives products like crackers and other snacks a longer shelf life.

Side Effects

Trans fatty acids can raise LDL cholesterol (the bad cholesterol) levels. At relatively high intakes they can also lower HDL (the good cholesterol) levels.

Rules for Use in Food

The Food and Drug Administration (FDA) now requires that the Nutrition Facts panel list the amount of trans fat in a serving of food if a serving contains 0.5 gram or more of trans fatty acids. This is listed on the line below the listing of saturated fat. There is no Daily Value for trans fat. Instead, the Institute of Medicine recommends we keep our intake of trans fats to as near zero as possible.

The food manufacturer must list partially hydrogenated oils in the ingredient list and specify the type of oil (for instance, “partially hydrogenated soybean oil”). If the manufacturer uses different oils, depending on supply and cost, then the notation may be “partially hydrogenated vegetable oil (cottonseed, soybean, or peanut),” depending on the oils used.

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Points to Consider

- Trans fatty acids are produced naturally in the rumen (stomach) of sheep and cattle. These animals' body fat has concentrations of trans fatty acids ranging from 4 to 11 percent.
- Butter, milk, and meat from cattle and sheep all contain natural trans fatty acids. The major one is called vaccenic acid. Butter contains about 4–11 percent trans fatty acids.
- Pomegranates are low in fat but 70 percent of it is a trans fatty acid called puniic acid.
- USDA estimates that the average American consumed about 8–13 grams of trans fatty acids per day from vegetable and animal sources prior to 2006.
- Hydrogenated vegetable oil is the major source of trans fatty acids in our diets. It contributes 80–90 percent of the trans fatty acids we eat.
- In terms of heart health, trans fats have an intermediate effect on blood cholesterol compared to saturated and polyunsaturated fats.
 - Saturated fats raise LDL cholesterol the most.
 - Trans fats raise LDL cholesterol some.
 - Unsaturated fats do not raise LDL cholesterol.

To control heart disease risk, keep your intake of *both* saturated and trans fat low.

- The major food sources of *trans* fatty acids are
 - baked goods like doughnuts and Danish pastry;
 - deep-fried foods like fried chicken and French fries;
 - snack chips;
 - imitation cheese;
 - margarine;
 - confectionery fats.
- Food manufacturers have reformulated many of their foods made with hydrogenated oils to reduce or eliminate trans fat per serving. They are replacing hydrogenated oils with
 - sunflower, soybean, or corn oil having high monounsaturated fatty acid levels (called high-oleic corn, soybean, or sunflower oils);
 - palm oil (10 percent polyunsaturated, 40 percent monounsaturated, and 50 percent saturated);
 - palm kernel oil (3 percent poly, 18 percent monounsaturated, and 82 percent saturated).
- Margarines can vary in the amount of trans fatty acids they contain. Manufacturers have reduced the amount of trans in both since 1999. However, this often increases their saturated fat content. Now
 - stick margarines have less than 20 percent trans fats;
 - tub margarines have less than 10 percent trans fats.
- Be sure to compare the saturated and trans fat between products. Keep intake of both low in your diet.

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Penn State College of Agricultural Sciences research, extension, and resident education programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

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Produced by Information and Communication Technologies in the College of Agricultural Sciences

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Code # **UK093** Rev5M8/06mpc4306E