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While reading this processing method, keep in mind that high temperatures, oxygen and light cause fats/oils to breakdown or become rancid.

The following steps are used to make many of the unrefined oils found in natural food stores.

1. **Seeds, Nuts and Beans**-contain fresh unprocessed/unrefined fats/oils as well as protein, vitamins, minerals and fiber.
2. **Clean and Hull**-they are mechanically cleaned and then cooked to make the extraction of oil easier. Cooking exposes them to temperatures up to 248°F and causes them to crack. This exposes the oil to air and high heat, which starts the process of rancidity.
3. **Mechanical (Expeller) Pressing (used for oils sold in health food stores)**-they are then mechanically pressed in an expeller or screw press which crushes them, creating friction, which causes heat. The greater the pressure during the expeller process the higher the heat. The higher the temperature and pressure the higher the oil yields (meaning more profit for the company producing the oil, but an inferior oil). At this point the oils can be filtered and sold in natural health food stores. Often they are sold in amber or green bottles to protect the oil from light. Sometimes they are refrigerated to protect them from heat. Outlined below are the remaining steps used to process commercial oils.

Steps 1 and 2 above and the steps outlined below are used to make many commercial oils.

4. **Solvent Extraction**-solvents such as hexane or heptane (gasoline) are used to dissolve the oils out of finely ground seed meal. Traces of the solvents may remain in the oils. Some protein, fiber, vitamins and minerals are lost during this process. During this stage the oils are heated to 131-149°F.
5. **Degumming**-degumming removes phospholipids including lecithin (good fats) and complex carbohydrates, chlorophyll (the green in plants), calcium, magnesium, iron and copper. During this stage the oils are heated to 140°F.
6. **Refining**-during refining oils are mixed with sodium hydroxide, also known as caustic soda or by the trade name "drano." They can also be mixed with sodium carbonate. This process removes free fatty acids, phospholipids, protein-like substances and minerals. During this stage the oils are heated to 167°F.
7. **Bleaching**-after the refining stage the oils are a red or a yellow color, therefore, they have to be bleached to remove the pigments. Bleaching takes place at 230°F. Significant deterioration or rancidity of fats occurs at this stage.

- 8. Deodorizing**-this process removes unpleasant odors and tastes that weren't in the natural oil before processing. This takes place at a very destructive temperature of 464-518°F. At temperatures of 302°F unsaturated fats become mutagenic which simply means they can damage our genes. Above 320°F trans fatty acids form. A trans fat is a fat that was once a naturally occurring fat that has been molecularly altered by high heat and is a major contributor to various diseases. The higher the temperature above 320°F the increasing rate at which trans fatty acids form. During this process vitamin E and phytosterols (natural components in foods that block absorption of cholesterol) are separated out and free fatty acids and flavor compounds are lost. Oils at this stage can still be sold as cold pressed because there is no commonly accepted definition of cold pressed.
- 9. Supermarket Step**-to extend shelf life these oils can have a synthetic (man made) antioxidant added to them. This is done because the natural antioxidants such as vitamin E and beta-carotene have been removed in the above steps.
- 10. Hydrogenation**-a process by which unsaturated fatty acids are made into saturated fatty acids. Simply put, it takes liquid oil and hardens it to make it spreadable. Just think of what that does to your arteries let alone what it does elsewhere. This is done to produce margarine, shortening and some oils.

These processing methods occur with most oils found in supermarkets including safflower, walnut, sunflower, corn, grape seed, soybean, sesame, rice bran, canola, almond, peanut, avocado or other seed, nut or oil blends. The exception to this refining process is extra virgin olive oil. This oil should still be packaged in green or amber bottles, stored in a cool area and capped after use to prevent exposure to oxygen and, therefore, rancidity.

Reference: Fats that Heal Fats that Kill, Udo Erasmus, 1993.

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