NATIONAL COTTONSEED PRODUCTS ASSOCIATION

FATS & OILS GLOSSARY

Antioxidant A substance that slows or interferes with the reaction of a fat or oil with oxygen. The addition of antioxidants to fats or foods containing them retard rancidity and increases stability and shelf life.

Bleaching The purification process to remove color bodies and residual impurities from oils and fats during refining, generally through the use of an adsorbent clay material.

Biotechnology The use of living organisms or other biological systems to develop food, drugs and other products.

Catalyst A material which accelerates a chemical reaction without becoming part of the reaction products.

Cholesterol A fat-soluble sterol found primarily in animal cells important in physiological processes.

Chlorophyll A natural, green coloring agent vital to a plant's photosynthesis process which is removed from vegetable oils through bleaching and refining processes.

Cis The term applied to a geometric isomer of an unsaturated fatty acid where the hydrogen atoms attached to the carbon atoms comprising the double bond are on the same side of the carbon chain.

Cold Press Extraction process whereby oil bearing materials are mechanically pressed without any heat treatment.

Confectionery fat A broad range of fats with steep melting profiles used in the formulation of sweet goods such as candy bars, bakery product coatings, cream centers, and granola bars.

Conjugated fatty acids Polyunsaturated fatty acids exhibiting two or more of unsaturated carbons atoms not separated by a saturated carbon atom.

Crude oil The oil product obtained from the initial extraction, either mechanical and/or solvent based, of an animal or vegetable source.

Crystals When triglyceride molecules of a fat pass from the liquid state to a solid as a result of the decrease of temperature, they freeze and are found is three different forms. The forms of crystal exist only when the fat is found in the solid state. They can affect the physical properties or functions of the fat.

Degumming The process that removes phosphatide compounds from crude oils prior to refining.

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Deodorization The process of subjecting oil to high temperatures in the presence of a vacuum to remove trace volatile components that may affect flavor, odor and color. It is generally the last step in the refining process.

Dewax Removal of natural waxes from edible oils.

Diglyceride A compound with a glycerol molecule attached to two fatty acids.

Emulsifier Compounds having the ability to reduce surface tension at the interface. Emulsifiers are often used to disperse immiscible liquids such as water and oil or fats in products such as mayonnaise, ice cream and salad dressings.

Emulsion A homogeneous dispersion of two dissimilar immiscible liquid phases. If oil is dispersed in water, it is an oil-in-water (O/W) emulsion. If water is dispersed in oil, it is a water-in-oil emulsion (W/O).

Ester The condensation reaction product of an alcohol and an acid.

Esterification The reaction of chemically combining an alcohol and an acid resulting in the formation of an ester.

Expeller pressed Mechanically separated oil from oilseed meal.

Fat Esters of fatty acids and glycerol which are normally solid at room temperature.

Fatty Acid A long chain carboxylic acid, which generally contains an unbranched chain with even number of carbons.

Fully refined oil The term used to describe an oil which has been subjected to extensive processing methods to remove: (1) free fatty acids and other impurities (refining), (2) naturally occurring color bodies such as chlorophyll (bleaching), and (3) volatile trace components which may affect color, flavor and odor (deodorizing).

Fire point The temperature at which an oil sample, when heated under prescribed conditions, will ignite for a period of at least five seconds (spontaneous combustion).

Flash point The temperature at which an oil sample, when heated under prescribed conditions, will flash when a flame is passed over the surface of the oil but not maintain ignition.

Fractionation The process of separating fats and oils by differences in melt points, solubility or volatility.

Free fatty acids The fatty acids in a fat which are not chemically bound to glycerol molecules.

Fully hydrogenated Describes a fat that has been hydrogenated to the completion or near completion of saturation, which results in significant chemical and physical changes. Changes include transformation of liquids to solids at room temperature and increase in melt point, solid content, saturation, and stability. As conversion to saturation is complete, *trans* isomers are not formed. Products containing hydrogenated fats include “heavy duty” frying fats for restaurant use, solid shortenings, confectionary coatings, peanut butter stabilizer and solid margarines.

Geometric isomer A type of isomer distinguished because of its structural location of certain elements.

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Glycerides Compounds that have one or more fatty acids attached to glycerol.

Glycerol A three-carbon chain alcohol molecule with chemical formula, C3H803. Also known as glycerin. When combined with one, two, or three fatty acids forms a mono, di, or triglyceride, respectively.

Hydrogenated A required term identified in the Food & Drug Administration's labeling regulations (21 CFR 101.4(b) 14) relating to hydrogenated fats and oils. The term indicates a fat or oil is completely hydrogenated. See "fully hydrogenated."

Hydrogenation The reaction of adding hydrogen atoms to the carbon-to-carbon double bonds in unsaturated fatty acids. This process results in increased melt points, higher solid fat content, and longer shelf life without rancidity in fat-containing products.

Hydrolysis A chemical reaction in which a substance reacts with water so as to be changed into one or more other substances, such as natural fats into glycerol and fatty acids

Interesterification The reaction of rearranging the fatty acids in triglyceride molecules. It is used principally in confectionery fats, table spreads, shortenings, and margarines to maintain solid fat content at ambient temperatures while lowering the melting point.

Iodine value An expression of the degree of unsaturation of a fat. It is determined by measuring the amount of iodine which reacts with a natural or processed fat under prescribed conditions.

Isomer Compounds containing the same elements in the same proportions which can exist in more than one structural form; e.g. geometric, positional or cyclic.

Lauric oils Oils containing 40-50% lauric acid (C-12) in combination with other relatively low molecular weight fatty acids. Coconut and palm kernel oils are principal examples.

Lecithins A phospholipid found in egg yolk and soybeans and also used as a food ingredient. It is a surfactant that can stabilize emulsions.

Lipids A class of organic compounds consisting of the fats and other substances of similar properties that are insoluble in water, soluble in organic (nonpolar) solvents such as ether or hexane. Triglycerides, cholesterol, and vitamin A are examples.

Lipoprotein Any of the class of proteins that contain a lipid combined with a simple protein.

Medium chain triglyceride (MCT) Triglycerides containing fatty acid chains of 6-10 carbon atoms.

Melting point The temperature at which a solid turns into a liquid. Because they are a mixture of compounds, fats appear to melt over a range of temperature. A specific melting temperature is determined by warming a fat and recording the temperature at which an observable event coinciding with conversion to a liquid occurs.

Miscella The mixture of solvent and oil that occurs during the solvent extraction of oil from oil seeds.

Mixed triglyceride A triglyceride containing two or three kinds of fatty acids.

Monoglyceride A compound with a glycerol molecule attached to one fatty acid.

Monounsaturated A fatty acid that has one double bond (C=C) in the carbon chain. Oleic acid is an example.

Non-conjugated fatty acids Polyunsaturated fatty acids exhibiting two or more double bonds separated by at least one saturated carbon atom.

Oil Esters of fatty acids and glycerol which normally are liquid at room temperature.

Oleate An ester or salt of oleic acid.

Olein The liquid fraction when an oil or fat is fractionated.

Oxidation A chemical reaction in which the double bond on a lipid molecule reacts with oxygen to produce a variety of chemical products. The consequences of this reaction are loss of nutritional value and formation of the off-flavors associated with rancidity.

Partially hydrogenated A required term identified in the FDA's labeling regulations (21 CFR 101.4(b) 14) relating to hydrogenated fats and oils. Partially hydrogenated oils are limited in degree of hydrogenation, as compared to completely hydrogenated oils. Light to moderate hydrogenation results in limited increases in melting properties, while improving stability.

Peroxide value A number that indicates the level of peroxides in a fat or oil that has developed as a result of oxidation. Peroxides are considered intermediates in the lipid oxidation reaction scheme.

Peroxides The primary compounds formed from the oxidation of unsaturated fatty acids, which may react further to form the compounds that can cause rancidity.

Phosphatide The chemical combination of an alcohol (typically glycerol) with phosphoric acid and a nitrogen compound; synonymous with phospholipid.

Phospholipid A natural component of fat that has a phosphate ester associated with the glyceride. It is a surfactant that aids emulsification.

Plasticity A physical property of a fat that describes how soft, pliable, and moldable it is at a given temperature.

Polar lipids Fat components that are more like water and less like fat in their solubility properties. Introduction of oxygen or nitrogen atoms into lipid molecules makes them more polar.

Polymerize The bonding of similar molecules into long chains or branched structures.

Polymorphism The property of a fat molecule to exist in multiple crystalline structures; mainly identified as alpha, beta and beta prime.

Polyunsaturated A fatty acid that has more than one double bond (C=C) in the carbon chain. Linoleic acid is an example.

Positional isomer An isomer distinguished by the location of a double bond.

Refining The process of removing impurities from crude oil by way of treatment with alkali solution (chemical) or steam stripping (physical).

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Saponification The chemical reaction between a fat or oil and an alkaline compound creating glycerol and soap.

Saturated A carbon chain in which the carbons are connected to each other by single bonds, drawn as C-C. It has no carbon-to-carbon double bonds.

Shortening A type of fat used in baking or frying. The name comes from the ability to tenderize or "shorten" baked products.

Simple triglyceride A triglyceride comprised of three identical fatty acids.

Soap The salt of fatty acids.

Soap stock The aqueous byproduct from the chemical refining process that is comprised of soap, hydrated gums, water, oil and other impurities.

Smoke point The temperature at which an oil sample, when heated under prescribed conditions, will form a thin continuous stream of smoke.

Stearin A white, crystalline substance found in the solid portion of most animal and some vegetable fats.

Stearic acid A saturated 18-carbon free fatty acid.

Sterol A compound made up of the sterol nucleus, an 8-10 carbon side chain and an alcohol group.

Surfactant A chemical compound that lowers the surface tension between two dissimilar phases such as oil and water.

Tocopherol A class of fat soluble compounds that have vitamin E activity and function as antioxidants.

Trans The term used to describe a geometric isomer of an unsaturated fatty acid where hydrogens attached to the carbons comprising the double bond are on opposite sides of the carbon chain.

Triglyceride Three fatty acids attached to a glycerol molecule. If the three fatty acids are the same, it is a simple triglyceride; if they are different from each other, it is a mixed triglyceride. Mixed triglycerides are the most common chemical components in fats and oils.

Unsaturated fatty acid A fatty acid containing one or more carbon-carbon double bonds.

Wax Hydrophobic material made of hydrocarbon, long chain fatty acids, long chain alcohols, or wax ester (ester of a long chain alcohol and fatty acid).

Winterize The process of separating the solid fraction (stearine) from the liquid fraction (olein) of an oil by cooling and filtering.

Sources: "Food, Fats and Oils-2006," Institute of Shortening and Edible Oils Inc., Washington, D.C., and National Cottonseed Products Association

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