FAPC-164

Robert M. Kerr Food & Agricultural Products Center

FOOD TECHNOLOGY FACT SHEET

Adding Value to Oklahoma

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Low *Trans* Fat and *Trans*-Free Fat Update

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In previous fact sheets (FAPC-133 *Trans* fats, health and nutritional labeling of foods and FAPC-134 Formulating food products with low *trans* fats), health effects of *trans* fats and the U.S. Food and Drug Administration labeling rule regarding foods containing *trans* fats were discussed. Since then, the edible shortening and oil industry have developed a number of new low *trans* and *trans*-free fat alternatives.

This fact sheet will highlight some of these products. While reading this fact sheet, it is important to keep in mind that "no *trans*" and "zero *trans*" claims refer to 0.5 grams or less *trans* fat per serving. The serving size is defined as 1 tablespoon or about 12 grams.

Fats/oils are essential components of a balanced diet and play a critical role in disease prevention and treatment. Omega-3 (see FAPC-135 Foods, health and omega-3 oils for more information on omega-3 oils) and conjugated linoleic acid-containing fats/oils have a number of health benefits including reducing body fat, increasing lean muscle mass, decreasing risk factor for late-onset of Alzheimer's disease and improving cardiovascular health.

Trans fats or *trans* fatty acid-containing fats/oils, naturally occur in meats and dairy products. Concerns about the adverse effects of *trans* fats are not for the ones naturally present in foods but for the ones formed during hydrogenation of vegetable oils. Today, there is a significant body of scientific evidence indicating that *trans* fatty acids increase low-density lipoprotein (bad cholesterol) and decrease high-density lipoprotein levels (good cholesterol).

The fatty acid composition of fats and oils determines their oxidative stability (Table 1). Oils containing highly unsaturated fatty acids (i.e. polyunsaturated acids such as linolenic, linoleic, eicosapentaenoic-EPA and docosahexaenoic acids-DHA) are prone to rapid oxidation. The majority of plant oils do not contain a significant amount of EPA and DHA. However, traditional soybean and canola varieties have substantial amounts of linolenic acid, which makes them unsuitable for some food applications such as deep fat frying. The degradation products of linolenic acid can result in strong off-flavors. Oils with lower levels of linolenic acid have dramatically improved flavor profiles.

Hydrogenation reduces the number of double bonds in unsaturated fatty acids. There are two main reasons for hydrogenating vegetable oils. These are 1) to increase stability by reducing the tendency to oxidize, thereby extending shelf life and fry life and 2) to change the physical characteristics for easier handling and consistency for improved functionality such as aeration, mouth feel and texture. Fats and oils containing low levels of linolenic acid without partial hydrogenation are naturally stable.

According to the Web site www.qualisoy.com/, QUALISOY™ "is a collaborative effort in the soybean industry to help market the development and availability of healthier soybeans and soy oil, reduce environmental impacts of livestock production through improved soybean meal and improve the global competitiveness of the U.S. soybean industry." Monsanto's VISTIVE™ family of products (less than 3 percent linolenic acid), Pioneer® brand low-linolenic soybeans and Iowa State University's ultra low-linolenic soybeans (Asoyia™, less than 1 percent linolenic acid) meet QUALISOY™ quality standards. Trait-enhanced oilseeds are developed

by breeders to have reduced levels of polyunsaturates (linolenic and linoleic acids).

The following low linolenic products (less than 3 percent linolenic acid) are available in the market: Advantage LL soybean oil from Cargill; VISTIVE™ low-linolenic soybean oil from Archer Daniel Midland, Ag Processing Inc., CHS Inc. and Zeeland Farms; and TREUS™ Low-Linolenic soybean oil developed in partnership by Bunge and DuPont.

Low *Trans* and *Trans*-Free Fats/Oils Available from ADM

Novalipid™

These products contain little to no *trans* fat but provide full functionality and extremely low taste profiles.

NovaLipid™ Interesterified Cake Shortening

This product has low *trans* fat content (1 gram of *trans* fat per serving) and does not contain tropical oils. It bakes moist cakes that stay fresh longer, improves grain and texture, and produces high volume finished products. It is highly recommended for flat or fudge icing.

NovaLipid™ Interesterified All-Purpose Shortening

This product is a shortening with low *trans* fat (1 gram per serving) content. It is ideal for baking, i.e. pastries, cookies, cakes and most other baking applications. This product contains no tropical oils.

NovaLipid™ Interesterified All-Purpose Vegetable Shortening (all soybean formula)

This product is a vegetable shortening with low *trans* fat (less than 1 gram per serving). It is recommended for baking applications. It does not contain tropical oils.

NovaLipid™ Interesterified Baker's Margarine

This product is a baker's margarine with low *trans* fat (1 gram per serving). This product is recommended as a superior roll-in margarine for Danish pastries, flaky dinner rolls or where workable plastic consistency is desired. It also works well for cookies, icings and fillings. A rich, buttery flavor resists bake out of flavor.

Trans Alternatives from Bunge North America

Nutra-Clear NT™

This product is a deep-frying oil, which contains high oleic and low linolenic canola oil. It is specially developed for high stability deep-frying applications and delivers long fry-life and good fried food taste. The oil is not hydrogenated, hence does not contain *trans* fat. The product is low in saturated fat and contains omega-3 fatty acids.

Amaizing NT™

This product is developed as a deep-frying oil, which is a clear blend of corn and high oleic canola oils. The oil is not hydrogenated, contains no *trans* fat and is low in saturated fat. According to the supplier, this product has good stability and fry-life and produces good quality fried foods.

Golden Award NT™

The product can be used to replace butter, margarine or butter substitutes. It is made with high stability soybean oil and costs less than butter. The product is liquid at room temperature and requires no refrigeration. It does not contain *trans* fat, water or milk solids, which results in reduced splattering and scorching.

Table 1. Fatty acid composition of oilseeds (%, w/w basis).

Oil Source	Saturated	Mono-unsaturated	Poly-unsaturated	Linoleic Acid	Linolenic Acid
Normal Soybean	14.4	23.3	57.9	51.0	6.8
Normal Canola	7.1	58.9	29.6	20.3	9.3
High Oleic Canola	6.5	72.0	17.1	14.8	2.6
Normal Sunflower	10.3	19.5	65.7	65.7	0.0
Mid Oleic Sunflower	9.0	57.3	29.0	28.7	<0.1
High Oleic Sunflower	9.7	83.6	3.8	3.6	0.2
Corn	12.9	27.6	54.7	53.2	1.2
Peanut	16.9	46.2	32.0	32.0	0.0
Cottonseed	25.9	17.8	51.9	51.5	0.2
Palm	49.3	37.0	9.3	9.1	0.2
Palm Kernel	81.5	11.4	1.6	1.6	0.0
Coconut	86.5	5.8	1.8	1.8	0.0

Amazing Coat® Ultra Performance

This product is made of pure vegetable oil, a blend of corn and high oleic canola oils. It is developed as a pan spray, which combines enhanced release capability and good heat resistance to minimize darkening and gumming. The product minimizes residue on cooking surfaces. It is Kosher certified and is free of *trans* fat and cholesterol.

Vreamay® NH - Cake and Icing Shortening

This product is a cake and icing shortening designed to make symmetrical, moist cakes and smooth and creamy icings that hold their shape. It reduces icing requirement per cake. This product contains palm oil but no *trans* fats (less than 0.5 gram or less *trans* fat per serving). It produces products with lower levels of *trans* fatty acids and high volume. The product is recommended for any cake or icing that needs to be frozen.

Vream® NH - All-Purpose Shortening

This product is recommended for cookies and biscuits. It contains palm oil but no *trans* fat.

Victor® NH - All-Purpose Margarine

The product is designed for Danish, cookies, cakes and icings. The oil will not bleed out during proofing. It contains palm oil but no *trans* fat.

Donut Fry NT™

This product is specifically developed for frying donuts. It contains all-vegetable oil and zero *trans* fat per serving. The product is Kosher certified.

Trans Fat Alternatives from Cargill

Clear Valley®

This line of products contains high oleic canola oils, zero *trans* fat per serving and low levels of saturated fats. This line consists of the following products:

High Oleic Canola Oil

This product is recommended for deep fry, sautés, sauces and salad dressings. It contains 1 gram saturated fat per 12 grams oil.

Donut and Icing Shortening

This solid product is developed for donut and icing applications. It contains 3 grams saturated fat per 12 grams shortening and no tropical oil.

All-Purpose Shortening

The product is designed for biscuits, cakes, pie crusts, cookies, muffins and pastries/sweet goods. According to the supplier, this product matches functionality, mouthfeel and stability of conventional shortenings. The product is solid and contains 3.5 grams saturated fat per 12 grams shortening and no tropical oil.

Cargill's Advantage®

This line of products is developed for frying applications. The products contain zero grams *trans* fat per serving. The lower absorption levels and extended fry life help lower oil costs. Some examples of this line of products are:

Advantage® Creamy Plus Frying Shortening

This product is a blend of low linolenic and conventional soybean oil. It is liquid at room temperature. It contains zero grams *trans* fat per serving and easy for filtering and fryer loading.

Advantage® Creamy Frying Shortening

This product performs well in a wide range of frying applications. It contains 0.5 gram or less *trans* fat per serving.

Advantage® Clear Frying Oil

The product is a blend of soybean and corn oil. It contains 0.5 gram or less *trans* fat per serving. The product lowers oil absorption by food.

Products from Aarhus United US Inc.

EsSence™ Puff Pastry Shortening

This product is a non-waxy roll-in shortening with good plasticity. According to the company, this product yields light, crisp and flaky laminated pastries. During the lamination process EsSence™ Puff Pastry shortening prevents cracking in the thinly folded pastry layers. The product is all-vegetable, non-lauric, no-*trans*, not hydrogenated and non-dairy. This product contains 20 percent less saturated fat than the butter and Kosher certified.

Cebes® Product Line

These products are developed from fractionated palm kernel oil. They are hard and brittle at room temperature and neutral in flavor. The melting profile for these products is short and below body temperature and similar to

cocoa butter. The Cebes line of products is recommended for applications such as chocolate and pastel compound coatings. These products contain no *trans* fat and are non-hydrogeneted.

Cisao® Product Line

This brand consists of a line of all-purpose shortenings and hardstocks designed for confectionery and bakery fillings and margarine industry. The products are *trans* free and non-hydrogenated and add texture to the final product facilitating consistency from batch to batch. Cisao line of products are largely produced from fractionated oils. According to the supplier, these products display good crystallization and melting properties and high oxidative stability. They contain zero *trans* fat and are non-hydrogenated.

A chart developed by the American Heart Association, which can be found at //www.njra.org/upload/AHA%20Resource%20List%20(3)_382527827_522008155150.pdf is a good resource to see several other commercially available *trans*-free fat alternatives and their suppliers.

References

For more information about the products listed in this fact sheet, please visit the following Web sites:

www.cargilldso.com/advantage.asp
www.admworld.com
www.agp.com/
www.chsinc.com/go.asp?Page=009084865&Template=02&Parent=3&Title=Margarine+Spreads
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