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Introduction

This information kit has been developed by the National Sunflower Association, a non-profit grower and industry organization based in Mandan, North Dakota. The NSA is focused on educating food manufacturers and chefs on the benefits of using sunflower oil.

All sunflower oil is non-GMO and two types of sunflower oil are available in Canada – mid oleic and high oleic.

Since there is no sunflower oil refinery in Canada, the majority of the sunflower oil that is available to food manufacturers and chefs comes from the USA. In fact, Canada is the #1 export market of refined US sunflower oil.



In addition to this resource booklet, a new video about sunflower oil is available at: http://bit.ly/sunoilvideo20



Overview of Canadian Marketplace

- Canadians are looking for healthier ingredients, so if you are creating new products or reformulating existing products, now is the time to consider switching to US sunflower oil, a non-GMO vegetable oil.
- Health Canada acknowledges the role of healthy fats in the diet. The Food Guide recommends that Canadians consume 2 to 3 Tbsp (30 to 45 mL) of unsaturated fats or oils, such as sunflower oil, each day.
- Health Canada wants unhealthy fats removed from our diets and as a result partially hydrogenated oils (PHOs) were banned as of September 15, 2018.
- Consultations on proposed front-of-pack labeling including saturated fats are currently underway. This may impact the type of fat or oil you choose to use in products.



Sunflower Oil Applications & Attributes

Applications

Sunflower oil is a premium oil that can be used in a variety of applications:

- savory and sweet snack foods
- · deep-frying or par-frying
- sauces, marinades and dressings
- specialty and ethnic foods
- Plant-based foods
- Home Meal Replacement foods
- spray coatings for cereal, crackers, snack bars and dried fruits
- bakery items including breads, muffins, brownies and quick breads
- prepared foods including soups, pea protein products and dry mixes
- "gluten free", Kosher and Halal foods

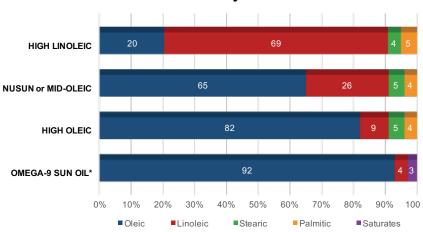
Attributes

- Fits with Clean Labels
- Non-GMO
- High smoke point (450°F)
- Excellent fry life
- Very stable due to only a trace of linolenic acid, resulting in longer shelf life than other oils
- Highest of all oils in Vitamin E
- Flavour neutral so true taste of food comes through
- Blends very well with other oils and solid fats
- Lends itself to products with claims around low/no/reduced allergens
- Kosher and Halal Certified

82% of Canadians believe sunflower oil is a healthy oil¹

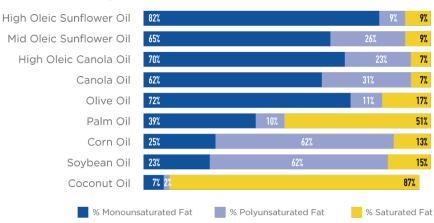
Different types of sunflower oil

Sunflower Oil Fatty Acid Profile



*coming soon

Fatty acid profile of sun oil vs. other oils



Storage & Shelf Life

Sunflower oil shelf life can be affected by temperature, humidity and light, so it is important to store sunflower oil in a cool dark place at room temperature (68 to 72F). Storing it next to ovens or fryers is not ideal. If oil quality is in question it can be "flavoured" to determine if it has oxidized or not. If the oil flavours as "painty", "fishy" or rancid it should not be used, just from a quality stand point. Oil does not pose a food safety risk, since without moisture, oil does not provide an environment for microbial growth.

Formats for Sunflower Oil:





Rail Cars

SUNFLOWER OIL RESEARCH



Research Overview

- Over the years, there have been many research studies conducted on sunflower oil.
- Some studies have been performed by researchers at universities and others have been conducted by large ingredient companies such as ADM and Cargill.
- Some of the research is focused on the functional benefits of sunflower oil and other research is focused on the nutritional benefits.
- Fry life research is important, since the quality of the oil in the fryer directly influences the quality of the food coming out.



Fry Life Research¹

Purpose

Determine how select vegetable oils compare as frying mediums

- Mid Oleic Sunflower Oil (NuSun®)
- High Oleic Canola Oil (HOC)
 - Both obtained from ADM
- High Oleic Sunflower Oil (HOSUN)
 - Obtained from Stratas Foods

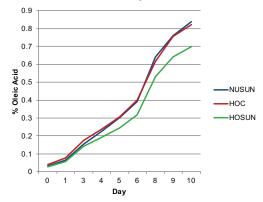
Items to be observed

- Free Fatty Acids
- Colour
- Fryer Observations

Bench top lab study

- 6.8 kg bench top fryers
- 10 day study/8 hours heating per day per fryer
 - Total heating time per fryer - 80 hours
 - Temperature of 370°F
- Twenty 230g cubed potato samples fried /fryer/day
 - Total fried product per fryer - 46 kg
- Oil samples collected and data reported for days 0, 1, 3, 4, 5, 6, 8, 9, & 10
- 200 g oil pulled each day
- 800 g oil added each morning

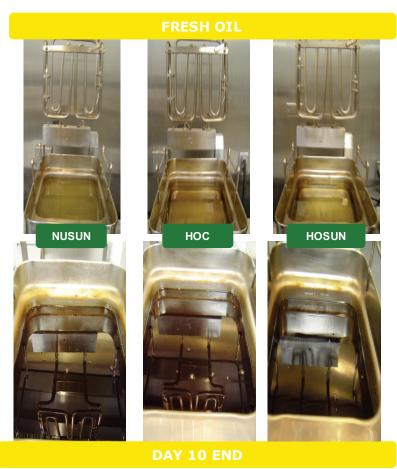
Free Fatty Acids



Free Fatty Acids (FFAs)

- The higher the fatty acid number the greater the oil degradation
- This graph shows that all of the FFA values are low for 10 days of frying and the best results occurred with High Oleic Sun Oil

Fryer Observations



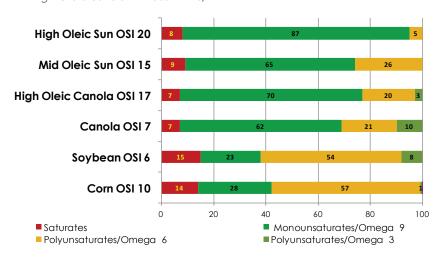
- Polymer build-up is the sticky gummy products formed by oil breakdown.
- Polyunsaturated fats (PUFAs) influence polymerization more PUFAs = more polymerization.
- There are more PUFAs in canola and soy bean oil vs. mid or high oleic sun oil.
- High oleic sun oil had the least polymer build-up at the end of the 10-day fry period.

Oxidative Stability and Oils

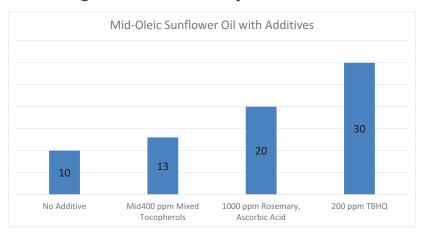
- Oxidative stability measures an oil's resistance to oxidation breakdown (i.e. rancidity). Anisidine values (AV) measure a secondary stage of oxidation breakdown in the deep frying process.
- Linolenic fatty acid (Omega-3) makes oils less stable so food manufacturers may want to consider high oleic and mid oleic sunflower oils since they have only a trace of linolenic fatty acid. In comparison, regular canola contains 11% and high oleic canola oil contains 3% linolenic fatty acid. Regular soybean oil has 7% linolenic acid and high oleic soybean oil has 2.5%.

Oxidative Stability Index for Various Oils

Oxidative stability measures an oil's resistance to oxidation breakdown. (i.e. rancidity) The standardized index below was developed by the AOCS and it measures the length of time (in hours) before a rapid acceleration of oxidation occurs (i.e. High Oleic Sunflower Oil will last 20 hrs in a fryer vs. High Oleic Canola will last 17 hrs)



Increasing Oxidative Stability



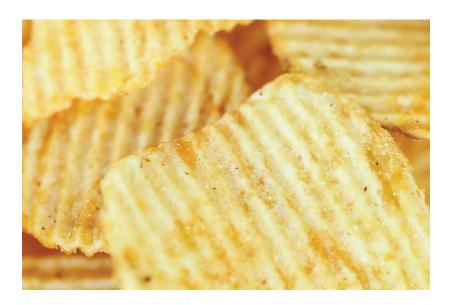
- When increased oxidative stability is needed, natural antioxidants such as rosemary, pepper and ascorbic acid benefit mid oleic sunflower oil. They have a proven protective effect on oil oxidation
- Antioxidants in oil can benefit other ingredients in your application since oil is an effective carrier.

SUNFLOWER OIL AND SNACK FOODS



Sun Oil creates great tasting snack foods

- Since sun oil has only trace amounts of linolenic fatty acid (Omega 3), it has a neutral flavour that allows the true taste of food to come through.
- When snacks are cooked in sunflower oil, there is less absorption of the oil into the food, making them taste lighter.
- Research¹ compared the taste of potato chips cooked in mid oleic sunflower oil with those cooked in other oils. After four days of storage, the chips cooked in sunflower oil had a delicious, light taste that was significantly better than the taste of the chips cooked in other oils.
- Additional research² on potato chips fried in mid oleic sun oil indicated that this oil retained the desirable fried flavour for 6 weeks, when chips were stored in a sealed container.



Research conducted at USDA/ARS National Center for AG Utilization Research, Peoria. IL, by Kathleen Warner

^{2.} International Journal of Food Properties - January 2013

Success Stories



Orville Redenbacher's

Orville Redenbacher Ready-to-Eat popcorn is made with sun oil mainly due to the high heat point that sun oil can sustain during the popping process.

As well, sun oil has a neutral taste which is ideal for blending with seasonings and flavours.

SimplyProtein®

These better-for-you protein bars and chips use high quality natural ingredients. The company decided to switch to sunflower oil, since it is non-GMO and preferred by consumers.



SUNFLOWER OIL HEALTH BENEFITS



Health Benefits

Sun Oil boosts HDL levels

- Sun oil is non-GMO, trans fat free and low in saturated fat
- Naturally high in Vitamin E and monounsaturates, sun oil provides heart health benefits
- A study¹ by U of T researcher Dr. David Jenkins appeared in the CMA Journal and showed that the intake of monounsaturated fats, particularly those found in sunflower oil, can boost HDL (good cholesterol)
 - Study participants replaced bread and sugar with 1 Tbsp. of High Oleic sunflower oil at breakfast, lunch and dinner
 - After four weeks, HDL levels of good cholesterol increased by 12.5%

Sun Oil lowers cholesterol

- In a study² done by Dr. Penny Kris-Etherton, Penn State University, participants used 2 Tbsp.(30mL) of mid-oleic sun oil or olive oil to replace saturated fat, to see how it affected their cholesterol levels.
- Results:
 - Olive oil diet No significant lowering of cholesterol
 - Mid Oleic sun oil diet Lowered total cholesterol by 4.7%
 - Lowered LDL cholesterol by 5.8%
 - Balance of fatty acids in NuSun provides the benefit (higher PUFA than olive oil)
- 1. Canadian Medical Association Journal, November 2010
- 2. Journal of the American Dietetic Association, July 2005

Canadian Success Stories



SOL Cuisine Vegetarian Foods

Create meatless burgers and meatless chicken strips for both the Canadian and US market.

Use sun oil since it is non-GMO, has longer shelf life than other oils and it contributes to taste and texture of the food.

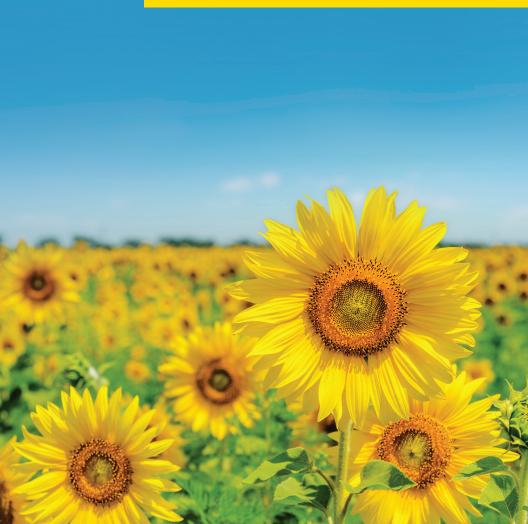
Giraffe Foods

Makes a wide variety of custom sauces, mayonnaise and dressings.

If a customer is looking for a non-GMO oil, with a long shelf life, sunflower oil is an excellent choice.



SUNFLOWER OIL BLENDS



Sun Oil is Ideal for Blending with Other Oils

If Omega-3 fatty acids are important to a product formulation, all types of sun oil can be blended with canola oil in order to achieve acceptable levels of Omega-3. Here is an example using mid oleic sunflower oil (NuSun®)

	NuSun	Canola	50 % NuSun 50 % Canola	75 % NuSun 25 % Canola
Saturates	9.0	7.0	8.0	8.5
Mono- unsaturates	65.0	61.0	63.0	64.0
Poly- unsaturates	26.0	32.0	29.0	27.5
Linoleic Acid - Omega-6	26.0	23.0	24.5	25.3
Linolenic Acid - Omega-3	0.0	9.0	4.5	2.3

Sunflower Can be Blended with Palm Oil

Mettler Drop Point (F)	110.84
SFC @ 50° F	35.87
SFC @ 70° F	18.90
SFC @ 80 F	12.63
SFC @ 92° F	8.23
SFC @ 104° F	4.68
OSI @ 110C (hrs)	27.78
Saturates	40%
Monounsaturates	50%

- Both oils are non-GMO
- Sunflower Oil can reduce saturate content
- Fatty acid profile for stability
 - · High in Monounsaturates
 - Low in Polyunsaturates < 1% linolenic acid
- Can be used in bakery applications

Sun Oil is Ideal for Biscuits and Crackers

- Recently researchers1 created biscuits using olive and sunflower oil instead of shortenings.
- The purpose of the research was to create a healthier biscuit that has a nice texture and tastes good.
- Researchers discovered that by using sunflower oil they could produce a biscuit with an overall fat reduction of 13%, without affecting the taste and texture of the biscuit.

Canadian Success Stories

lesley stowe raincoast crisps®

This premium artisan cracker brand started on the Canadian west coast and now is sold in the deli section of major grocery and premium food stores.

Sun oil was chosen mainly due to the fact that it is non-GMO and also because it has a longer shelf life than other oils.



Canadian Success Stories

Some of the Canadian food manufacturers who chose US sun oil for their products:

- Ozaku Japanese Condiments
- Sunflower Kitchen Hummus & Dips
- Indian Life Mini Samosas
- Georgian Bay Granola Company
- Earth's Own Oat
- Nona Vegan Sauces
- enerjive crackers & cookies
- FreeYumm Snacks



SUNFLOWER OIL APPENDIX & SUPPLIERS



Terminology

- Antifoam This product is added to oils that will be used for frying in order to change the surface tension of the oil and prevent the oil from foaming in the fryer. It is an additive that is used in very low dosage rate <10 ppm, typically more like 4 ppm. and it provides important functional benefits when deepfrying.
- Flavour Stability An oil's ability to resist the onset of off-flavours in food applications
- Oxidative Stability An oil's ability to resist chemical degradation resulting from the interaction with oxygen. There is a standardized Oxidative Stability Index that was developed by the American Oil Chemists Society (AOCS) and it measures the length of time that it takes for different oils to breakdown and oxidize.
- Polymer buildup This is the sticky gummy products formed by oil breakdown in a fryer.
- **Tocopherols** Naturally occurring antioxidants to preserve freshness.
- Winterization A process of removing waxes from oils. This process is primarily used for oils in salad dressings.

Mid Oleic Sun Oil **Technical Specs**

- Mid-Oleic Sunflower Oil (NuSun) FULLY REFINED, BLEACHED, & DEODORIZED Trading Rules Specifications from American Fats and Oils Association: Rule 15B
- http://www.sunflowernsa.com/oil/Product-Specifications

Sunflower Oil Suppliers

- ADM 800-637-5843
- Bank Brothers Sustainable Ingredients (formerly Hubberts Industries) 905-791-0101
- Bunge Loders Croklaan 800-361-3043
- Caldic Canada Inc.* 800-263-1939
- Cargill 800-227-4455
- C.P. Vegetable Oil Inc.* 800-431-3731

- Fazio Foods International Ltd. 604-253-2668
- IMCD Canada Ltd.* 800-575-3382
- Northern Alliance Commodities* 519-979-3800
- Sager Food Products Inc.* 514-643-4887
- TAKTIK Marketing 514-389-2553
- Tradin Organic USA LLC* 320-759-5416
- Univar Solutions* 855-888-8648

For More Information on Sunflower Oil

Please contact:

Chris Gould, Harbinger Communications 416-960-5100, ext. 234 cgould@harbingerideas.com

Or visit the National Sunflower Association web site: www.sunflowernsa.com

^{*} Also sells Organic or Conventional Expeller-Pressed sunflower oil

This information kit has been developed by the National Sunflower Association, a non-profit organization based in Mandan, North Dakota. The NSA is focused on educating food manufacturers and chefs on the benefits of using sunflower oil. October 2020 Edition