5 Seed Oil Benefits Contained Within "Panaseeda" by FOHN SBOA Member Gaye McDonald

Sunflower – Helianthus annuus

Sunflower oil is an omega 6, non-volatile oil pressed from sunflower seeds. It is used as a cooking oil and in cosmetics as an emollient.

There are three types of commonly used sunflower seeds: linoleic , high oleic, and NuSun. Each variety has its own unique levels of monounsaturated, saturated, and polyunsaturated fats. (MUFA/PUFA oils, omega 6 oils).

The original and most common is the linoleic acid type which has high levels of polyunsaturated fatty acids (68%+) and low saturated fat, the high oleic acid type which has high monounsaturated fatty acids and hybrids like NuSun containing linoleic acid and lower saturated fat levels. Sunflower seeds and oil contain both monounsaturated and polyunsaturated fat – the types of fat that may protect the heart.

Sunflower oil can be used at extremely high cooking temperatures and is thought to help food stay fresher longer.

Sunflower oil has been used to retain moisture in the skin and act as a protective barrier that resists infection in premature infants.

Types of Sunflower Oil and Their Fatty Acid Profiles

	Oleic/ Monounsaturated	Linoleic Acid/ Polyunsaturated	Saturated
Linoleic	20%	69%	11%
High Oleic	82%	9%	9%
NuSun	65%	26%	9%

Sunflower seeds

In addition to providing linoleic acid (an essential fatty acid), sunflower seeds are also an

excellent source of dietary fiber, some amino acids (tryptophan), vitamin E, several B vitamins (thiamine, pantothenic acid, and folic acid). Additionally, they are rich in cholesterol -lowering phytosterols. Sunflower seeds also have a low glycemic index as well as high levels of protein and minerals including selenium, iron, magnesium and copper.

Vitamin E is an antioxidant that may protect against heart disease by getting rid of harmful molecules called free radicals that can lead to atherosclerosis.

Folate, or folic acid is a B vitamin that plays an essential role in making new body cells by helping to form the DNA and RNA that contain each cell's "master plan" for reproduction. Folate also pairs with vitamin B-12 to help form hemoglobin in red blood cells, so they can carry optimal amounts of oxygen. Folate is involved in the removal of homocysteine, an amino acid thought to promote heart disease, from the blood.

Selenium works with vitamin E as an antioxidant and protects cells from damage that may lead to cancer, heart disease, and other health problems.

Copper helps your body carry oxygen to red blood cells and produce energy in the cells. Copper is also a vital part of some antioxidant enzymes in the body, thus protecting you from oxidative stress.

Zinc is a mineral that is vital for keeping your immune system strong, fending off infections and healing wounds.

Iron is essential in carrying oxygen from your lungs, through your blood, and to every body cell.

Phytochemicals, beneficial plant chemicals, may inhibit cancer growth, protect against heart disease, and offer protection from colon, prostate and breast cancer. Research suggests that sunflower seeds are high in many phytochemicals like choline, lignan, phenolic acids, and betaine, as well as the amino acid arginine.(6)

Sunflower seeds (Helianthus annuus) kernels, dried, Nutritional value pe 100 g. (Source: USDA National Nutrient data base)

Principle	Nutrient Value	Percentage of RDA
Energy	584 Kcal	29%
Carbohydrates	20 g	15%
Protein	20.78 g	37%
Total Fat	51.46 g	172%
Cholesterol	0 mg	0%
Dietary Fiber	8.6 g	23%
Vitamins		

Folates	227 µg	57%
Niacin	8.335 mg	52%
Pantothenic acid	1.130 mg	22%
Pyridoxine	1.345 mg	103%
Riboflavin	0.355 mg	27%
Thiamin	1.480 mg	123%
Vitamin A	50 IU	1.6%
Vitamin C	1.4	2%
Vitamin E	35.17 mg	234%
Electrolytes		
Sodium	9 mg	1%
Potassium	645 mg	14%
Minerals		
Calcium	78 mg	8%
Copper	1.800 mg	200%
Iron	5.25 mg	63%
Magnesium	325 mg	81%
Manganese	1.950 mg	85%
Phosphorus	660 mg	94%
Selenium	53 µg	96%
Zinc	5.00 mg	45%
Phyto-nutrients		
Carotene-ß	30 µg	--

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Pumpkin - *Cucurbita sp.*

Pumpkin seed oil comes from pressing roasted, hulled pumpkin seeds (pepitas) which produces a viscous green to dark red oil. New producers in India and China produce a cheaper product from nonhulled white seeds which gives a white oil.

Pumpkin seed oil has an intense nutty taste and is rich in polyunsaturated fatty acids such as myristic acid, palmitic acid, steric acid, oleic acid, linoleic acid, linolenic acid, arachidic acid as well as high in tocopherol (vitamin E) content that could potentially improve the nutrition of human diets.

Fatty acids	Species		
	C. pepo	*C. moschata*	*C. maxima*
Myristic acid (14:00)	0.23 ± 0.06	ND	0.16 ± 0.01
Palmitic acid (16:00)	12.97 ± 0.72^{b}	12.78 ± 0.11^{b}	10.84 ± 0.12^{a}
Heptadecanoic acid (17:00)	ND	ND	0.18 ± 0.01
Stearic acid (18:00)	4.67 ± 0.15^{a}	7.33 ± 0.20^{c}	5.84 ± 0.03^{b}
Oleic acid (18:1)	32.40 ± 0.56^{c}	31.34 ± 0.12^{b}	14.83 ± 0.05^{a}
Linoleic acid (18:2)	36.40 ± 0.82^{a}	35.72 ± 0.25^{a}	56.60 ± 0.29^{b}
Arachidic acid (20:00)	0.39 ± 0.06	ND	0.36 ± 0.02
Eicosenoic acid (20:1n-9)	ND	ND	0.07 ± 0.00
α-Linolenic acid (18:3n-3)	ND	ND	0.24 ± 0.01
Behenic acid (22:00)	0.37 ± 0.06	ND	0.09 ± 0.01
SFA	18.62 ± 0.64^{b}	20.11 ± 0.11^{c}	17.47 ± 0.13^{a}
MUFA	32.40 ± 1.66^{c}	31.34 ± 0.12^{b}	14.90 ± 0.04^{a}
PUFA	36.40 ± 0.82^{a}	35.72 ± 0.25^{a}	56.84 ± 0.29^{b}

Pumpkins have long been used for traditional medicine in many countries, such as China, Argentina, India, Mexico, Brazil, and Korea. Pumpkin flesh and seeds are rich in proteins,

antioxidant vitamins, such as carotenoids and tocopherols, and minerals, but low in fat and calories. β-carotene reduces skin damage from the sun and acts as an anti-inflammatory agent. α-carotene is thought to slow the aging process, reduce the risk of developing cataracts, and prevent tumor growth. Vitamin E (tocopherols) protect the cell from oxidative damage by preventing the oxidation of unsaturated fatty acids in the cell membrane. Pumpkin seeds are a good source of zinc, polyunsaturated fatty acids and phytosterols (e.g. β-sitosterol) which can prevent chronic diseases. Phytosterols are integral components of plant cell membranes, and are abundant in vegetable oils, nuts, seeds, and grains. Phytosterols can lower both total serum cholesterol and LDL-cholesterol in humans by inhibiting the absorption of dietary cholesterol , and can prevent cancer. Recently, plant sterols have been proposed to have other positive health effects. β-Sitosterol especially is considered a treatment for benign prostatic hyperplasia . Diets high in pumpkin seeds have been associated with lower risks of gastric, breast, lung, and colorectal cancers.

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Sesame - *Sesamum indicum* Black and white seeds

Sesame seed is considered to be the oldest oilseed crop known, domesticated well over 5000 years ago. It is included in the list of Egyptian medicinal drugs in the scrolls of the Ebers Papyrus dated to be over 3600 years old.

Sesame has one of the highest oil content of any seed; some varietals exceeding 50 percent oil content. It has a rich nutty flavor, and is a common ingredient in cuisines across the world. This pressed oil is made from either untoasted sesame seeds, resulting in a light-colored oil, or toasted sesame seeds, for a dark-colored oil. Light sesame oil has a nutty flavor and is good for frying, while dark sesame oil has a strong flavor and is generally added to dishes in small quantities for flavor just before serving. Despite sesame oil's high proportion (~41%) of polyunsaturated (Omega-6 –PUFA's) fatty acids, it is least prone, among cooking oils with high smoke points, to turn rancid when kept in the open. This is due to the natural antioxidants present in the oil. It is a good source of both monounsaturated fat and polyunsaturated fat.

The fruit is an oblong, mucronate, pubescent capsule containing numerous small, oval, yellow, white, red, brown, or black seeds.

Sesame oil is composed of the following fatty acids

Fatty acid	Nomenclature	Minimum	Maximum
Palmitic	C16:0	7.0%	12.0%
Palmitoleic	C16:1	trace	0.5%
Stearic	C18:0	3.5%	6.0%
Oleic	C18:1	35.0%	50.0%
Linoleic	C18:2	35.0%	50.0%
Linolenic	C18:3	trace	1.0%
Eicosenoic	C20:1	trace	1.0%

Lignans are a group of chemical compounds found in plants. Lignans are one of the major

classes of phytoestrogens, which are estrogen-like chemicals and also act as antioxidants. Sesame seeds contain higher levels of lignans than most other foods.
Sesame lignans have antioxidant and health promoting activities High amounts of both sesamin and sesamolin have been identified in sesame. Both sesamin and sesamolin were reported to increase both the hepatic mitochondrial and the peroxisomal fatty acid oxidation rate. Sesame seed consumption appears to increase plasma gamma-tocopherol and enhanced vitamin E activity which are believed to prevent cancer and heart disease. Sesamin remained at 90% of the original level after roasting. PUFA's and semamin reduce blood pressure in hypertensive rats. Sesame lignans also inhibit the synthesis and absorption of cholesterol in these rats. Cephalin from sesame seed has hemostat activity. Historically, fiber is used as an antidiabetic, antitumor, antiulcer, cancer preventive, cardioprotective, and laxative. Sesame seed contains a high portion of fiber. Sesame seed contains lecithin which has antioxidant and hepatoprotective activity. Lecithin is also likely effective for reducing hepatic steatosis in long term parenteral nutrition patients and a successful treatment for dermatitis and dry skin.

The oil from the nutrient rich seed is popular in alternative medicine – from traditional massages and treatments to the modern day. Sesame oil is used in the manufacture of Ayurvedic drugs. Ayurvedic physicians use the oil in the treatment of several chronic disease processes, including hepatitis, diabetes and migraines. Black sesame seeds are traditionally preferred type for Ayurvedic medicines.

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Flax - Linum usitatissimum

Flax seeds come in two varieties: brown and yellow or golden. Most types have similar nutritional characteristics and equal numbers of short-chain omega-3 fatty acids. The exception is a type of yellow flax called solin (trade name Linola), which has a completely different oil profile and is very low in omega-3 FAs. Although brown flax can be consumed as readily as yellow, and has been for thousands of years, it is better known as an ingredient in paints, fiber and cattle feed. Flax seeds produce a vegetable oil known as flaxseed or linseed oil, which is one of the oldest commercial oils, and solvent-processed flax seed oil has been used for centuries as a drying oil for painting and varnishing.

Flax helps protect against heart attacks and stroke by lowering blood lipids, maintaining healthy blood vessels, and decreasing inflammation. The main nutrients in flax – namely, alpha-linolenic acid (ALA), the essential omega-3 fat; dietary fibre; and the lignan secoisolariciresinol diglucoside (SDG) – all contribute to its heart healthy effects. Milled flax and whole flax seeds contain ALA, dietary fibre and lignans. Flax oil is very rich in ALA but contains virtually no dietary fibre and lignans.

Flax seeds contain high levels of dietary fiber as well as lignans, an abundance of micronutrients and omega-3 fatty acids. Studies have shown that flax seeds may lower cholesterol levels. It's the flaxseed lignans -- a group of chemical compounds found in plants that are known for their protective health effects -- that may help lower cholesterol, These

compounds are converted to their bioactive forms by gut microbes. Hendrich reports that they made a healthy conversion in the subjects in this study, with no adverse health consequences.

Initial studies suggest that flax seeds in the diet may benefit individuals with certain types of breast and prostate cancers. A study done at Duke University suggests that flaxseed may stunt the growth of prostate tumors. Flax may also lessen the severity of diabetes by stabilizing blood-sugar levels. There is some support for the use of flax seed as a laxative due to its dietary fiber content though excessive consumption without liquid can result in intestinal blockage. Consuming large amounts of flax seed may impair the effectiveness of certain oral medications, due to its fiber content and may have adverse effects due to its content of neurotoxic cyanogen glycosides and immunosuppressive cyclic nona peptides.

Flax seeds

Nutritional value per 100 g (3.5 oz)	
Energy	2,234 kJ (534 kcal)
Carbohydrates	28.88 g
- Sugars	1.55 g
- Dietary fiber	27.3 g
Fat	42.16 g
- saturated	3.663
- monounsaturated	7.527
- polyunsaturated	28.730
Protein	18.29 g
Thiamine (vit. B1)	1.644 mg (143%)
Riboflavin (vit. B2)	0.161 mg (13%)
Niacin (vit. B3)	3.08 mg (21%)
Pantothenic acid (B5)	0.985 mg (20%)
Vitamin B6	0.473 mg (36%)
Folate (vit. B9)	0 µg (0%)
Vitamin C	0.6 mg (1%)
Calcium	255 mg (26%)
Iron	5.73 mg (44%)
Magnesium	392 mg (110%)

Phosphorus	642 mg (92%)
Potassium	813 mg (17%)
Zinc	4.34 mg (46%)
Percentages are relative to US recommendations for adults. Source: USDA Nutrient Database	

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Chia - alvia hispanica

Chia is native to central and southern Mexico and Guatemala and was an important crop for the Aztecs. Chia is grown commercially for its seed, a food that is rich in omega-3 fatty acids, since the seeds yield 25–30% extractable oil, including α-linolenic acid (ALA). Of total fat, the composition of the oil can be 60% omega-3, 15% omega-6, 5% omega-9, and 20% saturated fat.

Chia seeds are typically small ovals with a diameter of about 1 mm (0.039 in). They are mottle-colored with brown, gray, black and white.

Chia is being studied as a potential natural treatment for type-2 diabetes because of its ability to slow down digestion. The gelatinous coating chia seeds develop when exposed to liquids-can also prevent blood sugar spikes. Chia's stabilizing effect on blood sugar also fights insulin resistance. This type of resistance can be harmful for your overall health.

Just a 28-gram or one-ounce serving of chia has 11 grams of dietary fibre — about a third of the recommended daily intake for adults. Adding some chia to your diet is an easy way to make sure you're getting a good amount of fibre, which is important for digestive health.

Chia seeds are packed with omega-3 fatty acids, with nearly five grams in a one-ounce serving. These fats are important for brain and heart health.
A serving of chia seeds has 18 per cent of the recommended daily intake for calcium, which helps to maintaining bone and oral health and prevent osteoporosis**.**

Manganese is important for our health: it's good for your bones and helps your body use other essential nutrients like biotin and thiamin. One serving of chia seeds, or 28 grams, has 30 per cent of your recommended intake of this mineral.

With 27 per cent of your daily value for phosphorus, chia seeds also help you maintain healthy bones and teeth. Phosphorus is also used by the body to synthesize protein for cell and tissue growth and repair.

Chia seeds also make a great source of protein for vegetarians and don't have any cholesterol. One 28-gram serving of these super seeds has 4.4 grams of protein, nearly 10 per cent of the daily value.

Tryptophan, an amino acid found in turkey, is also found in chia seeds. While tryptophan is responsible for that strong urge to nap after a big Thanksgiving dinner for example, it also helps regulate appetite, sleep and improve mood.

According to the Cleveland Clinic, chia seeds have been shown to improve blood pressure in diabetics, and may also increase healthy cholesterol while lowering total, LDL, and triglyceride cholesterol. Good news for your heart.

Seeds, chia seeds, dried	

Nutritional value per 100 g (3.5 oz)	
Energy	2,034 kJ (486 kcal)
Carbohydrates	42.12 g
Dietary fiber	34.4 g
Fat	30.74 g
saturated	3.330
monounsaturated	2.309
polyunsaturated	23.665
Protein	16.54 g
Vitamin A equiv.	54 µg (7%)
Thiamine (vit. B_1)	0.62 mg (54%)
Riboflavin (vit. B_2)	0.17 mg (14%)
Niacin (vit. B_3)	8.83 mg (59%)
Folate (vit. B_9)	49 µg (12%)
Vitamin C	1.6 mg (2%)
Vitamin E	0.5 mg (3%)
Calcium	631 mg (63%)
Iron	7.72 mg (59%)
Magnesium	335 mg (94%)
Manganese	2.723 mg (130%)
Phosphorus	860 mg (123%)
Potassium	407 mg (9%)

Sodium	16 mg (1%)
Zinc	4.58 mg (48%)

Source: USDA Nutrient Database

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Coriander - *Coriandrum sativum*

Coriander is an annual spice crop and a member of the Umbelliferae, or carrot family. The fresh green herb is called cilantro, or Chinese parsley. It is used in southeast and southern Asian, Chinese and Mexican cuisine, and for flavouring salads and soups. All parts of the plant are edible, but the fresh leaves and the dried seeds are the parts most traditionally used in cooking.

There are two types of coriander: large seeded (fruited) and small seeded.
The mature, round fruit contains two fused seeds. The fruits must be intact, as the essential oil can volatilize from split fruit or individual seeds. Mature seeds have a pleasant, spicy aroma. Coriander powder is made from ground seeds and is used to flavour many products such as curries, gin and prepared meats.

Coriander essential oil is used as a flavour ingredient, but it also has a long history as a traditional medicine. It is obtained by steam distillation of the dried fully ripe fruits (seeds). The oil is a colorless or pale yellow liquid with a characteristic odor and mild, sweet, warm and aromatic flavour; linalool is the major constituent (approximately 70%).
Cilantro is rich in thiamin, zinc, dietary fiber and vitamins A, C, E and K. It has trace amounts of riboflavin, niacin, vitamin B6, folate, pantothenic acid, calcium, iron, magnesium, phosphorous, potassium, copper and manganese.

Coriander, contains antioxidants, which can delay or prevent the spoilage of food seasoned with this spice. Both the leaves and seed contain antioxidants, but the leaves were found to have a stronger effect.

Coriander oil has broad-spectrum, antimicrobial activity.

Chemicals from coriander leaves were found to have antibacterial activity against *Salmonella choleraesuis*, and this activity was in part due to these chemicals acting as nonionic surfactants.

Coriander has been documented as a traditional treatment for type 2 diabetes. A study on mice found coriander extract had both insulin-releasing and insulin-like activity.

Coriander seeds were found in a study on rats to have a significant hypolipidaemic effect, resulting in lowering of levels of total cholesterol and triglycerides, and increasing levels of high-density lipoprotein. This effect appeared to be caused by increasing synthesis of bile by the liver and increasing the breakdown of cholesterol into other compounds.

Coriander has also been used for the relief of anxiety and insomnia, as a diuretic and as a digestive aid in holistic and traditional medicine. It plays an important role in Ayurvedic diets as well.

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Hemp - *Cannabis sativa L.*

The seed of non-drug varieties of Cannabis, commonly referred to as hemp, has been an important source of nutrition for thousands of years in Old World cultures. Hemp is refined into products like hemp seed foods, hemp oil, wax, resin, rope, cloth, pulp, and fuel and building products. Hemp is a high protein seed containing all 20 amino acids, including the 9 essential amino acids (EAAs) our bodies cannot produce. Technically a nut, hempseed contains over 30% oil and about 25% protein, with considerable amounts of dietary fiber, vitamins and

minerals. It has a balanced ratio of omega 6 to 3 fats at around a three to one ratio considered to be optimal for human cardiovascular health, brain health and general strengthening of the immune system.

Hempseed oil has over 80% polyunsaturated fatty acids (PUFAs), and is an exceptionally rich source of the two essential fatty acids (EFAs) linoleic acid (18:2 omega-6) and alpha-linolenic acid (18:3 omega-3). In addition, the biological metabolites of the two EFAs, gamma-linolenic acid (18:3 omega-6; 'GLA') and stearidonic acid (18:4 omega-3; 'SDA'), are also present in hempseed oil.

Polyunsaturated fatty acids (PUFAS's) in the form of essential fatty acids (EFA'S) that are found in hemp, have had much research that shows their impact on keeping cholesterol in balance for vascular and heart health. Dietary PUFA's are known to favourably influence the fatty acid profile in low density lipoproteins (LDL) - the bad cholesterol. Therefore a diet rich in PUFA's like hemp, can lower arterial levels of LDL cholesterol and blood pressure in humans. PUFA's also decrease platelet aggregation which increases bleeding time and results in decreased peripheral blood pressure and clot formation. The optimum ratio of EFA's for good health is roughly a 3:1 ratio of omega -6 to omega-3. The modern diet is badly imbalanced with a 15:1 ratio due to diets relying mainly on animal fat and other forms of seed and vegetable oils. This imbalance causes the body to metabolize the EFA's into hormones called eiconasoids which leads to inflammation and have been implicated in chronic disease states of the human immune system, and a wide range of health problems such as arthritis, cancer, cardiovascular disease, diabetes, mood disorders and skin ailments. As hemp has a ratio of between 3:1 to 2:1 its consumption can help balance the excess of omega-6 in the diet.

Dietary supplementation with foods that contain PUFAs and optimum ratio of EFA's are beneficial for cellular health on a fundamental level as the PUFA's ingested are incorporated into the formation of the phospholipid membrane of cells and organelles membranes. PUFA's within the phospholipid bilayer is essential for maintaining cell membrane fluidity, particularly neuronal membranes of the central nervous system.

There have been many studies that correlate the 3:1 ratio of omega-6 to omega 3 in the diet to reducing the risk of:

- Atherosclerosis
- Sudden cardiac arrests and/or Strokes
- Certain forms of cancer
- Rheumatoid arthritis symptoms
- Mood and bi-polar disorder
- Asthma

The protein in hemp is of extremely high quality in terms of its amino acid content and protein structure which affects digestibility and utilization by the human body. The protein comes mainly from two main sources in the hemp, edestin and albumin. These are high quality storage

proteins called globulin's that are similar to the structure of proteins manufactured in our blood are easy to digest and utilize. Hemp carries the full spectrum of essential amino acids in significant amounts. Some of the most prominent being arginine, glutamic acid and the sulfur based methionine and cystine. The amino acid profile is actually closer to complete sources of protein such as eggs, meat and milk. This is rare in plant based foods, and one of the only oil seeds except for soy to do so. Unlike soy, hemp does not have any anti nutrients that affect protein uptake. This is very important for people who follow a predominately plant based diet such as vegans and vegetarians.

Typical nutritional analysis of hulled hemp seeds	
Calories/100 g	567 kcal
Protein	30.6
Carbohydrate	10.9
Dietary fiber	6.0
Fat	47.2
Saturated fat	5.2
Palmitic 16:0	3.4
Stearic 18:0	1.5
Monounsaturated fat	5.8
Oleic 18:1 (Omega-9)	5.8
Polyunsaturated fat	36.2
Linoleic 18:2 (Omega-6)	27.6
Linolenic 18:3 (Omega-3)	8.7
Gamma-Linolenic 18:3 (Omega-6)	0.8
Cholesterol	0 mg
Moisture	4.7
Ash	6.6
Vitamin A (B-Carotene)	4.0 IU/100g
Thiamine (Vit B_1)	1.4 mg
Riboflavin (Vit B_2)	0.3 mg
Pyridoxine (Vit B_6)	0.1 mg
Vitamin C	1.0 mg

Vitamin E	9.0 IU/100g
Sodium	9.0 mg
Calcium	74.0 mg
Iron	4.7 mg

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Black Cumin - *Nigella Sativa L.*

Since ancient times in the traditional areas touched by the Silk Road connecting China, India, Persia and the Mediterranean countries, oils derived from black cumin seed have been used in cooking both as a spice, a condiment and as a home remedy to aid in digestion. Islamic physicians prescribed medicines made from black cumin seeds for everything from indigestion to upper respiratory problems.

Black Cumin (Nigella sativa) Seed is a valuable source of protein, carbohydrates, essential fatty acids, vitamins A, B1, B2, C, and niacin as well as minerals such as calcium, potassium, iron, magnesium, selenium, copper and zinc.

Black cumin oil contains the fatty acids: Myristic Acid (0.5%), Palmitic Acid (13.7%), Palmitoleic Acid (0.1%), Stearic Acid (2.6%), Oleic Acid (23.7%), Linoleic Acid [Omega-6] (57.9%), Linolenic Acid [Omega-3] (0.2%), and Arachidic Acid (1.3%).

Recent studies indicate that black cumin has cardio-protective, anti-cancer, anti-diabetic, antioxidant, antimicrobial and immune-modulatory properties.

Constituents of the Nigella sativa seed and oil are reported to possess potent antioxidant effects primarily due to the bioactive component thymoquinine (TQ). Which is believed to work by enhancing the oxidant scavenger system.

The seeds and oil reportedly have anti-inflammatory effects on several inflammation-based models including experimental encephalomyelitis, colitis, peritonitis, oedama, and arthritis through suppression of the inflammatory mediators prostaglandins and leukotrienes. The oil and certain active ingredients showed immunomodulatory properties, augmenting the T cell- and natural killer cell-mediated immune responses.

In addition, daily supplements of black seed oil have been found to reduce cholesterol, triglyceride and glucose levels in rats.

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Muscadine grape seed (*Vitis rotundifolia*)

Muscadine grapes are native to the present-day southeastern United States and have been extensively cultivated since the 16th century. Muscadines are not only eaten fresh, but also are used in making wine, juice, and jelly.

Muscadine grapes are notable for their highly pigmented, thick skins in which the content of polyphenols is known to be high. As one of nature's richest sources of polyphenolic antioxidants, muscadines have been studied for their potential health benefits which include preliminary evidence for effects against cancer mechanisms. Gallic acid, (+)-catechin and epicatechin are the major phenolics in seeds, while ellagic acid, myricetin, quercetin, kaempferol, and trans-resveratrol are the major phenolics in the skins. To date, in vitro studies have shown positive effects of muscadine phenolics against blood, colon and prostate cancers.

Researchers from Clemson University found various grape extracts and their compounds to be effective at inhibiting Helicobacter pylori, one of the leading causes of gastritis in humans. Following 24 hour treatment, results showed that muscadine grape skin extract had the highest anti-H. pylori effect, followed by muscadine grape synergy and seed extract.

Muscadine grape seed extract may offer antibacterial and food preservative benefits, according to researchers at the Department of Food Science, Nutrition and Health Promotion at Mississippi State University. In the study, two varieties of muscadines, one purple and one bronze-colored, were tested against three strains of E. coli bacteria, which is associated with food-borne intestinal illnesses. Researchers concluded good potential for the use of muscadine grape seed extract as a preservative for juices and other beverages.

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