

Non-Conventional Seed Oils: An Innovative Strategy to Boost Human Health

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Abstract

Non-conventional seed oils are valuable due to their unique constituents that exhibit health-promoting perspectives as functional ingredients. Key factor responsible for the ignorance of these oils is the lack of consumer awareness about their functional and nutraceutical aspects. Advancement in science and technology has revealed their role in daily life via revealing their health maintaining and disease preventing outcomes. Non-conventional seed oils include coriander seed oil, rice bran oil, sesame seed oil, flaxseed oil, hempseed oil, black cumin seed oil, cottonseed oil, peanut oil, pomegranate seed oil, avocado oil and many more. These Seed oils have symbolic role in boosting one's health i.e. black cumin oil is rich in thymoquinone that offers strong antifungal activity whereas subcutaneous injection of rice bran oil has neuroendocrinological effect. Sesame seed oil has sesamin and sesamol that has been proven for the treatment of alzheimer and parkinson's disease. Coriander seed oil and flaxseed oil have anti-anxiety and anti-tumor activity respectively. Likewise, hempseed oil is advantageous due to presence of anti-hypercholesteromic component beta-sitosterol. Hence, current review focuses on all these non conventional seed oils contribute their own to improve the consumer life style by promising the role of fats and oils in our daily life.

Keywords: Non-conventional oils; Nutritional profile; Fatty acids; Health benefits; Disease prevention

Introduction

Recent decades, the most important part of the world agriculture is the oil crop sector. In developing countries food and non-food demands for oil seed crops is increasing day by day. Their increasing demand shows direct link between production and utilization therefore oil seed crops i.e. palm oil, soybean oil are not only used for food purposes but also for feed while the non-food uses include paints, detergents, lubricants, oleo chemicals and biodiesel.

A small number of crops and countries significantly manage world production of oil crops. Since 1990 oil palm, soybeans and rapeseed contributed about 82% of overall increase in global oil yield and cottonseed oil contributed only 4% despite of having major role in food supply and food security purposes. Pakistan, Sahel, Turkey, Syrian Arab Republic, Sudan, Uganda, Ethiopia, Ghana, Myanmar, India, Viet Nam, Senegal, the Democratic Republic of the Congo, Thailand, the United Republic of Tanzania, Benin, Philippines, Sri Lanka and Mexico are the major contributor of oil crop production. Some oil crops have low share in world's total oil production but considered important due to their major contribution in food security i.e. sesame seed from Sudan, Myanmar, Ethiopia and Uganda; coconut seed oil from Sri Lanka, Philippines, Mexico and Viet Nam; cottonseed oil in the countries of Central Asia and those in Sahel, Pakistan, Turkey and Syrian Arab Republic; olive oil in Mediterranean countries. India contributed 6%-7% in world's oilseed production by cultivating 28 million tons of oil seed crops during 2007-2008. In the total world's palm oil production 87% contributed by Malaysia and

Indonesia while Thailand (2.5%) Columbia and Nigeria (2%) were minor contributors during the year of 2010-2011.

Fats and oils play a vital role in human diet especially in terms of their nutritional value. Oils have significant proportion of beneficial components i.e. free fatty acids (linolenic acid, linoleic acid), triacylglycerols (stereo specific composition of triacylglycerol has many beneficial effects on human and animal feeding, on fat absorption plasma triacylglycerol and plasma cholesterol concentrations and atherogenesis), phenols (preventive against oxidative damage tocopherols (vitamin E) present in corn oil, palm oil, wheat germ oil and pomegranate seed oils have neuroprotective and anti-tumor activity sterols (in corn, cotton seed, peanut and linseed oils) while stanols, squalene, waxes, phospholipids and other hydrocarbons in trace amounts. Linolenic acid (omega 3 fatty acid) is an essential fatty acid that must come from diet because it cannot be synthesized by human body.

Oils are used from centuries for different purposes worldwide but its overuse can be hazardous to human health are known as conventional oils. Fatty acids are the key contributors in determining oils quality. According to World Health Organization (WHO) recommended intake of total fat must be in the range of 30%-35% of total caloric intake out of which saturated fatty acids should be 10%, Poly Unsaturated Fatty Acid (PUFA) 6%-11% and Monounsaturated Fatty Acids (MUFA) 10%-14%. WHO also suggest that the ratio of polyunsaturated fatty acid: monounsaturated fatty acid saturated fatty acid should be 1:1.5:1. Now these days, commercially available conventional oils do not meet the recommended intake of these

suggested ratios and consumer standard needs i.e. texture, stability .If fat intake exceed from 35%-40% from daily intake then it will cause many health related problems i.e. thrombosis (blood clotting), atherosclerosis (blocking of cardiac arteries), certain cancers and diabetes. Trans fats and trans poly unsaturated fatty acids available are not accepted by human enzymatic system as our body can only utilized cis form of fatty acids. Similarly, saturated fatty acids i.e. palmitic acid, lauric acid and myristic acid are hazardous on human consumption by increasing Low Density Lipoprotein(LDL),total cholesterol in blood stream. Conventional oils are prone to heat stability on each heat treatment and form trans fatty acids. Hence, trans fatty acids play major role in metabolic disorders by increasing LDL and total cholesterol and lowering (High Density Lipoprotein) HDL [1-10].

Literature Review

Some oils are used for the medicinal purposes having number of health promoting factors can be used as alternative to these conventional oils. Such oils are known as non-conventional oils. These are commonly employed but not consumed on regular basis despite of their huge number of benefits. These oils are used in salad dressing, pharmacological and medicinal purposes. It is also beneficial for human health due to essential fatty acids constituents, especially significant proportion of linolenic fatty acid and alpha linoleic fatty acid in flaxseed oil and hempseed oil. It has the potential to control heart disease, hypertension, cancer and autoimmune disorders. Their health promoting components are linolenic and linoleic fatty acid that are used in the treatment of cardiac diseases .Its prevalence can be controlled or reduced by changing dietary pattern (high fat, high calories) and stress in developed countries [11-19].

Black cumin seed oil

Black cumin (*Nigella sativa*) is a miracle herb also known as black caraway from the *Ranunculaceae* family and native of Southwest Asia and North Africa which is cultivated in Middle Eastern Mediterranean region, India, Pakistan, Saudi Arabia, Turkey, Syria and South Europe. Its seeds are available in India, Syria and Egypt and traditionally used for medicinal purposes. It consists of polyunsaturated fatty acid (linoleic fatty acid), proteins and crude fat. It is a member of parsley family and yellow-grey and oblong. They are used in various food cuisines in different countries as whole and ground forms (Table 1) [20-22].

Table 1: Fatty acid profile of black cumin.

Fatty acids	Percentages (%)
Linoleic Acid	50-60
Saturated Fatty Acids (Palmitic, Stearic Acid)	30 or <
Dihomolinoleic Acid	10
Eicodadienoic Acid	3
Oleic acid	20

It has no refining process and has lipophilic phytochemical content like thymoquinone derivatives and natural antioxidants (Table 2).

Table 2: Bioactive components of black cumin.

Bioactive components	Ranges in percentage (%)
Thymoquinone	30-48
Carvacrol	44901
Thymohydroquinone, Dithymoquinone, P-Cymene	42186
4-Terpeneol	44744
Sesquiterpene Longifolene	44774
T-Anethol	44652

Some traces of pyrazol alkaloids, Isoquinoline alkaloids that have pyrazol alkaloids or indazole ring bearing alkaloids which comprises of nigellidine and nigellidine and nigellidine-N-oxide and nigellidine. It also has alpha hederin which is a water soluble pentacyclic triterpene and saponin which have anticarcinogenic properties. Carvone, citronellol, limonene also present in less proportion. It also contains some amount of vitamin A that is converted in the liver from its precursor form (carotene), vitamin E (tocopherol) that have antitumor activity and minerals i.e. Cu, P, Zn and Fe. Black cumin seeds are important source of nutritionally vital components. It is used for the management of different diseases from centuries due to its medicinal uses i.e. in Unani and ayurveda medicines for the treatment of appetite loss, indigestion, diarrhea, amenorrhea, dysmenorrhea, dropsy and in the treatment of worms and skin eruptions. Roasted black seeds are given orally to stop vomiting. Externally, it has been proven to treat against antiseptic and local anesthetic. Its oil is differentiated into essential oil and crude oil while It's essential oil have thymoquinone which exhibit beneficial effect in the treatment of diabetes, oxidative stress, immune dysfunction, cancer specially breast cancer. Essential oil used in creams, detergents, surfactants, emulsifiers, lotions and perfumes. Along with its essential oil its crude oil is also beneficial for the treatment of many disorders i.e. antioxidant and anti-inflammatory purposes to prevent liver inflammation and dislipidemia in humans. Now, it is also used as antitumor, antibacterial, antihelmenthic, antifungal agents [23-30].

Ahmad and colleagues investigated methanolic extract of black cumin against fungal attack. Which have strongest affinity against fungal attack followed by chloroform extracts on variant strains of *Candida albicans*. Their observations found that on liver, spleen and kidneys *Candida albicans* intravenous inoculums produced colonies of organisms. 24-hour inoculation with plant extract for the treatment of mice shows significant effect on all studied organs by inhibiting growth of organisms. Histopathological examination of respective organs observed on animal group when post treated with plant extract. Result shows 5 times reduction of *Candida* in kidney, 11 times in spleen and 8 times in liver of mice. He also studied nephro protective activity of black cumin seed oil with vitamin C against Gentamicin (GM) related nephrotoxicity in rabbits. Indicators of nephrotoxicity are blood urea nitrogen, serum creatinine and antioxidant activity in rabbits. He concluded that seed oil and vitamin C together reduces the concentration of serum creatinine, antioxidant activity and blood urea nitrogen as compared to GM control group values. The beneficial effects of black cumin seed oil are also studied by Ahmad and colleagues on rats against hyperoxia induced lung injury. In result, oxygen induced lung injury lead toward the increase the symptoms of broncho pulmonary dysplasia in premature infants. In result, he observed that significant reduction in severity of lungs damage through hyperoxia [31-36].

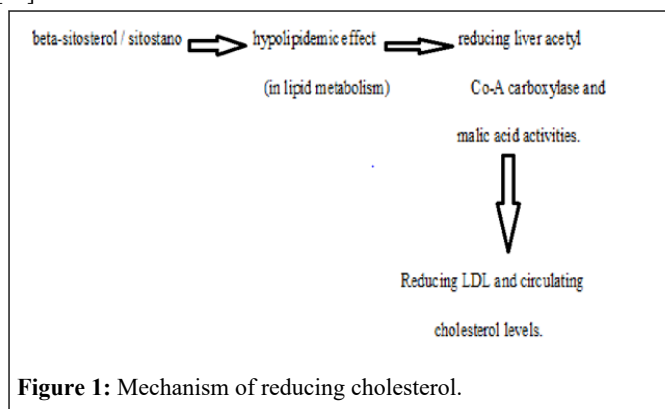
Rice bran oil

Rice is among one of the important crops in Asia and third in terms of production after wheat and corn. It is produced almost in 100 countries having 18000 species that contribute about 25% of world food grain product. Rice cultivated countries are Asia, America and Africa. In milling and de-husking, removed brownish part is rice bran. Bran is the rice hard external coating contains saleurone and pericarp and obtained as byproduct. It is commonly used as animal feed and left over is wasted. Wasted components includes inositol, lecithin, tocotrienols, ferulic acid, oryzanols, tocopherols, phytic acid, wax that have been proven to improve health. Major rice bran oil producing countries are India and Thailand. Through solvent extraction method it produced 40 lac ton rice bran and 6.5 lac ton is utilized as rice bran oil in India (Table 3) [37].

Table 3: Fatty acid profile of rice bran oil.

Fatty acids	Percentages (%)
Linoleic acid	34.4
Oleic acid	38.4
Palmitic acid	21.5
Stearic acid	2.9
Alpha-linolenic acid	2.2

It contains almost 85% of triacylglycerol, saponifiable lipids such as glycolipids, phospholipids and unsaponifiable lipids i.e. tocopherols, tocotrienols, sterols, γ -oryzanols and carotenoids are present in rice bran. The unsaponifiable components of rice bran also have compounds that are present in fewer amounts, including carotenoids, lecithin, long-chain alcohols such as squalene and 1-octacosanol. From colored varieties of rice bran antioxidant obtained are carotenoids, vitamin-E, polyphenols and tocotrienol that prevent damaging of body tissues and oxidative damage of DNA (Figure 1) [15].



Researchers revealed that antioxidant also improves atherosclerotic plaque by improving antioxidant status in blood. The ferulic acid ester of the gamma oryzanol has strong antioxidant potential and show stabilizing behavior at high temperatures. In inhibition of cellular oxidation process. One test tube of gamma oryzanol is four times effective like vitamin E when compared with the four components of vitamin E (alpha-tocotrienol and beta tocotrienol, alpha-tocopherol, beta-tocopherol). The unsaponifiable lipid gamma oryzanol and its components triterpene alcohols and ferulic acid (esters of sterols)

exhibit elevated antioxidant capacity. Bakota and colleagues studied the effect of Gamma oryzanol against hypercholesterolemia. Gamma oryzanol given for four weeks decreases LDL-C (10.5%), total plasma cholesterol (6.3%) and LDL-C/HDL-C ratio (18.9%). Dietary fiber comes from cereal intake is exposed to lower the risk of Coronary Heart Disease (CHD) mortality by dropping blood pressure, improving insulin sensitivity and lower blood cholesterol levels. Gamma oryzanol is defensive against lipid peroxidation induced by Ultra Violet (UV) light. It prevents skin damage, skin ageing and improves hair growth through the action of frulic acid and its esters. Prasad and colleagues estimated the amount of tocotrienol, 500 ppm is applied to the skins that are penetrated and absorbed. Due to behavior of antioxidants, it gets accumulated on strata corneum of skin and act as first line of defense for skin. Free radicals produced in the skin are stabilized when exposed to oxidative rays. The effect of neuro endocrinological gastroenterological, anabolic and dermatological on rats studied by providing subcutaneous injection of rice bran oil. Their observations reveal that it hold back Luteinizing Hormone (LH) release, discharge and increase the release of the catecholamines, dopamine and norepinephrine in the brain and also decreases Growth Hormone (GH) production. Rice bran oil has immune boosting behavior due to the presence of sterolins, phytosterols. It elevates the serum level in hypothyroidism and reducing the symptoms of menopause i.e. hot flashes

Coriander seed oil

Over 3000 years the oldest herb used for medicinal and culinary purposes is coriander sativum (*Coriandrum sativum*) belongs to *Apiaceae* family which is widely cultivated in Mediterranean region like Central Europe, North Africa, Russia, Canada, Iran, India, Pakistan, Algeria, Bangladesh and Brazil. It is also known as “dhanya” in Indo-Pak subcontinent region. Its green herbs used for the production of steam-distilled essential oil or the solvent extracted oleoresins (Table 4).

Table 4: Fatty acid profile coriander seed oil.

Fatty acids	Percentage % range
Linoleic acid	13.05-16.70
Oleic acid	0.20-7.85
Arachidic acid	0.10-0.25
Stearic acid	0.78-2.91
Palmitoleic acid	0.41-1.1
Palmitic acid	0.10-3.96
α -linolenic acid	0.15-0.50

The major constituent in its oil is petroselinic acid which is extracted through different techniques i.e. organic solvent extraction (soxhlet), steam distillation supercritical fluid extraction which provide antioxidants, enzymes, peptides, vitamins (vitamin A 12 mg/100 g and vitamin C 160 mg/100 g), minerals (iron, zinc). Essential oil and fatty oil is the most important constituent of coriander seed. The commercial value of its essential oil depends upon its physical attributes, chemical composition and aroma quality. The contribution of fatty oil is about 25% while 1% is essential oil in its seed. The uniqueness of fatty oil is due to the presence of petroselinic

acid. From last decades, it is used in food and industries while its bioactive components and essential oil used to improve human health status (Table 5).

Table 5: Coriander seed oil constituents.

Constituents	Percentage ranges %
Camphor	3.40-6.20
Phellandrene	1.7-4.1
α - pinene	1.20-3.20
Limonene	0.70-1.80
Linalyl acetate	2.40-3.30
Geranyl acetate	0.90-1.60
Para-cymene	0.50-1.30

Major constituents are volatile oil 1.8%, distilled oil contain 70% linalool (coriandrol). Minor constituent of coriander are monoterpene hydrocarbons; γ -terpinene, Geranylacetate β - pinene, p -lymene, citron, borneol, limonene, linalol, Geraniol and Xmphoe, Hetero-cyclic compounds; thiazole, furan, pyrazine, pyridine, tetrahydrofuran derivatives; coriandrones A-E, glazonoids, isocoumarin, coriandrin, dihydrocoriandrin. Neochidilide Z-digustilide; flavonoids, phenolic acids, sterols. It is used in flavoring of sausages, garnishing of salads and also used in chutneys. It is also used to fulfill micronutrient deficiency i.e. Vitamin and iron related diseases. It is also helpful for the treatment of digestive tract disorders (indigestion, nausea and dysentery), respiratory tract disorders and urinary tract infections. It also shows pharmacological activities like antioxidant, antispasmodic and antilipidemic. Coriandrol, jireniol and vebriniol are the constituents of coriander oil that have antimicrobial activity i.e. used against *Campylobacter jejuni* in food. Its seed extract lowers the blood glucose level while increasing the insulin level in blood in result improves hyperglycemia.

Bhat and colleagues studied anti-anxiety behavior of hydroalcoholic coriander seed oil in male albino mice using diazepam as standard treatment. Their investigation reveals that aqueous extract at 50 mg/kg, 100 mg/kg and 500 mg/kg potentially decreases the spontaneous activity and neuromuscular coordination in comparison to control group. He concludes that coriander extract can be used for the relaxation of muscles. He also studied diuretic activity on rats by using plant extracts of coriander 200 g to 250 g by giving saline and furosamide (Furosamide is a standard diuretic drug used for treatment and management of hypertension) solution to positive and negative control groups of animals. While rest of the animals receives coriander plant extract dissolved in saline solution 50 ml/kg. Their results show the significant increase in urine output. Sahib and colleagues studied the effect of coriander seed oil on cancer causing cells by using Salmonella typhimurium strains in Ames reversion mutagenicity assay. They found that aqueous crude coriander juice significantly lowers the effect of mutagenicity caused by metabolized aromatic amines which are the leading cause of mutagenicity in human and plants. The effect of mutagenicity is reduced in the presence of the chlorophyll content present in its juice.

Flax seed oil

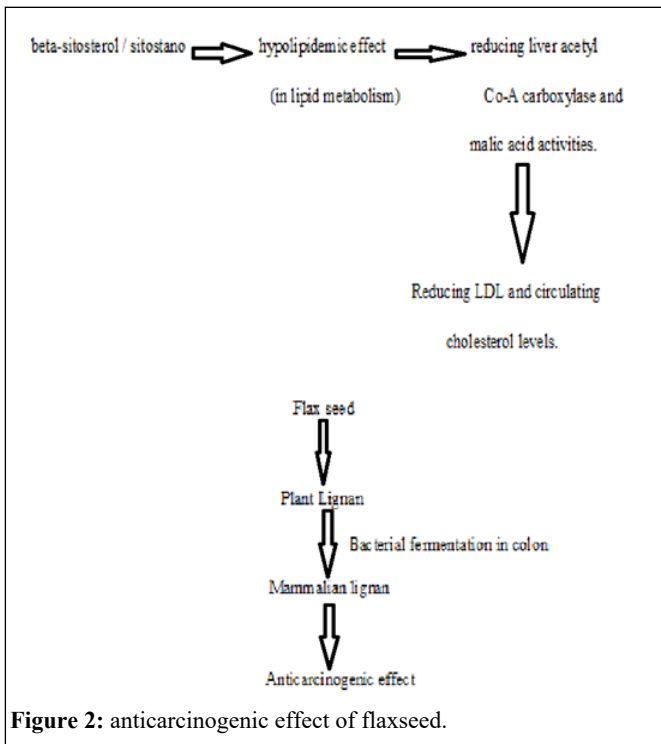
Since ancient times flax seed (*Linum usitatissimum*) has been cultivated for flax oil and flax proteins. In 2009-2010 the world production of flax is about 2.3 million metric tons. Its major cultivars are Canada that produces about 40% of its worldwide production. World's largest crusher country of flaxseed is European Union that imports two third of world flaxseed demand, while it is also cultivated in china as flax oil and flax fiber according to their uses. Flax oil is distributed in northwest china for its oil purposes while flax fiber is distributed in northeast china for fiber purposes. It is also known as linseed, flaxseed that contains 26%-45% oil. Its fatty oil contains saturated fat in low, MUFA in moderate and PUFA in high concentrations especially α -linolenic fatty acid (ALA). It plays a vital role in nutrition and pharmacy (richest source of essential fatty acids linolenic acid and n-fatty acid) from many decades when no one knows it is real benefits. The products of flaxseed are oil, lignans, mucilage are used as functional and nutraceutical food product constituents in market. Flaxseed consumption introduced in public health intervention can be beneficial against chronic diseases and as anti-inflammatory biomarkers for better health status (Table 6) [38].

Table 6: Fatty acids profile in flaxseed.

Fatty acids	mg/kg of flaxseed
Alpha linolenic acid	550
Linoleic fatty acid	170
Palmitic acid	60
Stearic acid	40
Oleic acid	180

It is the richest source of linoleic fatty acid and alpha linolenic acid, which contributes to prevent cardiovascular disease risks. The supplementation of alpha linolenic acid (3 g/day) will increase the plasma concentration of linoleic fatty acid. The intake of flaxseed oil will help to prevent post-menopausal symptoms i.e. hot flashes in women and also prevent from autoimmune disorders. The linolenic acid (55%) also gives the anti-inflammatory effect and used to treat allergies, arthritis and lupus and boost up immune system. Its consumption lowers the risk of hypercholesterolemia especially in post-menopausal women. Its oil with vitamin E lowers down blood pressure, atherosclerosis and thrombosis. Flaxseed has health benefits due to alpha linolenic acid but on the other hand it affect flaxseed shelf life as it is vulnerable to oxidation reaction that will affect its nutritional, functional and sensory properties.

Shim and colleagues studied the effect of flaxseed meal (15%) with corn meal or corn oil with flaxseed oil (15%) in a basal diet given to Fisher 344 male rats. They found that it reduces tumor multiplication and size in the small intestine and colon. Hence, flaxseed meal and oil have chemo-preventive activity. Aziza and colleagues fed *Eimeria tenella* infected broilers with soybean based diet supplemented with 10% flaxseed meal and observed the reduced severity of *E. tenella* infection, diminished oocyst excretion during oocysts shedding period and improved growth performance (Figure 2).



Strong antioxidant activity of sesamin, sesamol and sesamol improves shelf life and stability of its oil so it can be blended with other oils to make them more nutritious. These bioactive components also used against neurological disorders, hypertension, antiageing and atherosclerosis, antitumor activity.

Kanu and colleagues studied the effects of sesame seed oil constituents, sesamin and sesamol for Alzheimer and Parkinson’s disease. He investigated the role of sesamin and sesamol that exhibit to slow down the Nuclear Factor (NF)-kB activation and that the Lipopolysaccharide (LPS) activated p38 Mitogen Activated Protein Kinase (MAPK). A resident macrophage like population present in brain cells is called microglia which exhibit to mediate inflammatory cytokine in Central Nervous System (CNS) diseases. He also studied the activity of sesamine (bioactive nutritional component of Sesame seed oil) against *in vivo* hypocholesterolemic activity which also suppress the activity against chemically induced cancer while in diet reduces the risk of heart diseases. He also investigated the effect of tocopherol and gamma tocopherol on animals. He found that cerebral ischemia induced by brain damage prevent by these two constituents in mice.

Hsu and colleagues studied the effect of Sesame seed oil in renal injury by Lipopolysaccharide (LPS) induced rats. They found no injury by LPS induced rats and protect liver from damaging. He also suggest that if its oil is given on regular basis it will cure endotoxemia or sepsis through the action of nutritional and antioxidant components. Sepsis occurs when impairment of gastric secretion and mucosa slows down digestion and absorption of drugs, as the administered routes are important for drug digestion and absorption. Zeb and colleagues fed rabbits by supplementing Sesame seed oil in diet and observed significantly improved the body weight, improved serum level in lipids. Hence, sesame contains high levels of polyphenolic compounds that pertains good health benefits [39-42].

Sesame seed oil

Over 6000 years, sesame seeds and its oil have been used. Its plant (*Sesamum indicum*) originated from central Africa then spread all around Egypt, Africa, Tanzania, Uganda, Kenya, India and China. China, India, Sudan, Mexico and Burma contributing 60% of total world sesame seed production. Now it is considered as high potential oil crop as in past decades it was neglected and underutilized by The International Plant Genetic Resources Institute (IPGRI). It is cultivated for both oil and protein utilization as its seed has 20% protein and 55% lipids but have highest oil content 35%-63% as compared to other oil crops. Its oil content comprises of olein, stearin, palmitin, myristin, linolein, sesamin and sesamol that contribute to increase its nutritional value. Its seed is also used for culinary purposes i.e. bakery products, oil formation, Tahina, Halwa etc (Table 7).

Table 7: Fatty acid profile of sesame seed oil.

Fatty acid	Ranges in % age
Saturated fatty acid	42-70.5
Linoleic acid	37.7-41.2
Oleic acid	45.3-49.4

Sesame seed oil contributes in health promotion due to the presence of significant proportion of Monounsaturated Fatty Acids (MUFA) than Saturated Fatty Acid (SFA) and bioactive components i.e. tocopherol, phytosterol, lignans that includes sesamin, sesamol, sesaminol, sesangolin, 2-epialatin and phenols that promote health and prevent from oxidative damage by free radicals and resistant to rancidity.

Hemp seed oil

Hemp seed (*Cannabis sativa*) is an annually cultivated plant from *Cannabaceae* family in Europe, Australia, Russia, Austria, France, China, Great Britain, Canada, India and Spain. It is used in paints and varnishes and imported in North America for birds feed while it is legally consumed by human beings in Canada from 10 years and united states. Hempseed oil is a rich source of essential nutrients. It’s not only provides polyunsaturated fatty acids and proteins, but also terpenes and cannabinoids and also has potential health benefits due to significant proportions of linoleic acid, linolenic acid as their ratio fulfill body requirements of essential fatty acids. These essential fatty acids contributed 80% of total fatty acid content out of which Linoleic Acid (LA) shares 56 g/100 g and Alpha Linolenic Acid (ALA) 22g/100g in its oil (Table 8).

Table 8: Fatty acid profile in hempseed oil.

Fatty acids	Fatty acids
Eicosadienoic acid	Oleic acid
Gamma-Linolenic acid	Stearic acid
Linoleic acid	Eicosanoic acid
Palmitic acid	Alpha-Linolenic acid

It is a complete nutritious source of essential fatty acids and has pharmacological activity depicted by its constituents, Linolenic Fatty Acid (LA) and Alpha Linolenic Acid (ALA) which are essential as they are not produced by human body so comes from diet.

The ratio 3:1 are nutritionally important to meet the recommended intake of fatty acids but addition of Gamma-Linolenic Acid (GLA) makes it superior than other seed oils. These constituents are used to treat against chronic diseases i.e. cancer, inflammation arthritis, osteoporosis, autoimmune disorders and thrombosis. Natural products which are made up from its oil (sitosterol and methyl salicylate) contribute to enhance nutritional value and free radical scavenging activity due to its antioxidant behavior.

Lutterodt and colleagues studied the effect of beta-sitosterol on human in lowering of hypercholesterolemia. In result, 500 mg of cholesterol in their diet with beta sitosterol lowers the cholesterol absorption. It also inhibits cholesterol uptake that comes from dietary fat and also long term use of beta sitosterol have no toxic effects so can be used to treat hypocholesterolemia in human. He also studied the anti-inflammatory property on isolated ethanolic extracts of *Hedychium spicatum* while beta sitosterol fraction from *Artemisia annua* showed 80% inhibitory effect against tobacco mosaic virus.

Discussion

Methyl Salicylate is a plant silicate used from centuries for medical treatment. When given intravenously, it converts in to salicylic acid that is the active component of aspirin (drug) and used in pharmacological treatment of heart attack, strokes and cancer.

These silicylates are used worldwide due to having antipyretic, anti-inflammatory and analgesic properties. Kiralan and colleagues studied the effect of Polyunsaturated Fatty Acids (PUFA) linoleic, α -linolenic and γ -linolenic acids for skin care by effecting cell membrane functioning and used to cure cardiac diseases hence considered as health promoting seed oils.

Reveals the constituent of hemp seed that is PUFA (linolenic and γ -linolenic acids) against hepatic disease i.e. fatty liver and hemorrhagic syndrome on Lipid peroxidation of hepatocyte and organelle membranes can result in oxidative damage, increasing the susceptibility from lipid peroxidation [42,43].

Conclusion

Conventional oils are used for centuries whereas interest in non-conventional seed oil has recently developed as; seed oils are important source of bioactive components which exhibit health benefits. Previously, non-conventional oils were less known to the world due to lack of awareness towards nutrition and health. Advancement in nutrition science reveals nature mysteries to use natural products for promotion of health and treatment of diseases that is more economic. So non-conventional oils should be used due to health promoting bioactive components i.e. essential fatty acids (LA, ALA), thymquinone, oryzanol, corianderol etc.

These have been proven to treat diabetes mellitus, cancer, hypertension, skin disease, neuroendocrinological disorders, bacterial and fungal diseases and many more. So we should emphasis to take these seed oils on daily basis to improve nutrition and health status to achieve quality life.

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