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Extraction of High Value Specialty Oil

Trade News

Importance of Lipids & Lipid constituents in Nutrition & Health

Health News

Apricot Kernel Oil

Oil Technologists' Association of India (North Zone)

Macflow Engineering Pvt Ltd

E-59, 1st Floor, Patparganj Road, Pandav Nagar, Delhi-110091
M: 9818690601, 011-22799200/300, E: amitmohan@macflow.in,

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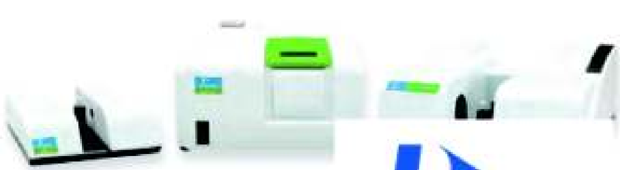

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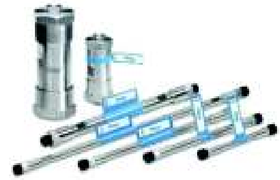

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OTAI Conference - October 2017, New Delhi

OTAI in association with FSSAI organised The International Conference on “Compliance in India across Food Value Chain- Challenges & Future Road Map” on 30th – 31st October 2017 held at Manekshaw Centre. The conference was one of the largest food conference in India which gave food industry stakeholders an opportunity to discuss regulation aspect and growing requirement for compliance in the global food value chain.

With the growing global awareness on safety & security of Food for human consumption, compliance is becoming a major challenge for the Indian Food Industry. The two days conference had 18+ panel discussions on topics such as food safety & standards, Legal Metrology, Packaging Material, Oils & Fats etc. Where 50+ panelists gave their recommendations for strengthening of the system. The conference was indeed a platform for stakeholders in food value Chain to discuss policy issues, concern of the industry which will lead to improved policy that will facilitate ease of doing business.

There was an exhibition at the conference that displayed upcoming and existing products and technologies by International and National stakeholders in the food sector, which came out to be highly informative and also appreciated by the delegates and dignitaries.

The conference also gave an opportunity to students from different eminent colleges across India to have direct interaction with Industry and to know the current scenario of Food Industry from the regulation perspective.


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Editor's desk

The edible oil is an important segment of Indian food basket. It is also the rich source of calories to the masses. The monthly requirement of edible oil in India is around 16.50 lac tons. More than 70% requirement of edible oil is met through import. The rise in per capita income has led to steady rise in consumption of edible oil. With improvement in edible oil consumption, the dietary calories requirement of Indian population is being met. But to address the micronutrient deficiency in Indian diet still is a area of concern.

The fortification of edible oil can be used to address the issue of micronutrient deficiency in India. Various State Governments are already perusing fortification of edible oil with Vitamin A and Vitamin D. Some big oil manufacturers are also fortifying the edible oil with Vitamin A, D and E. The recent initiative by FSSAI (Food Safety and Standard Authority of India) towards universalization of edible oil fortification has further strengthened this initiative.

The fortification of edible oil is not only streamlining the production and manufacturing activity, but also addressing the issue of loose sale and encouraging sale of good quality edible oil. The impact of universal fortification will be far reaching apart from providing indian masses a micronutrient rich diet & will change the face of edible oil production, supply and consumption patterns in India.

Yours truly
C S Joshi
Editor

Oil Technologists' Association of India
(North Zone)

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Extraction of High Value Specialty Oil

Vidhi Hitesh Bhimjiyani, Satya Narayan Naik
Center for Rural Development and Technology,
Indian Institute of Technology, Hauz Khas, New Delhi-110016

Introduction:

Specialty oils extracted from various plats shows potential of containing high concentrations of bioactive compounds which thus can be used to provide immense boost to complement health benefits to the life. In general, these specialty oils are blends of triacylglycerol along with fatty acid composition rich unsaturates and minor compound such as tocols (tocopherols and tocotrienols), carotenoids and sterols. Various specialty oils are extracted such as Nut oils like almond, hazelnut, peanut, pecan, pistachio, walnut etc., seed oil like Moringa oleifera, flax, grape, hibiscus sabdariffa and rosehip etc. These oil are majorly known as specialty oils.

In recent studies, dietary supplements are produced in form of capsules made from these specialty oils. Specialty oils found in market are produced using conventional method of mechanical pressing and solvent extraction. Cold pressing technique (<60º C) used for extraction of oil limits the amount of extracted material which leads to find chemical treated methods for extraction of specialty oils. Conventional techniques such as solvent extraction involving organic solvent (hexane, petroleum ether etc.) can be applied heat for removal of solvent leading to loss of bioactive compounds. Government regulations on the use of organic solvents are now severe and safety of residue organic solvent in the final product is questioned.

Supercritical fluid extraction technology (green technology) has been found beneficial because it can overcome many of disadvantages associated with convectional technologies and meet consumers demand for natural products. Advantages of processing with super critical CO2 includes low processing temperatures, minimum thermal degradation, ease of separation of extraction solvent, resulting in no solvent residue lift in the product.

Bioactive compounds in specialty oil:

Large variety of bioactive compounds are present in natural sources of the specialty oil such as carotenoids, Polyunsaturated fatty acids (PUFAs) sterols, tocopherols and tocotrienols found in many of specialty oils.

Carotenoids

Carotenoids represent a group of over 600 fat soluble pigments. These pigments are responsible for the bright yellow, orange and red color of fruit, roots, flowers, fish, algae, molds and yeasts. Green vegetables containing carotenoids, in which color is masked by chlorophyll. Carotenoids are mainly divided into two class carotenes, which are C40 polyunsaturated hydrocarbons, and xanthophyll, oxygenated derivatives of carotenes, carotenoid compounds are coloured due to their high level of conjugated double bonds, which makes them unstable. In terms of specialty oils, carotenoids are mainly present in carrot, tomato rosehip and wheat germ oils.

Polyunsaturated fatty acids (PUFAs)

PUFAs are fatty acids that contain two or more double bonds in the carbon chain. Most PUFAs are essential fatty acids and have to be provided to the body through the diet. They are usually classified as ?-3 and ?-6, depending on position of first double bond from the methyl end of carbon chain. ?- linolenic (ALA) eicosapentaenoic (EPA), docosapentaenoic acid (DPA) and docosahexaenoic (DHA) acids are example of PUFAs. The main source of EPA, DPA and DHA are fish oils. LA, ALA and GLA are essential fatty acids that enzymes can transfer into the PUFAs required by the body.

Squalene

Squalene is liquid that was originally obtained from shark liver oil. It is also found in olive, palm and wheat germ oils. A number of animal studies showed that dietary squalene has distinct anticarcinogenic effect. Besides its anticarcinogenic activity, Squalene prevents lipid peroxidation in human skin surface which is useful in treating conditions resulting from inadequate immune response.

Sterols

The main sterols in plant material are sitosterol, campesterol and stigmasterol. They are mainly found in specialty oils of acorn, hazelnut, and walnut, cherry, grape, pumpkin and rice bran.

Tocols

Tocopherols and tocotrienols make up the tocols family of Vitamin E compounds, which must be obtained from the diet because humans cannot synthesize them. Tocols are found in almond, hazelnut, pecan, walnut, flax, tomato, rice bran and wheat germ oil. The difference between tocopherols and tocotrienols lies in phytyl chain attached tochromanal ring. The phytyl chain is saturated in tocopherols, whereas the phytyl chain in tocotrienols has three double bonds. Application of Vitamin E in cancer treatment is also been studied. It is also benefit individual with osteoarthritis. Supplementation of 400 mg/ day of vitamin E has a beneficial analgesic and anti-inflammatory effect.

Extraction of different types of specialty oils:

The specialty oils reach in bioactive can be extracted from many plant sources. These extract oils are mainly mixture of triglycerides, free fatty acids, monoglycerides, diglycerides, and other minor components such as tocols, carotenoids, sterols, and squalene. Specialty oils are extracted from different plant materials using SC-CO_2 .They have to be soluble in SC-CO_2. All the lipid components of interest in specialty oils are soluble in SC-CO_2 to different extents, depending on temperature pressure conditions. Generally, solubility in SC-CO_2 decreases with increase in polarity and molecular weight. SC-CO_2 extraction of specialty oils from various sources has been studied quit extensively. The extraction efficiency and characteristics of product are affected by various parameters, such as piratical size, and moisture size.

Name of Specialty oil	Oil yield (%)	Bioactive compounds
Flax seed	30-32%	linolenic acid, linoleic acid, lignans, cyclic peptides, polysaccharides, alkaloids, cyanogenic glycosides, and cadmium.
Hibiscus Sabdarifa	20-25%	Glucose, malic acid, α-tocopherol linoleic acid, proteins, fats, riboflavin, β- carotene
Almond	30-35%	Unsaturated oil, tocopherols, oleic acid, linoleic acid
Hazelnut	40-45%	Oleic acid, linoleic acid
Moringa oleifera (Drumsticks)	35-45 %	vitamins, carotenoids, polyphenol, phenolic acids, flavonoids, alkaloids, glucosinolates, isothiocyanates, tannins, saponins

Table 1 – Major Specialty oils in India

Hibiscus sabdariffa L. (Roselle):

Hibiscus sabdariffa plant is about 4-5 feet tall. It has cylindrical smooth steams. (green in initial stages and red at maturity stage). Leaves of plant are 8-10 cm long with dark green color, Flowers at initial stage are yellow in color with red eye. Mature fruit is capsule, which is 2-3 cm long, with dark wine red color (green when immature). Hibiscus sabdarifa are shown in figures (1, 2, 3) below.

preparation of a beverage. Young roselle shoots, leaves and calices are used as a cooked vegetable or finely cut and used in sauces. The leaves and fresh green calices are used to make a soup.

Fatty Acids	Seed oil
Palmatic acid C16	20-25%
Palmitoleic acid C16:1	2-3 %
Stearic acid C18:0	5-8%
Oleic acid C18:1	28-30%
Linoleic acid C18:2	40-42%
Linolenic acid C18:3	-

Table 2 - Fatty acid composition of *Hibiscus sabdariffa*

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Trade News

Is This the Tail End of Animal Testing for Cosmetics and Personal Care?

Abstract: With awareness of animal testing rising--due in part to conversations via social media and an influx of companies granting "cruelty-free" wishes--brands that are slow to omit animal testing may see consumers opting for other products they know have never been tested on animals.

While animal testing for cosmetics and personal care products has been a tumultuous topic in previous years, the rise in popularity of "vegan" and "cruelty-free" products, combined with the at-times overwhelming power of social media, has placed this testing topic in the zeitgeist more than ever.

Recently, the Australian Federal Department of Health announced its plan to ban animal testing for cosmetics products. Shiseido's own NARS Cosmetics received major backlash from consumers in June 2017 when it came out that the company had introduced its animal-tested makeup in China. The Body Shop is currently partnering with Cruelty Free International on a petition, that already has more than 2.3 million signatures, in support of a global ban on animal cosmetics, to be presented to the UN General Assembly in 2018. Through all of this, it is obvious that both the industry itself and consumers are making efforts to end animal testing once and for all.

While the goal in many countries is to reduce the use of animal testing, the fact remains: we now live in a time where the power has shifted from the companies creating the products to the consumers purchasing them. With animal testing awareness rising due in part to conversations via social media and an influx of companies granting those "cruelty-free" wishes, brands that are slow to omit animal testing may see consumers opting for other brands' products that consumers can be sure have never been tested on an animal.

But what about alternatives? At the end of the day, cosmetic and personal care products need to be tested for safety and quality before reaching consumers. Everyone knows that.

Is Skin Substrate Technology the Answer?

Cosmetics & Toiletries spoke with Alex Armento, director of business development at MatTek Corporation, a biotechnology company specializing in human cell-based tissue engineering and constructs, regarding skin substrate technology, its potential as an alternative for animal testing in the cosmetic and personal care industry and how it can move the industry forward.

What is skin substrate technology? How is it used at MatTek?

MatTek has a product called EpiDerm. It is a 3-dimensional human cell-based model that represents the fully differentiated structure of the human epidermis. The cells used are typically isolated from surgical waste, taken with the patient's consent, which are then broken down into cellular components. We can recapitulate the structure of the skin in small microtissue formats using the same genetically identical cells for a long period of time. This leads to a high level of reproducibility of testing in the future.?

Does this kind of technology have the potential to act as an alternative to animal testing in the cosmetics industry? Has it been done before? Was it successful?

The nice thing about 3-dimensional micro tissues is that they're cultured in what is called the air-liquid interface, basically, these 3D tissues are fed from the basolateral side, similar to a bloodstream, bringing nutrients to the tissues from the blood vessels. The top surface of the skin is open to the atmosphere similar to our skin. So, we can apply liquids, solids, soaps, cosmetics and lotions to the top surface of the skin just like it would be done in humans.

Over the last 20-25 years the EpiDerm model, along with a couple other models have been used for safety testing, as alternatives to animal testing, focusing specifically on acute toxicity. We can measure skin irritation and corrosion, to a high level of predictivity compared to humans. The OECD and other regulatory agencies have accepted the EpiDerm and other microtissue tests as a standalone alternative to the Draize test.

How do you see this type of technology moving the industry forward? Not just for an alternative for animal testing, but for product development and R&D?

When you mention synthetic substrate, that brings to mind a couple of different things; there are chemically synthetic products out there that don't resemble biology, and there is a skin corrosion test that uses a non-biological substrate to determine whether something is corrosive or not. We look at the actual biology and construct the skin using actual human skin cells to reconstruct the actual function of the tissue.

This is proving to be very advantageous in areas of even more sensitive toxicities, like repeat dose experiments where you can apply a cosmetic or a pharmaceutical to these tissues as somebody would at home. One can put soap on the tissue for up to seven days in a row to see what kind of effects these have on the biological responses of the skin tissue. We can even look at things like inflammation and sensitization and things of that nature?

In terms of efficacy, how do tests using this technology perform?

Since launching in 1993, EpiDerm models have become more complex. EpiDermFT (full thickness) model, for example, incorporates not only the epidermis but also the dermis, including the fibroblasts. We do a lot of anti-aging testing and look at a lot of skin creams that are made to reduce wrinkles or made to enhance extracellular matrix production. They're typically used to rank ingredients according to how well they function and companies will take the top functioning and move them into the clinic for further testing. ?

The MelanoDerm model includes pigmenting skin cells, i.e., human melanocytes, and is also used prior to clinical studies to look at the effectiveness of skin lighteners.

Other Alternative Routes Worth Exploring

As previously stated, the topic of animal testing and its negative connotations among consumers have been around for years. The idea of finding alternative solutions is nothing new.

Over the past few years, alternatives have been validated to test the safety of cosmetic ingredients. Back in 2015, L'Oréal and San Diego-based Organovo collaborated on the development of 3D bio printed skin tissue for beauty product testing.

In 2010, researchers from the National Institute for Occupational Safety and Health and researchers at Portland State University published work, titled "Rapid and Simple Kinetics Screening Assay for Electrophilic Dermal Sensitizers Using Nitrobenzenethiol." This report detailed how the researchers evaluated a kinetic spectrophotometric assay involving the reactivity of electrophilic sensitizers to nitrobenzenethiol.

Despite efforts to move the industry away from animal testing, the challenge still remains to devise a proper alternative method. However, with technology growing more advanced each and every day, the solution may be closer than we think.

Conclusion

When it comes cosmetic and personal care R&D, long gone are the days when consumers are unaware of the processes and ingredients going into their favorite products. Today's consumer has a voice and is not afraid to use it in order to get the products he or she is after. If companies don't listen to the wants and concerns of their customers or take the time to find an alternative to long-established practices, some may find customers purchasing products from companies that better align with their views and moral code.

Courtesy: Cosmetics & Toiletries

Silk Spun by Graphene-Fed Spiders Is One of the Strongest Materials on Earth

Scientists have found a way to increase the overall strength and durability of spider silk. After feeding a spider a small amount of graphene and carbon nanotubes, the creature produced webs that were five times stronger than normal.

DOES WHATEVER A SPIDER WEB DOES

Spider webs are already strong enough to restrain small insects unlucky enough to fly into them, and soon, they may be capable of carrying the weight of a person.

In a new study published in 2D Materials, Nicola Pugno at the University of Trento in Italy and his team detail how they cranked arachnids' already impressive metabolic process up to 11 by adding graphene and carbon nanotubes to a spider's drinking water.

Afterward, the spider produced silk as it normally would, but the silk was five times stronger, putting it on par with the likes of pure carbon fibers and Kevlar — the strongest materials on Earth.

"We already know that there are biominerals present in the protein matrices and hard tissues of insects, which gives them high strength and hardness in their jaws, mandibles, and teeth, for example," Pugno told The Sydney Morning Herald. "So our study looked at whether spider silk's properties could be 'enhanced' by artificially incorporating various different nanomaterials into the silk's biological protein structures."

ONLY THE BEGINNING

The enhanced webbing is still in the early phases of research, and Pugno's results were derived from just a small amount of spider silk, so far more testing is required. If all goes as hoped, the research could eventually lead to millions of enhanced spiders producing webbing that can be used to make parachutes, rope, cables, and more.

And those are just a few of the potential applications of this research. Pugno believes it could eventually be applied to creatures beyond spiders. "This process of the natural integration of reinforcements in biological structural materials could also be applied to other animals and plants, leading to a new class of ‘bionicomposites’ for innovative applications,” he asserted.

Regardless of where Pugno’s work takes us, it provides yet another example of graphene’s versatility. In the last month alone, the material has been used to make health-tracking tattoos, construct unbreakable rubber bands, and cause electrons to flow like water. The super material is now giving living creatures arguably super abilities, and who knows what could be next?

Courtesy: www.futuristic .com

Biofuel-friendly sugarcane has all the sugar and more oil

Amongst the arguments against growing crops for use as biofuel feedstock is the fact that they displace food crops. However, what if they could be grown on marginal land that wouldn't be suitable for food crops anyway? Well, that's the case with sugarcane. Now, genetically-engineered types of sugarcane may make it a more valuable source of biofuel than ever before.

Led by the University of Illinois, a multi-institution team created varieties of sugarcane that have much more oil in their leaves and stem than unmodified varieties. That oil could be used in biodiesel production. It was assumed that this boost in oil production would result in less sugar production, although that turned out not to be the case. That's a good thing, as that sugar can be used to produce ethanol.

The scientists ran the sugarcane through a juicer, simultaneously extracting about 90 percent of the sugar and 60 percent of the oil. Using a patented technique, that mixture was subsequently fermented to produce ethanol, then treated with organic solvents to recover the oil.

So far, the team has created sugarcane plants that are 13 percent oil, 8 percent of which is the type that could be made into biodiesel. Even if that figure were just 5 percent, the researchers claim that it would amount to "an extra 123 gallons [466 l] of biodiesel per acre than soybeans and 350 more gallons [1,325 l] of ethanol per acre than corn."

That said, the project is currently hoping to boost that oil content figure to 20 percent, which is the theoretical maximum limit.

A paper on the research was recently published in the journal Biocatalysis and Agricultural Biotechnology.

Source: University of Illinois PETROSS Project

Cargill, New Hope and Hebei Bohai Investment launch new oilseeds processing plant in Cangzhou, Hebei Province

New plant aims to meet market's need for high quality food products in North China and is in line with China's strategy to drive economic integration in the Beijing-Tianjin-Hebei region.

Cargill, New Hope Group and Hebei Bohai Investment Group have launched a US$100 million oilseeds processing plant with an annual processing capacity of 1.32 million metric tons in Huanghua, Cangzhou in Hebei Province. The plant will help meet the growing demand for high quality food products in Northern China, drive the development of the local economy, and facilitate its integration into the Beijing-Tianjin-Hebei region.

The plant, Hebei Jiahao Grain & Oil Co Ltd, covers 21,000 square meters in the Bohai New Development Area, which is the largest national economic development zone along China’s east coast. Finished products will include high quality oil and animal feed which will be marketed in northern China, including in the Beijing-Tianjin-Hebei region.

The investment in the plant is in line with China’s strategy to drive more coordinated development in the Beijing-Tianjin-Hebei region. China aims to enhance synergies within the region and enable economic growth in the relatively less-developed Hebei province.

Cargill Chairman and Chief Executive Officer David MacLennan and New Hope Group board member and Chairlady of New Hope Liuhe Angelia Liu inaugurated the plant at an opening ceremony today.

Investment in Jihai Port

Also announced today is the opening of Hebei Jihai Port Co, Ltd (Jihai Port), which manages a bulk & general cargo berth with a capacity of 100,000 tons. Jihai Port will serve the transportation and storage needs of the new plant for both domestic and international trade. It will connect Huanghua and Cangzhou to the global grain and food trade. Total investments in the Jihai Port have exceeded US$100 million.

“These investments in the new oilseeds plant and Jihai Port reinforce Cargill’s strong commitment to China, a strategic market for us,” said MacLennan. “They will also help in the coordinated development in the Beijing-Tianjin and Hebei regions which is of great significance to China. We are incredibly grateful for the strong support we have received from the government during the construction and from our customers during the trial period.”

“As one of China’s largest food and modern agriculture enterprises, New Hope has been closely watching the market trends. With the consumption upgrading in China, we hope to meet the market demand for quality and nutritious food by leveraging our integrated supply chain that comprises both agriculture and animal husbandry. We are pleased to enter into cooperation with Cargill, and we regard highly Cargill’s resources and advantages in food and agriculture. With shared visions and combined advantages of all the parties, we believe this project will lead to deeper cooperation and will contribute to the development of local economies and related industries," said Angela Liu, board member of New Hope Group and Chairlady of New Hope Liuhe Co., Ltd.

Cargill already has three oilseeds processing plants in China, which are all situated in Southern China and the Yangtze River delta. This new plant in Huanghua will enhance Cargill's oilseed processing capabilities and help it to better meet the growing demands of customers in China, many of whom are expanding their national presence. This investment will also function as the doorway of Cargill into serving the market of 300 million people of Northern China.

Courtesy: Cargill.com

Brazil Reveals widespread Olive oil Fraud:

An investigation by Brazil's Ministry of Agriculture, Livestock and Farming's (MAP) revealed widespread mislabelling of olive oil products being sold in the country where olive oil consumption has risen sharply in recent years.

The MAP report confirmed that 45 brands of olive oil, out of 140 analyzed in the last two years, did not meet the quality required by their labeling.

The highest incidences of olive oil fraud occurred in São Paulo, Paraná, Santa Catarina and the Federal District; areas with large numbers of packaging companies. Fraud was rife among bottlers who import olive oil in bulk, mainly from Argentina.

The investigation exposed companies in Paraná that had marketed "olive oil" which was composed of 85 percent soybean oil and 15 percent lampante oil, a grade not fit for human consumption until it is further refined.

MAP analyzed 322,329 liters of olive oil samples collected from 12 Brazilian states and found 207,579 liters (64 percent) to be substandard. The fraudulent brands included; Astorga, Carrefour, Almeirim and Conde de Torres.

114,750 liters of olive oil from brands deemed to be authentic included Andorinha, Aro, Apolo, Borges, Belo Porto and Carrefour Discount.

The substandard olive oil was seized and the fraudsters were reported to the Public Ministry. A police investigation will be launched, with offenders facing fines of up to $170,000.

Brazil's clamp down on fake olive oil was stepped up this month. MAP targeted and collected samples from companies that have shown irregularities over the past two years. In the first week of April, 243,000 liters of suspect olive oil were collected for analysis.

According to Luis Rangel, the secretary of agriculture

Importance of Lipids & Lipid constituents in Nutrition & Health

Dr. S. K. Handoo
BUNGE INDIA Pvt. Ltd.
RAJPURA (Pb,)

The high incidence of diet related disorders has led to worldwide interest in healthy foods. High fat intake, especially saturated fat has been implicated in cardiovascular disorders including atherosclerosis (blocking of cardiac arteries), thrombosis (blood clotting), certain cancers and diabetes. On the other hand, there is increasing evidence that diets containing higher levels of certain lipid components are associated with reduced incidence of several diseases.

Fatty acid profiles : There is accumulating evidence that diets with fat intake high in MUFA such as in olive oil, and high omega –3 PUFA from certain fish including salmon, tuna and mackerel help prevent heart disease. One of the major factors involved in cardiovascular disease is low density lipoprotein (LDL) cholesterol in the blood stream. In contrast high density lipoprotein (HDL) cholesterol is linked to a reduced risk of coronary heart disease . Salmon oil which contains the omega –3 PUFA eicosapentaenoic acid and docosahexaenoic acids, lowers LDL cholesterol to a lesser or similar degree as the plant omega –6 fatty acid, linoleic acid. Salmon oil, however, dramatically lowers very low density lipoprotein (VLDL) cholesterol and triacylglycerol levels without altering HDL Cholesterol, the form of cholesterol which has beneficial effects on the cardiovascular system. Linolenic acid, the omega –3 fatty acid in plant oils, also reduces LDL cholesterol. Omega –3 fatty acids also reduces plasma triacyl glycerols, another factor in cardiovascular disease.

Antioxidants : An increasing body of literature implicates antioxidants in a wide range of health promoting benefits including reducing some forms of cancer and cardiovascular disease. A large number of antioxidants occur in edible oils derived from plants. They include polyphenols (also flavonoids such as proanthocyanidins), carotenoids, tocopherols and phytosterols. The most widespread and biologically active of the tocopherols is alpha –tocopherol(5,7,8-trimethyltocol). Other common tocopherols are beta –tocopherol , gamma- tocopherol and delta-tocopherol. The structurally related tocotrienols are less widespread but occur in large quantities in wheat germ oils, corn oil and palm oil. The only difference between the two series is that the trienols have a long side chain at carbon-2 which consists of 3 isoprene units instead of the saturated side chain in the tocol series. The major carotenoids found in vegetable oils have an all trans-configuration.

Antioxidants may prevent oxidation of polyunsaturates in the blood stream and thus protect LDL cholesterol from oxidation , a key factor in the development of atherosclerosis lesions.

Olive oil has been reported to lower blood pressure, but not through its high oleic acid content. This could be due to the presence of antioxidants. Olive oil has higher polyphenol content than macadamia, avocado, sesame, canola, soy, grapeseed, sunflower, walnut, peanut and almond oils.

Plant Stanols and Sterols : Phytosterols inhibit cholesterol absorption in humans and can lower total blood serum cholesterol and LDL cholesterol by 10-15 %. High levels of phytosterols in corn oil are a major factor in its LDL cholesterol lowering properties. Stanols occur in low amounts in oils and are equally effective in lowering plasma cholesterol and, unlike the sterols are not readily found in plasma.

PHYTOSTEROLS : highly promising compounds

Phytosterols are structurally related cyclic alcohols found in the unsaponifiable fractions of fats and oils derived from plants.. Phytosterols, or phytosterol derivatives, present a wide range of properties and uses.

Occurrence : The great majority of plants contain sterols represented by beta-sitosterol which is basic phytosterol. Some higher plants, including members of the cucurbitaceae (cucumber) and Theaceae (tea) families for example, contain spinasterol.

Sterols are found in highest concentrations in the seed fruits of oleaginous plants but they are also present in the leaves and seeds of edible plants such as legumes and vegetables. They are commonly found in our food and drink, in quantities depending on the type of diet. It is well – known that the phytosterol composition depends on the growth conditions, ripeness, harvest and storage conditions of the plant material.

The deodorizer distillates from vegetable oil refining of Soybean, corn, rapeseed, sunflower, cottonseed, peanut and palm are the major sources of phytosterols, They generally contain 10-30% unsaponifiable matter which is composed of 40% phytosterols and 15% tocopherols. Economically speaking, tall oil, a by-product resulting from the process used in papermaking, is the second most important raw material for phytosterol recovery.

Properties of Phytosterols : Scientists cannot claim to have identified all the properties of phytosterols but those that are already known can justify their utilization .

The activity of phytosterols, that makes them most interesting at present is their ability to control moderate hypercholesterolemia by decreasing the synthesis of cholesterol and entering into competition with its binding sites. The mechanism of their action in cholesterol regulation is not fully clarified. Some phytosterols, for instance beta- sitosterol, show an anti-inflammatory activity and are known to play an anti-aging role through their action on the synthesis of fatty acids. Others are able to regulate the secretion of sebaceous glands and are used in the treatment of prostatic adenoma.

Phytosterols are not only interesting for their biochemical activities but also for their physicochemical properties. They are mainly lipophilic products with a hydroxyl group, which makes them slightly hydrophilic, This combination of hydrophobicity and hydrophilicity in the same structure implies an emulsifying property. This property could be improved by chemical modifications of the hydroxyl group. A consequence of this feature is that phytosterols have ability to control and regulate trans-membrane fluidity that finds an application in the pharmaceutical and cosmetics industries.

Squalene : Squalene is a hexaisoprenoid or triterpene widely found in plant and animal tissue and is precursor of sterols, olive oil appears to have a cancer protective effect and this may be the result of its squalene content. There is some evidence that squalene reduces colon cancer and skin cancer. There are, however , reports that high levels of squalene intake increases total serum cholesterol and harmful LDL cholesterol, although other workers have shown that lower intakes of squalene had no effect on serum cholesterol.

Oryzanol : Oryzanol is the ferulic acid ester of triterpene alcohols. Rice bran oil is the only vegetable oil which contains this unique micronutrient having beneficial biological effects. Oryzanol has been shown to reduce blood cholesterol, anti dandruff & anti itching properties, accelerates human growth, stimulates hormonal secretion, alleviates blood circulation, retards ageing etc.

Designing a healthy edible oil : Defining a precise composition of the ideal healthy oil to be used for cooking and other purposes is difficult .However, fatty acid content should be dominated by monounsaturates such as oleic acid. Polyunsaturated fatty acids can also improve blood cholesterol profiles, although their susceptibility to oxidation (in vitro) could accelerate atherosclerosis in vivo, a major factor in cardiovascular disease. Linolenic acid is not heat stable and undergoes trans isomerization when heated. On the best available evidence, linolenic acid levels should be kept to a minimum in a healthy oil if it is to be subjected to repeated heating.

HEALTH ATTRIBUTES OF CONSTITUENTS OF EDIBLE OILS

Constituent	Cardiovascular Benefit	Anti-cancer Benefit
Monounsaturated fatty acids	+	?
Polyunsaturated fatty acids	+ / -	?
Squalene	?	+
Phytosterols	+	?
Polyphenols	+	+
Tocopherols	+	+
Carotenoids	?	+
Proanthocyanidins	?	+

Better understanding of the functions and effects of dietary fatty acids and lipids will lead to development of food products to improve nutrition and the quality of life

Functions of Food Lipids : The overriding concern about dietary fat as a source of excess calories, saturated fatty acids, and cholesterol is justified for many segments of the population . The overriding concern about the role of dietary fat in CAD has tended to disregard the importance of lipids in determining food quality and the metabolic diversity of food lipids by tending to classify dietary fats solely as saturated or polyunsaturated and simply judging fats on the basis of their effects on plasma lipids or lipoproteins. This has resulted in a negative image of food fats that overlooks many useful attributes.

The various components of food lipids perform many desirable organoleptic, physical, nutritional, and biological functions that must be considered in making broad recommendations regarding dietary lipids. An understanding of these attributes and their mode of action should be helpful in developing more effective and perhaps safer strategies for motivating public acceptance of reduced fat foods and in facilitating the fabrication of foods with less fat but comparable satisfaction.

Nutritional and Biological effects : In context of diet & nutrition, food lipids serve as a source of energy, provide essential nutrients (Linoleic acid, linolenic acid, and vitamins A,D,E and K), and facilitate the absorption of fat-soluble vitamins.

Dietary lipids are hydrolysed by pancreatic lipases, and the fatty acids and monoglycerides are absorbed in the upper segment of the small intestine. These are mostly resynthesized to triglycerides in the mucosal, epithelial layer and assembled into chylomicrons, which enter the bloodstream via the lymphatic system. These chylomicrons are metabolized in liver and tissues. Following uptake by the liver, both exogenous and endogenous fatty acids and cholesterol are incorporated into very-low density and low-density lipoproteins (VLDLs and LDLs), secreted into blood and transported to peripheral tissues, where, via lipoprotein lipase, they provide fatty acids for the various tissues.

Once absorbed, dietary lipids perform many diverse metabolic structural and regulatory functions. Fatty acids are facilely oxidized via beta-oxidation in muscle, heart and liver mitochondria as a source of energy for these tissues.

Some Functions and Effects of the various dietary fatty acids

Fatty acid	Function/Effect
Medium-Chain	Rapid source of calories (energy)
Saturated	
Lauric (12:0)	Hyperlipidemic, Hypercholesterolemic, Prothrombotic
Myristic (14:0)	
Palmitic (16:0)	
Stearic (18:0)	Neutral or Hypolipodemic, Precursor of oleic acid
Monounsaturated	
Oleic (18:1) n-9	Hypolipidemic/hypochlosterolemic, Precursor of eicosatrienoic acid (20;3 , n-9) in essential fatty acid insufficiency
Eladic 918:1 trans)	Analogous to 18 :0
Erucic (22;1 , n-9)	Impaired fatty acid oxidation in heart of rat
n-6 Polyunsaturated	
Linoleic (18;2 , n-6)	Essential FA (45 mg/kg/day) component of acylglucoceramides, Precursor of arachidonic acid (AA), Hypolipidemic compared to saturated fatty acid, Hypotensive? Increases membrane fluidity
Gamma linolenic, 18:3 n-6	Precursor of eicosatrienoic acid and AA
Gama- Homolinolenic 20;3 n-6	Precursor of PGE series of eicosanoids
Arachidonic acid 20:4, n-6	Memberane fluidity, Precursor of eicosanoids
n-3 Polyunsaturated	
Alfa-linoleic 18:3 n-3	Hypolipidemic, memberane fluidity, Precursor of EPA & DHA (essential ?) reduces eicosanoid synthesis
Eicosapentaenoic 20:5 n-3	Hypolipidemic, Reduces AA synthesis & eicosanoids, Precursor of PGI_3, TXA_3, Precursor of TXB_5
Docosahexaenoic 22:6, n-3	Hypolipidemic, essential for vision, neural membranes? Reduces AA synthesis, Reduces eicosanoid in some cells (macrophages)

Essential fatty Acids :

Both plants & animals can make fats using building blocks known as fatty acids. The fatty acids we humans can make are called nonessential fatty acids because we don't need to get them from the food we eat. However, there are certain fatty acids that we can not make ourselves, but which are essential to health. These are called the essential fatty acids and needs to be taken via the diet.

Burr & Burr (1930) demonstrated that linoleic acid (LA) at 1-20% of dietary calories cures symptoms of essential fatty acids (EFA) deficiency; however, most interest in dietary LA in the US has focused on its ability to lower plasma cholesterol. In the 1950s, it was surmised that heart disease might possibly be a reflection of EFA insufficiency. When

PUFAs from vegetable oils instead of SFAs were fed, a reduction in plasma lipids was observed . To further test this hypothesis, fish oils (which contain PUFAs but not the essential PUFA, LA) were tested. The fish oils were more effective in supressing plasma lipids, apparently disproving the EFA hypothesis.

In the 1960s and subsequently, research on dietary fatty acids became devoted mainly to the effects of vegetable oil PUFA on plasma lipids and their linkage to heart disease. However, some researchers continued research to elucidate the mechanism (s) whereby dietary LA relieved or cured the diverse symptoms of EFA deficiency; these include renal dysfunction, excess transepidermal water loss, bleeding, mitochondrial swelling, reproductive failure, etc..

It has been shown that dietary LA by metabolic process in the body gets desaturated and elongated to arachidonic acid (AA) which has significantly higher EFA potency as compared to LA. AA relieved most symptoms of EFA deficiency except the excessive dermal water loss. Subsequently, it was shown that in addition to servings precursor of AA and as a structural component of membrane phospholipids, LA was a required component of acylglucosylceramides of the subepidermal layer in skin and as such controlled transepidermal water loss.

The Arachidonic acid produced by metabolic process from dietary linoleic acid also gets metabolized further to important class of compounds called Eicosanoids.

The eicosanoids (prostanoids and leukotrienes) are important signaling agents which affect cell behavior and cell-to-cell interactions. They modulate secretory, smooth-muscle (contraction or relaxation), and cascade –type reactions which are essential to normal health. A deficiency of these compounds results in progressive impairment of function, while excessive or imbalanced production may result in a number of pathophysiological states e.g. inflammation, immunosuppression, arthritis, and thrombosis. Eicosanoids are particularly involved in cardiovascular, renal, and pulmonary functions and are especially involved in the protective (phagocytotic, immune) roles of blood cells such as platelets, monocytes, macrophages and neutrophils. The balanced production of these eicosanoids modulates short term local responses to injury, perturbation or infection that are required for normal health.

Functions of the Omega Fatty acids

Why are the Omega fatty acids so important to health? There are a number of reasons. Because they form important components of cell membranes, Omega oils are needed to prevent drying and flaking of the skin. They are also needed to ensure proper growth and development in infants and children. But two of the Omega oils most important functions involve regulating the body's use of cholesterol and the production of substances that regulate nearly all other bodily processes.

Omega oils and the Body's Regulators

The body also uses the Omega oils to create a variety of chemicals called eicosanoids, that regulate a wide variety of bodily processes. The omega-3 and the Omega-6 families each produce their own eicosanoids. The important role these chemicals play within the body helps to explain why the essential fatty acids are so essential.

One of the most important groups of eicosanoids is the prostaglandins. Medical interest in prostaglandins-extremely active biological substances made only from essential fatty acids-has grown. Prostaglandins as used in this article may also include other eicosanoids.

Prostaglandins operate in most tissues of the body to regulate just about every bodily function, including:

Cardiovascular and Kidney system function, including dilation or constriction of blood vessels and clot formation

- Digestive system function, including regulation of stomach secretions.
- The healing and repair process, including regulation of cell division
- Immune system function including allergy responses
- The inflammatory process including fever and pain regulation
- Nervous system function including regulation regulation of neural circuits in the brain
- Reproductive system function, including induction of labor or menstrual cramps
- Thermoregulation, or the maintenance of a constant body temperature
- Various other functions, including control of fluid pressure in the eyes, ears and joints

Prostaglandins constitute a local tissue hormone like system. They work with hormones, such as insulin, that are released directly into the bloodstream and act widely throughout the body. The prostaglandins translate the directives of hormones into local instructions for local cells and tissues. In this way, prostaglandins implement hormone function on the local level, in addition to carrying out other regulatory activities.

The Omega-6 and Omega-3 fatty acid groups each produce separate distinct prostaglandins with different functions. For good health, both types of fatty acids are needed, and in the right ratio. That vital balance is hard to achieve because Omega-3 is often missing from the modern diet. When optimal amounts of essential fatty acids are added to the diet many of the body's organs-including the skin heart and the body's ability to fight both cancer and infections is improved.

Prostaglandin imbalances can also lead to a loss of the body's ability to protect itself. For example, certain prostaglandins in the stomach govern the secretion of a protective stomach coating that prevents digestive acids from acting on the walls of the stomach. Without this coating, the stomach would digest itself. People may be more susceptible to stomach ailments when prostaglandin imbalance's cause this safeguard to fail. Such imbalances are also believed to be responsible for similar safeguard failures in other parts of the digestive system

Sources of Omega-3 fatty acids

Plankton, a class of microscopic ocean plants at the base of the marine food chain, is rich in the first member of the Omega-3 family, ALA. Both fin fish and shell fish feed on the plankton and use the ALA to create the longer-chain DHA and EPA. Therefore, fish oils do not supply the similar ALA, which the body also needs. But flaxseed yields an oil that is very high in ALA.

Flaxseed oil and flaxseed from which it is made have been used in both cooking and health remedies since the days of ancient Greece and Rome. Until World war II, freshly squeezed flaxseed oil was delivered weekly to homes in Northern Europe as a cooking oil. Some families have a tradition of spreading a teaspoon of flaxseed over their breakfast cereal.

Although flaxseed oil has been used for centuries, it is not as popular in the United States as are some other vegetable oils, including some-walnut, soybean and wheat germ-that contain moderate amounts of Omega-3 ALA. However oil has the most ALA-50 to 60%. This makes it an ideal oil for cooking and for use as a diet supplement, especially if a medical condition already exists.

Flaxseed oil has some advantages over fish oil. Flaxseed oil is far more palatable than fish oil, especially when taken in large therapeutic quantities. Unlike fish oil, flaxseed oil can be used for cooking and in salad dressings, which provide easy ways to take large doses when needed. And unrefined flaxseed oil, unlike fish oil, is a source of lignin, a special kind of plant fiber that is associated with reduced incidence of breast, colon and prostate cancers.

The body can normally use ALA to make the EPA and DHA found in fish oils. However, there are indications that some individuals cannot produce enough EPA and DHA from dietary flaxseed oil. In such cases, fish-oil supplements may be needed. Also when flaxseed oil is the major Omega-3 in the diet of a pregnant woman, she may not be able to convert ALA into enough EPA and DHA to meet her own increased needs plus those of the fetus. Because these Omega-3 fatty acids are so important to the fetus's growth and brain development, supplements of fish oils for the mother may be necessary if she is unable or unwilling to eat seafood.

How do we get the omega-3 we need

Not all vegetable oils are alike. The Omega-6 fats have been restored via oils and margarine-often in too great abundance-to many American diets, but most diets still lack the crucial omega-3 oils. Moreover, the presence in our tissues of trans-fatty acids that interfere with cell membrane function requires additional Omega-3 fats just to undo that damage.

The most popular food oils are safflower, corn, sunflower, cottonseed and peanut oils, all of which are high in Omega-6 fatty acids- but none contain more than traces of Omega-3 fats. Soybean oil, normally a good source of both Omega-3 and Omega-6, seemed to be the answer. However, because of hydrogenation and the development of a soybean with little Omega-3, it has been a nutritional disappointment.

Chemist's now have the technology to reduce rancidity and still preserve essential fatty acids. I hope this technology will be used on a large scale as the public demand for Omega-3 increases.

With Omega-3 essential fatty acids stripped from our diets, do most of us get the nutrition we need?

Heart Disease and Omega-3

Only a disturbance in the body,s prostaglandin regulatory system, which depends on a proper balance of Omega fatty acids, can explain such a complex set of heart-attack triggers. For example, angina pectoris-acute chest pain caused by spasms that squeeze the coronary arteries- is related to prostaglandin-controlled spasms in other tissues, such as the spasm of the esophagus that cause choking or the spasm of the colon that causes diarrhea.

There is also evidence that prostaglandins are involved in maintaining a normal rhythm in the beating of the heart, and that Omega-3 fatty acids help prevent potentially fatal disturbances-called arrhythmias in the heartbeat. Such arrhythmias, which cause thousands of deaths each year, can occur even when a person does not have atherosclerosis. Arrhythmia is another potential danger of having too much thromboxane in the bloodstream, since a surplus of thromboxane can promote disturbances in the heartbeat. Since Omega-3 tends to reduce thromboxane levels, it can help keep the heartbeat regular. Omega-3 can also help keep a proper amount of calcium, an important heartbeat regulator, in the heart muscle. While there is no statistical evidence that Omega-3 can help prevent arrhythmias, this is the subject of intense research.

The Omega-3 fatty acids play diverse protective roles in keeping our hearts healthy. For example studies using fish oils that are high in the Omega-3 oils EPA and DHA show the following effects:

Reduction in levels of thromboxanes, the prostaglandin that promotes artery constriction and blood clotting

Increase in levels of a substance, produced by the blood vessels, that helps keep the arteries relaxed and inhibits abnormal platelet clumping

Increase in levels of clot-dissolving factors

Inhibition of a substance that promotes the growth of muscle within artery walls, a growth that leads to plaque buildup

Decreased production of a chemical responsible for causing the inflammation that contributes to plaque buildup

Thinner blood, leading to improved circulation

Increased flexibility of red blood cell membranes, which makes it easier for blood to flow through tiny capillaries

Often,the beneficial effects of Omega-3 oils produce noticeable results. For example, viscous or sludgy blood is often associated with diseased blood vessels in the feet, legs and hands. Pain in the legs after walking a short distance-a condition called intermittent claudication-is a frequent sign of the problem. Researchers suggest that the Omega-3 fatty acids improve sludgy blood by making the red blood cell membranes more flexible, which allows the cells to travel more freely through narrowed blood vessels.

A 1965 study showed that flaxseed –oil supplements, which are high in the Omega-3 essential fatty acids, significantly reduced the incidence of heart disease and related deaths. And other studies show that when flaxseed oil, or flaxseed meal baked into bread, is introduced into the diet, there are beneficial changes in the blood, as well as smoother functioning of the cardiovascular system-similar in many respects to the improvements seen with increasing the amount of fish in the diet, or with fish-oil supplements. And a 1974 report in the British journal Lancet found that an ALA-rich diet reduced deaths from cardiovascular disease by 70% over a 2 year period.

Diabetes and Omega-3

Although it was known in ancient times, diabetes has been an increasingly common problem in this century. It is now among the leading causes of death from noninfectious disease in the United states.

Two hormones produced by the pancreas-insulin and glucagon-cooperate to keep blood sugar, called glucose, at the correct level. When glucose levels are too high, the pancreas sends out insulin to force glucose from the blood-stream into the body’s cells. If glucose levels are too low, glucagon sends glucose into the bloodstream for additional energy.

Diabetes occurs in two forms. The most serious form-called juvenile or Type 1 diabetes-usually strikes in childhood. It may arise from an attack by the immune system on either the insulin-producing cells of the pancreas or on the insulin receptors within the tissues. In juvenile diabetes, an essential fatty acid deficiency can cause the immune system to turn against the body instead of defending it.

The more common form-called adult-onset or type 2 diabetes-usually appears later in life. In people who are predisposed by heredity to this form of diabetes, a diet high in sugar and fibreless carbohydrates can eventually stress the insulin production mechanism. Hypoglycemia or low blood sugar, may represent an early phase of diabetes, in which a hair-trigger response from the overworked pancreas sends out too much insulin. Eventually, the body stops responding to the pancreas’s signals and blood levels of both insulin and sugar go up.

As we’ve seen, all hormones, including insulin and glucagon, exert their control over the cells by stimulating production of local regulatory chemicals called prostaglandins of local regulatory chemicals called prostaglandins. In turn, the prostaglandins pass the message of the hormones to the individual cells. The prostaglandins are made from essential fatty acids. Therefore, a deficiency of essential fatty acids or of the vitamins or minerals they need to be effective, interferes with prostaglandin production. This can intensify adult-onset diabetes even though adequate insulin is produced.

The essential fatty acids also affect the ability of the body’s cells to respond to insulin. In a 1993 study, Australian researchers learned that insulin resistance is related to what kinds of fatty acids make up the cell membranes. The more Omega-3 and Omega-6 fatty acids there are in the cell membranes of adult diabetics, the more their tissues respond to insulin.

Omega Antiaging benefits

Most of us would like to fight the effects that age has on our bodies, and many of us go to great lengths in order to do so. But an antiaging regimen does not have to be either time-consuming or expensive. Here are four ways to help fight the aging process:

Make sure you get enough Omega-3 oil. Increase your fish consumption to at least one serving a week. Older people may benefit especially from fish-oil supplements containing the Omega-3 ultra polyunsaturates EPA and DHA. Also supplement your diet with flaxseed oil.

Take a complete multivitamin and multimineral supplement every day. This supplement should include the antioxidants-beta carotene, vitamin C, Vitamin E and selenium.

Make sure you eat enough fiber-have a fiber appetizer before breakfast, lunch and dinner. Fiber not only prevents constipation, but it can also help clear out unneeded cholesterol from the body. Use flaxseed or flaxseed meal as a source of both the anticancer fiber called lignan and the essential fatty acids.

Participate in a program of aerobic exercise suitable to your strength and health. Aerobic exercises, which strengthen the heart and lungs include walking, jogging and cycling.

Within these guidelines, try eating different ratios of protein, carbohydrate, and fat over a three-week period. Note your reactions by keeping a food diary-it will help you find your optimum diet. High protein meals are often used as supplemental diets before surgery or to give debilitated people a boost. Avoid high-protein diets, however, if you have liver or kidney disease, because the body's processing of proteins places an additional burden on these organs.

Oil Sources of Omega fatty acids (Grams per 100 gram)

Sources	Omega-6 EFA 1	**Omega –3 EFA**				
	Linoleic	Alfa Linolenic	EPA	DHA	Total EFA	Total fat
FISH OIL						
Cod, Atlantic	1.2	0.8	12.4	21.9	41.7	100
Halibut, pacific	0.9	0.3	10.1	7.9	26.9	100
Mackerel	1.1	1.3	7.1	10.8	29.3	100
Rockfish	1.6	0.8	11.7	17.4	36.1	100
Salmon, Chinook	1.1	0.9	8.2	5.9	20.6	100
Salmon, coho	1.2	0.6	12.0	13.8	33.6	100
Sole, lemon	0.7	2.0	14.7	6.8	36.6	100
Tuna, albacore	0.7	0.6	6.5	17.6	25.4	100
Tuna, Bluefin	1.3	Treces	6.6	20.8	28.7	100
FISH LIVER OIL						
Cod, atlantic (3)	1.5	0.9	8.0	14.3	29.7	100
SHELLFISH OIL						
Oyster. Pacific	1.2	1.6	21.5	20.2	51.7	100
Scallop, sea	0.6	0.3	21.3	26.2	55.7	100
Vegetable oil, omega 6 Sources Tropical to temperate climates						
Cashew	16	0.4	0	0	16	100
Coconut	3	N/A	0	0	3	100
Corn	57	0.8	0	0	58	100
Cottonseed	48	0.4	0	0	48	100
Evening Primrose$	72	0.2	0	0	81	100
Olive						
Peanut	9	0.7	0	0	10	100
Poppy seed	29	1.1	0	0	30	100
Pumpkin seed	69	N/A	0	0	69	100
Safflower	51	N/A	0	0	51	100
Sesame	58	N/A	0	0	58	100
Sunflower	42	0.5	0	0	42	100
	53	N/A	0	0	46	100

Vegetable oil Omega-3 Sources-temperate to polar climates						
Canola, rapeseed	22	11	0	0	33	100
Chestnuts, European	35	4	0	0	39	100
Flaxseed, Linseed						
Hempseed	15	55	0	0	63	100
Perilla	62	19	0	0	81	100
Soybean	16	67	0	0	83	100
Walnut	53	7	0	0	60	100
Walnut, black	67	4	0	0	71	100
Walnut, English	62	7	0	0	69	100
Wheat germ	55	11	0	0	66	100
	54	7	0	0	61	100
ANIMAL FAT						
Beef tallow	4	0.7	N/A	N/A	4.2	100
Butter	1.8	1.2	N/A	N/A	3.0	80
Chicken fat	17	1.1	N/A	N/A	17.6	100
Lard	10	1.4	N/A	N/A	11.8	100
Mutton fat	5	2.9	N/A	N/a	8.1	100

1 EFA=Essential fatty acids. Total EFA includes these listed plus others if any are not listed here.

3 Toxic at high dosages

5 Contains 8.6 grams of Omega-6 gamma linolenic acid (GLA)

Dietary Cholesterol

The original simple story in the 1950s was that high cholesterol levels increase heart disease risk. Cholesterol shuttles through the blood in an array of packages. Low-density lipoprotein particles (LDL, the bad cholesterol) deliver fat and cholesterol from the liver to tissues that need it. Including the arterial cells, where it can lead to atherosclerotic plaques. High-density lipoproteins (HDLs, the good cholesterol) return cholesterol to the liver. The higher the HDL, the lower the heart disease risk. Then there are triglycerides, which contain fatty acids, and very low density lipoproteins (VLDLs), which transport triglycerides.

All of these particles have some effect on heart disease risk, while the fats, carbohydrates, and protein in the diet have varying effects on all these particles. The 1950s story was that saturated fats increase total cholesterol , polyunsaturated fats decrease it, and monounsaturated fats are neutral. By the late 1970s – when researchers accepted the benefits of HDL-they realized that monounsaturated fats are not neutral. Rather, they raise HDL, at least compared to carbohydrates, and lower LDL. This makes them an ideal nutrient as far as cholesterol goes. Furthermore, saturated fats can not be quite so evil because, while they elevate LDL, which is bad, they also elevate HDL, which is good. Stearic acid raises HDL level but does little or nothing to LDL.

It has been shown that in a majority of people, homeostatic mechanisms operate to maintain blood cholesterol within a certain range. This occurs by feedback inhibition of cholesterol biosynthesis in the liver

Important Figures

Edible Oil Estimates for India
(Marketing Year - November 2016 – October 2017)

(Unit: Million Tonnes)

Table 1:Production, Stocks, Trade and Availability of Edible Oils				
2015-16	**2016-17 Estimates***		**Jan,2017**	**Source**
9.18	10.97	Production	10.97	DVVOF
14.82	13.23	Imports	3.39**	DOC
24.00	24.20	Availability	14.36	
0.55	0.65	Export and Industrial use	0.65	DVVOF
23.45	23.55	Total Available for domestic consumption	13.71	

Source: Directorate of Vanaspati, Vegetable oil and Fats (DVVOF) and Department of Commerce

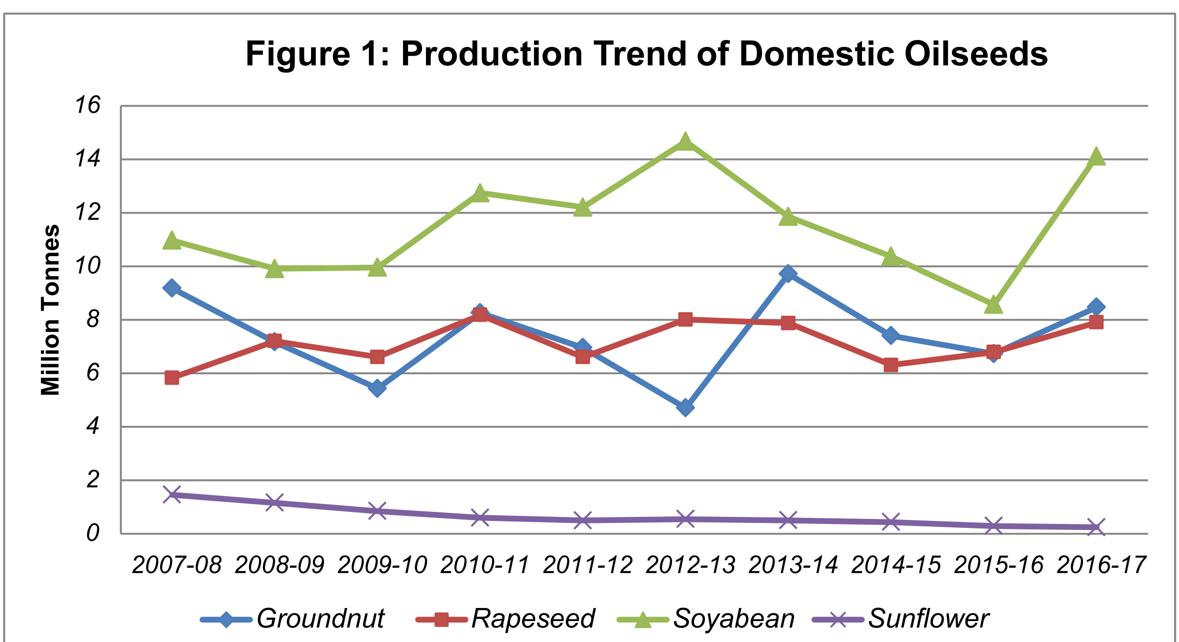
*For 2016-17 estimates, production and export & industrial use as estimated by Directorate of Vanaspati, Vegetable oil and Fats (DVVOF) and import is 3 years average from DGCI&S, Kolkata.

**Figure of import is for the period Nov-Jan, 2016-17.

Availability: Domestic production plus Imports; Total Availability for Domestic Consumption: Availability minus export and Industrial use.

≠ The figure for domestic production of edible oils in 2016-17 is 10.97 MT which is more than the actual production last year in 2015-16 (i.e. 9.18 MT).

Production Trends of domestic edible oils

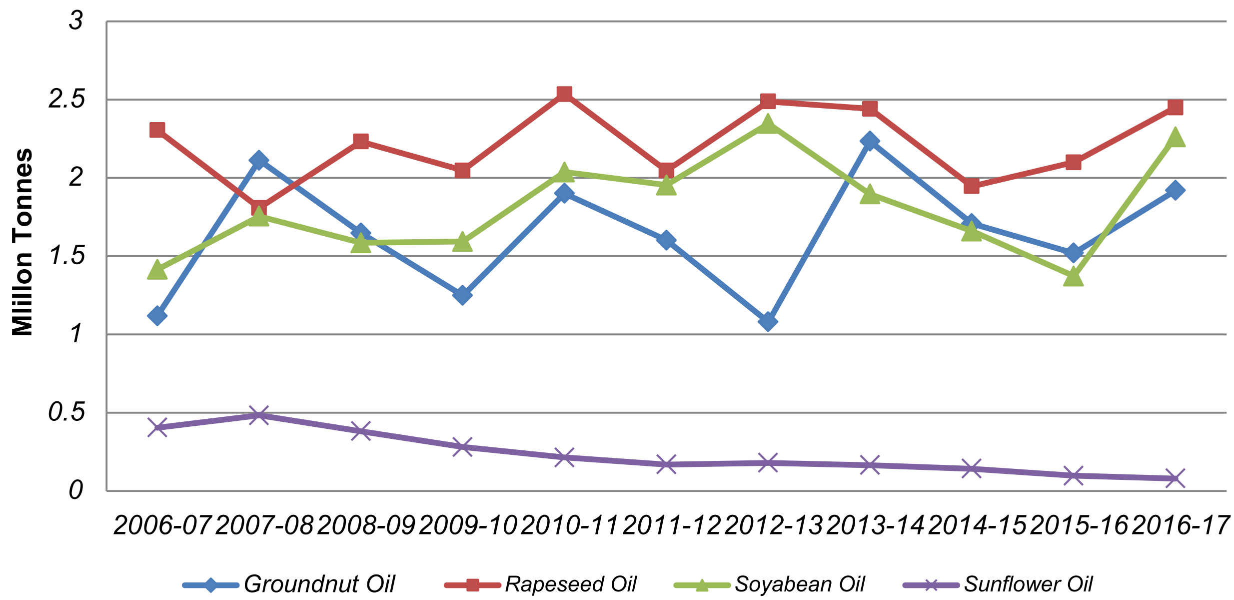


Source: Directorate of Economics and Statistics

- India's Soybean production has increased in the last 10 years at CAGR of 4.79 percent.
- Production of Groundnut decreased from 7.4 million (2013-14) to 6.7 million tonnes (2015-16) showing a decline of about 9%. However, production is estimated to be at 8.47 million tonnes in 2016-17.

Production Trends of domestic edible oils

Figure 2: Production Trend of Domestic Edible oil



Source: Directorate of Vanaspati, Vegetable oil and Fats (DVVOF)

- Soybean oil production has increased in the last 10 years at CAGR of 4.83 percent.
- Rapeseed oil production increased from 2.11 Million MT from 2015-16 to Million 2.45 MT in 2016-17.

Global production trends of major edible oils

A) Groundnut oil

Figure 3: Production Trend Groundnut Oil

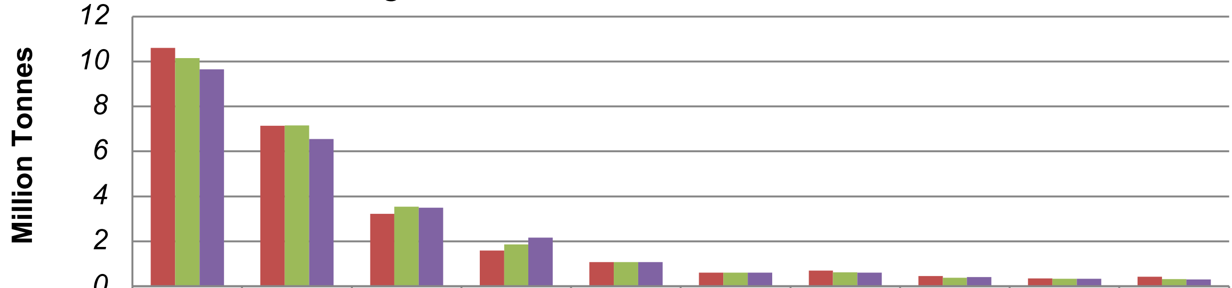
	China	India	Burma	Nigeria	Sudan	Tanzania	US	Senegal	Argentina	Burkina
2014/15	2.634	1.156	0.27	0.265	0.19	0.133	0.097	0.09	0.077	0.075
2015/16	2.727	0.918	0.27	0.265	0.22	0.133	0.113	0.097	0.076	0.076
2016/17	2.761	0.952	0.27	0.265	0.22	0.133	0.121	0.097	0.078	0.076

Source: United States Department of Agriculture

- China is expected to be the top producer followed by India and Burma in 2016-17.
- India’s share in global production of Groundnut Oil in 2016-17 may be around 19 percent.

B) Mustard Oil

Figure 4: Production Trend Mustard Oil



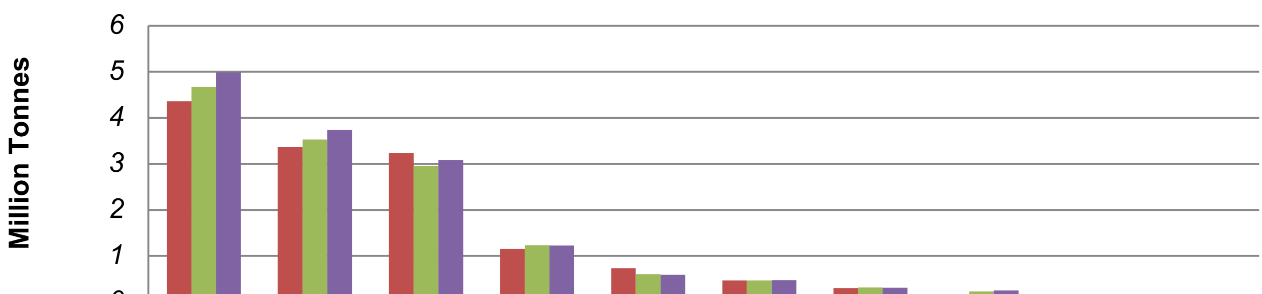
	EU	China	Canada	India	Japan	Mexico	US	Russia	UAE	Pakistan
2014/15	10.603	7.137	3.23	1.596	1.074	0.616	0.704	0.463	0.354	0.435
2015/16	10.157	7.157	3.55	1.862	1.075	0.616	0.632	0.376	0.345	0.316
2016/17	9.656	6.552	3.5	2.166	1.075	0.616	0.615	0.412	0.333	0.312

Source: United States Department of Agriculture

- European Union (EU) is expected to be the top producer followed by China and Canada in 2016-17. India may be the fourth largest producer.
- India's share in global production of mustard oil in 2016-17 may be around 8.5 percent.

C) Sunflower oil

Figure 5: Production Trend Sunflower Oil



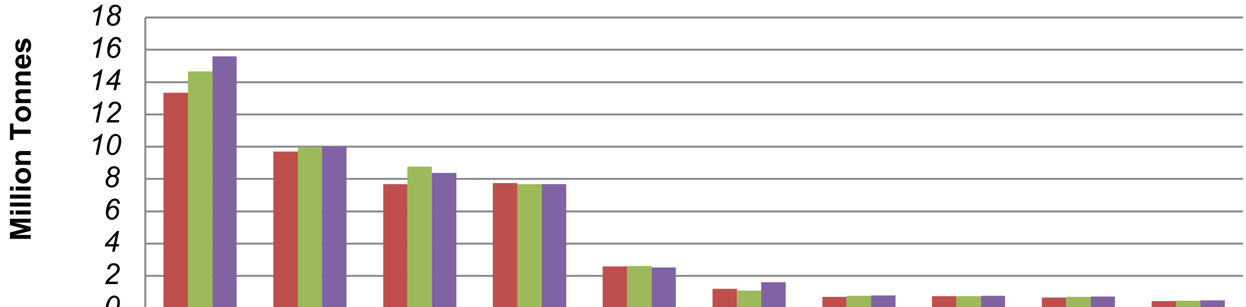
	Ukraine	Russia	EU	Argentina	Turkey	China	South Africa	US	Bolivia	India
2014/15	4.357	3.366	3.232	1.151	0.731	0.466	0.298	0.147	0.123	0.117
2015/16	4.674	3.53	2.958	1.23	0.602	0.466	0.314	0.228	0.142	0.098
2016/17	4.991	3.738	3.084	1.223	0.589	0.475	0.308	0.247	0.151	0.108

Source: United States Department of Agriculture

- Ukraine is expected to be the largest producer followed by Russia and EU in 2016-17. India may be at the 10th position in global producer.
- India's share in global production of sunflower oil in 2016-17 may be around 1.0 percent.

D) Soybean oil

Figure 6: Production Trend Soybean Oil



	China	US	Argentina	Brazil	EU	India	Paraguay	Mexico	Russia	Bolivia
2014/15	13.347	9.706	7.687	7.76	2.584	1.204	0.697	0.745	0.654	0.445
2015/16	14.655	9.934	8.77	7.68	2.622	1.098	0.783	0.76	0.717	0.475
2016/17	15.587	10.034	8.38	7.68	2.527	1.611	0.8	0.766	0.735	0.49

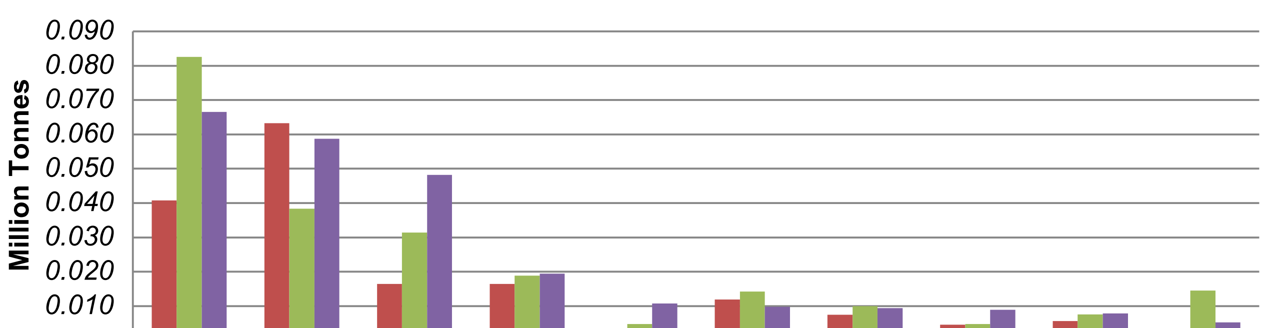
Source: United States Department of Agriculture

- China, United States, Argentina and Brazil are expected to be the key producers of Soybean oil in 2016-17.
- India's share in global production of Soybean Oil in 2016-17 may be around 3.5 percent.

Major Exporting and Importing countries of edible oils

A. Groundnut oil

Figure 7 : Major Exporting countries of Groundnut Oil

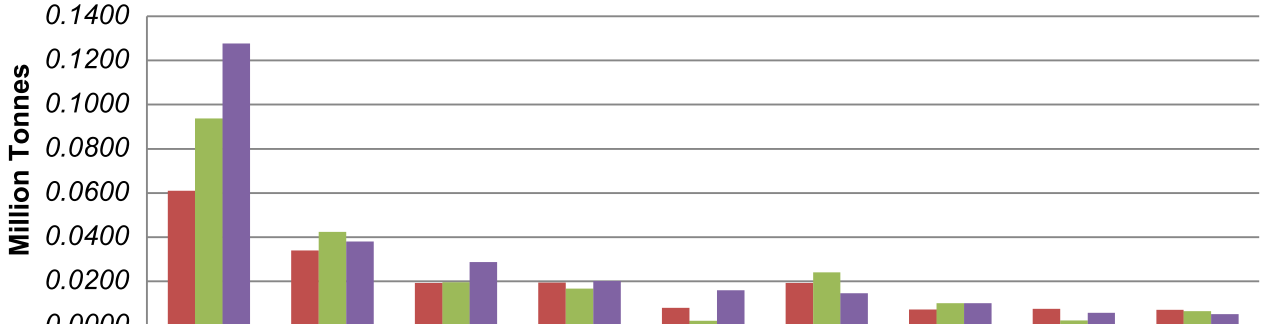


	Argentina	Brazil	Senegal	Nicaragua	Netherlands	Belgium	China	US	France	India
2013/14	0.041	0.063	0.016	0.016	0.003	0.012	0.007	0.005	0.006	0.003
2014/15	0.083	0.038	0.031	0.019	0.005	0.014	0.010	0.005	0.008	0.015
2015/16	0.067	0.059	0.048	0.019	0.011	0.010	0.009	0.009	0.008	0.005

Source: Comtrade

- Argentina and Brazil were the top two exporting countries of Groundnut oil in 2015-16. India was the 10th largest exporting country of groundnut oil in the world in 2015-16.

Figure 8 : Major Importing countries of Groundnut Oil



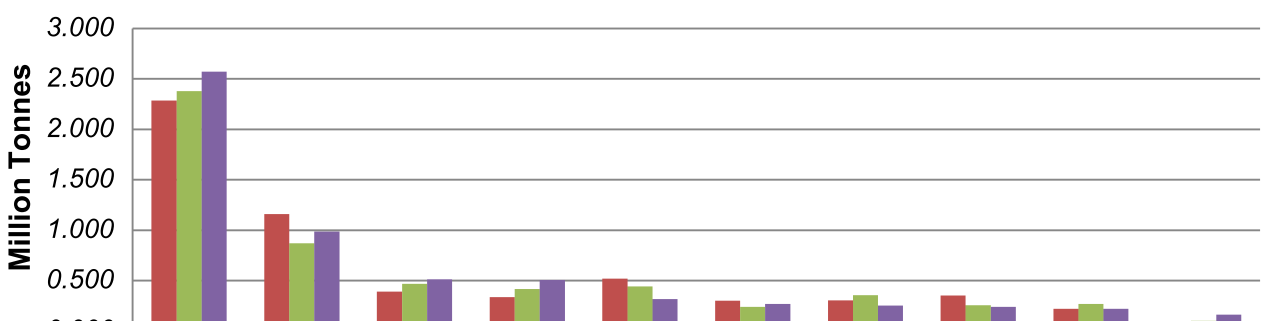
	China	Italy	US	France	Benin	Belgium	Hong Kong	Switzerland	Netherlands
2013/14	0.0610	0.0340	0.0192	0.0194	0.0080	0.0193	0.0073	0.0076	0.007
2014/15	0.0937	0.0423	0.0196	0.0168	0.0021	0.0240	0.0100	0.0024	0.007
2015/16	0.1277	0.0380	0.0288	0.0201	0.0160	0.0146	0.0102	0.0057	0.005

Source: Comtrade

- China and Italy were the major importing country of groundnut oil in 2015-16.

B. Mustard oil

Figure 9 : Major Exporting Countries of Mustard Oil

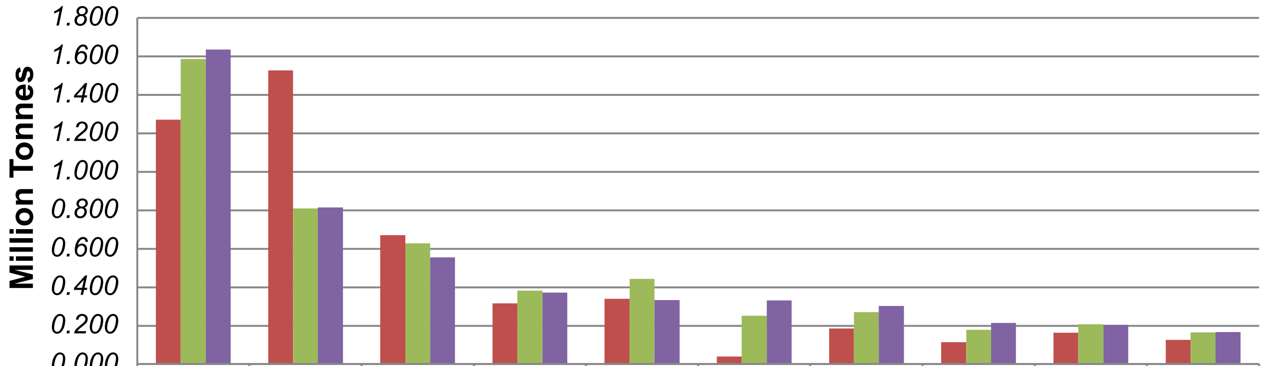


	Canada	Germany	Poland	Czech Republic	Netherlands	France	Russia	Belgium	UK	Ukraine
2013/14	2.287	1.158	0.390	0.336	0.519	0.299	0.305	0.352	0.220	0.048
2014/15	2.379	0.869	0.466	0.417	0.443	0.238	0.355	0.254	0.268	0.100
2015/16	2.573	0.986	0.511	0.505	0.316	0.269	0.252	0.240	0.220	0.163

Source: Comtrade

- Canada was the largest exporter of Mustard oil in the world followed by Germany and Poland in 2015-16.

Figure 10 : Major Importing Countries of Mustard Oil



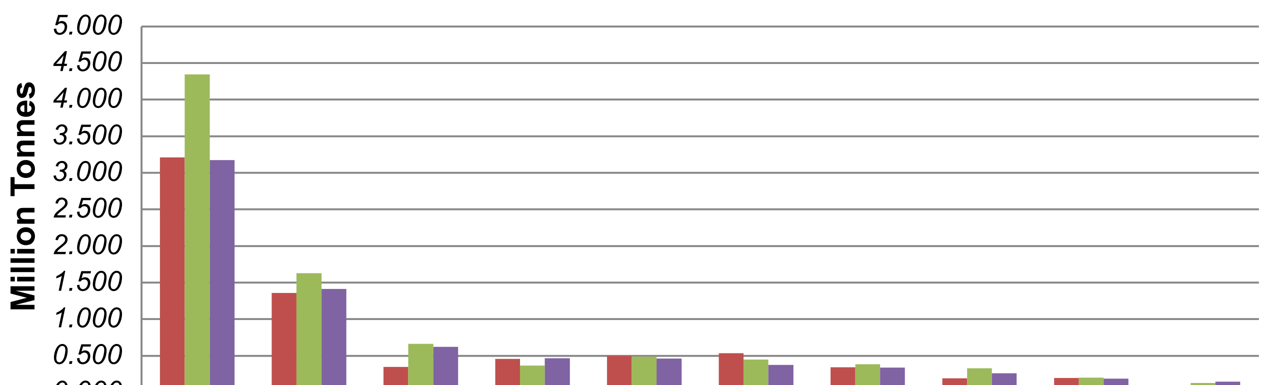
	US	China	Netherlands	Norway	Belgium	India	Germany	Czech Republic	Sweden	Italy
2013/14	1.272	1.527	0.670	0.317	0.341	0.039	0.186	0.114	0.164	0.126
2014/15	1.586	0.810	0.629	0.383	0.443	0.252	0.271	0.179	0.208	0.165
2015/16	1.636	0.815	0.555	0.373	0.333	0.331	0.302	0.214	0.204	0.168

Source: Comtrade

- The US and China were the leading importing countries of Mustard oil in the world. India was the 6thlargest importing country in 2015-16.

C. Sunflower oil

Figure 11 : Major Exporting Countries of Sunflower Oil

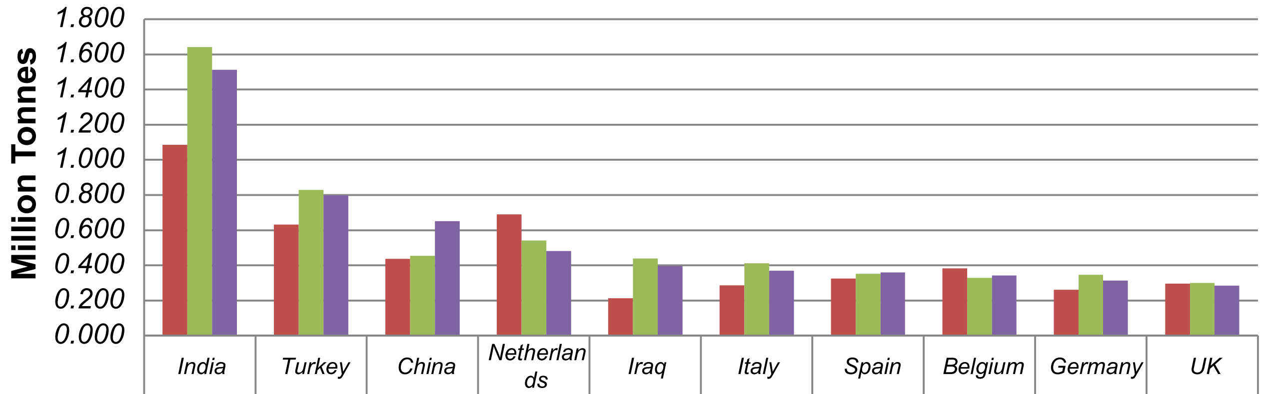


	Ukraine	Russia	Turkey	Argentina	Hungary	Netherlands	France	Bulgaria	Romania	Spain
2013/14	3.209	1.358	0.346	0.459	0.500	0.534	0.345	0.193	0.198	0.103
2014/15	4.342	1.629	0.665	0.364	0.490	0.448	0.384	0.330	0.200	0.127
2015/16	3.174	1.413	0.623	0.466	0.461	0.375	0.337	0.263	0.188	0.145

Source: Comtrade

- Ukraine and Russia were the top two global exporters of sunflower oil during 2015-16.

Figure 12 : Major Importing Countries of Sunflower Oil



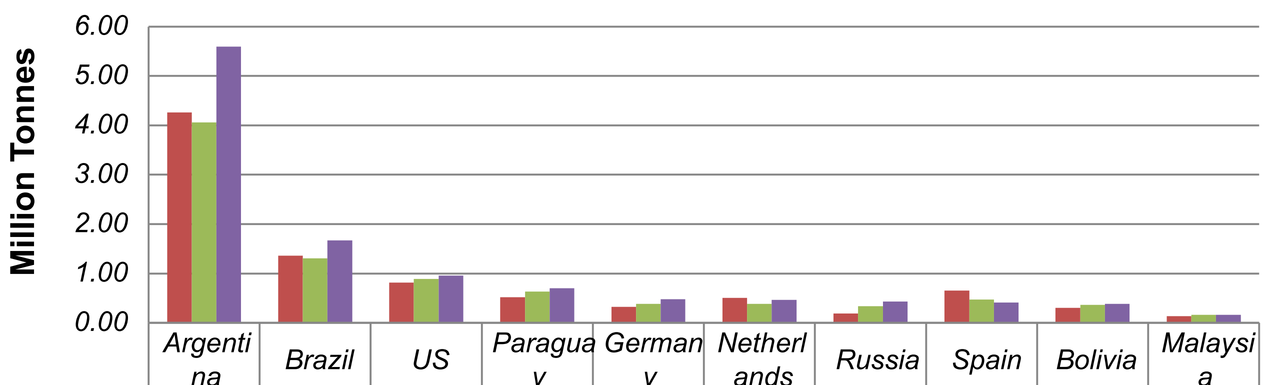
	India	Turkey	China	Netherlands	Iraq	Italy	Spain	Belgium	Germany	UK
2013/14	1.086	0.632	0.436	0.690	0.213	0.287	0.324	0.384	0.262	0.295
2014/15	1.641	0.829	0.455	0.541	0.438	0.411	0.353	0.329	0.345	0.299
2015/16	1.512	0.798	0.651	0.481	0.397	0.369	0.360	0.342	0.313	0.283

Source: Comtrade

- India was the largest importer of Sunflower oil followed by Turkey, China and Netherland during 2015-16.
- There is a secular increase in the importation of Sunflower oil of China.

D. Soybean oil

Figure 13 : Major Exporting Countries of Soybean Oil

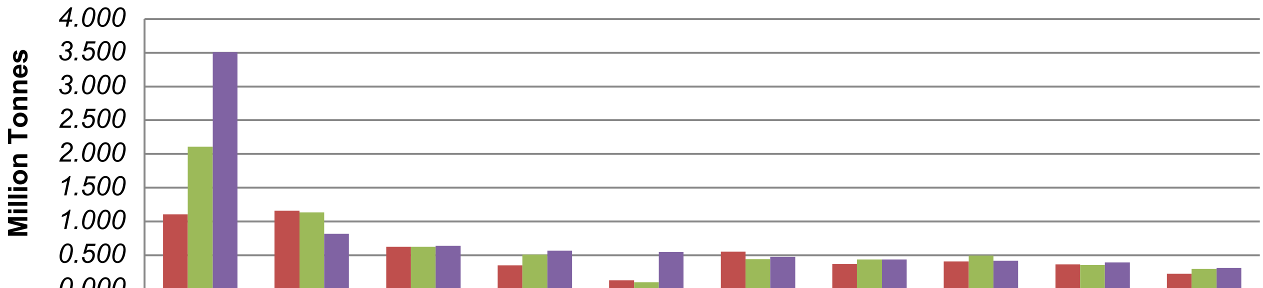


	Argentina	Brazil	US	Paraguay	Germany	Netherlands	Russia	Spain	Bolivia	Malaysia
2013/14	4.26	1.36	0.82	0.52	0.32	0.51	0.19	0.65	0.30	0.13
2014/15	4.06	1.31	0.89	0.63	0.38	0.38	0.34	0.47	0.36	0.16
2015/16	5.60	1.67	0.96	0.70	0.48	0.47	0.43	0.41	0.38	0.16

Source: Comtrade

- Ukraine and Russia were the top two global exporters of sunflower oil during 2015-16.

Figure 14 : Major Importing Countries of Soybean Oil

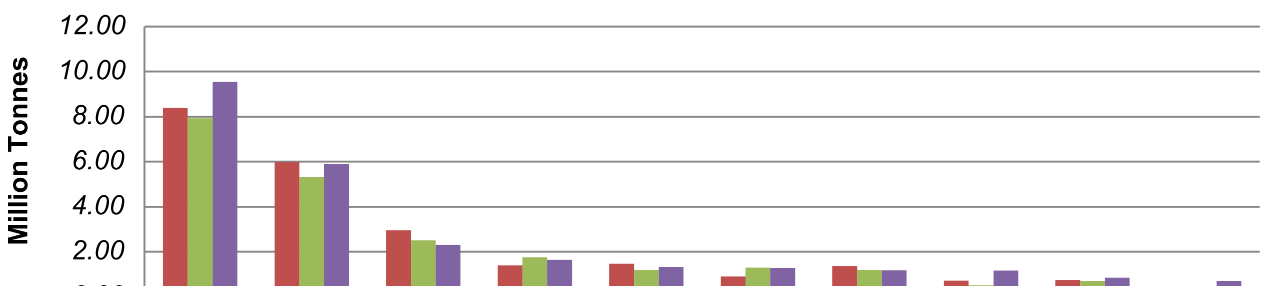


	India	China	Algeria	Bangladesh	Egypt	Iran	Morocco	Venezuela	Peru	Colombia
2013/14	1.108	1.158	0.623	0.350	0.130	0.550	0.371	0.407	0.363	0.224
2014/15	2.106	1.135	0.625	0.508	0.100	0.442	0.438	0.493	0.355	0.299
2015/16	3.509	0.818	0.637	0.566	0.546	0.476	0.439	0.419	0.395	0.311

Source: Comtrade

- India was the largest importer of soybean oil that constituted 29.89 percent of the global import in the year 2015-16.

Figure 16: Major Importing Countries of Palm Oil



	India	China	Netherlands	Italy	Germany	Spain	US	Malaysia	Russia	Ethiopia
2013/14	8.39	5.98	2.96	1.39	1.47	0.90	1.37	0.72	0.75	0.35
2014/15	7.93	5.32	2.51	1.76	1.20	1.30	1.19	0.51	0.71	0.38
2015/16	9.54	5.91	2.30	1.64	1.32	1.28	1.18	1.17	0.84	0.70

Source: Comtrade

- India is the largest importer of Palm oil in the world followed by China, Netherland and Italy.

E. Palm oil

Figure 15: Major Exporting Countries of Palm Oil

	Indonesia	Malaysia	Netherlands	Papua New Guinea	Guatemala	Germany	Colombia	Ecuador	Costa Rica	Brazil
2013/14	20.58	15.24	1.44	0.57	0.36	0.35	0.18	0.21	0.17	0.07
2014/15	22.89	15.14	1.39	0.56	0.40	0.37	0.25	0.23	0.15	0.10
2015/16		15.43	1.19	0.60	0.47	0.44	0.40	0.28	0.16	0.13

Source: Comtrade

- Indonesia and Malaysia hold both competitive as well as comparative advantage in exportation of Palm oil in the world.

India's Import of major edible oils

(Million Tonnes)

Table 2: India's Import of Major Edible Oils during 2012-13 to 2016-17			
Year	**Soybean Oil**	**Palm Oil**	**Sunflower Oil**
2012-13	1.1	8.4	1.1
2013-14	1.3	7.6	1.1
2014-15	2.3	8.1	1.7
2015-16	3.9	9.6	1.4
2016-17(Apr-Dec)	2.7	6.1	1.1

Source: Department. Of commerce

≠ India imports substantial amount of edible oils for its domestic consumption. Among all edible oils importation into India, Palm oil importation share is around 70-80 percent.

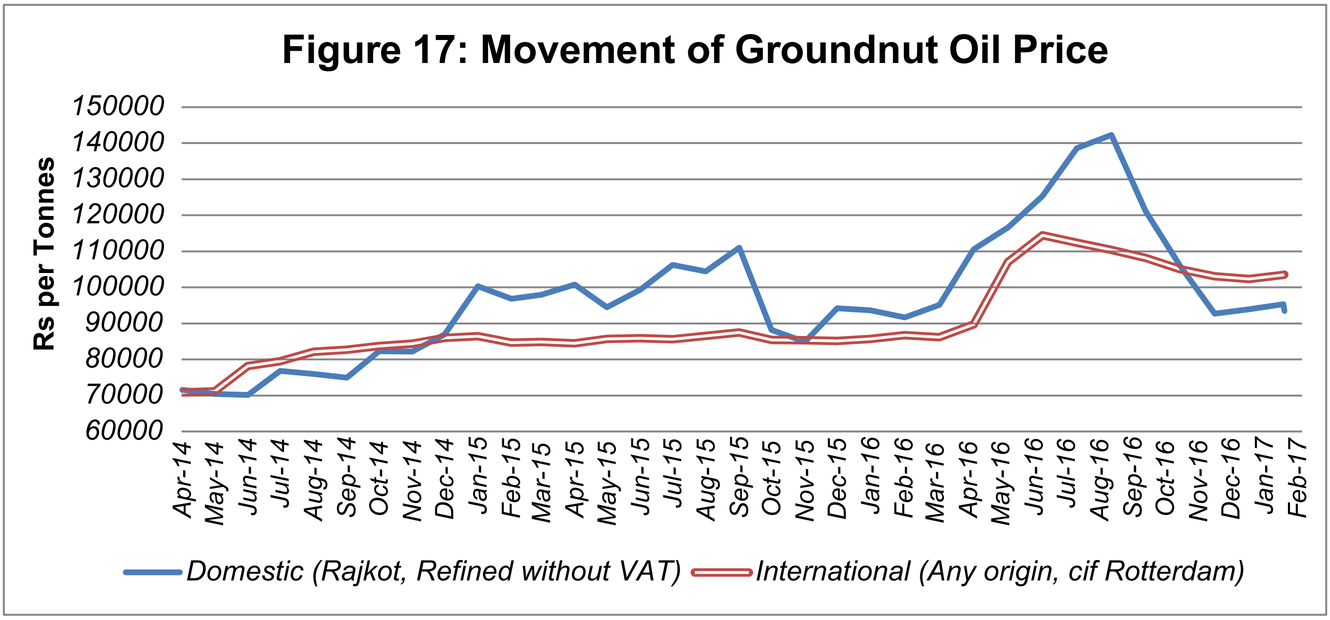
India's top Import source of Soya, Palm and sunflower

Table 3: India's Top Import Sources of Palm, Soya and Sunflower Oils	
Edible Oils	**Import Source**
Soybean Oil	Argentina and Brazil
Palm Oil	Indonesia and Malaysia
Sunflower	Ukraine and Mexico

Source: Department of Commerce

Movement of Domestic and international edible oils

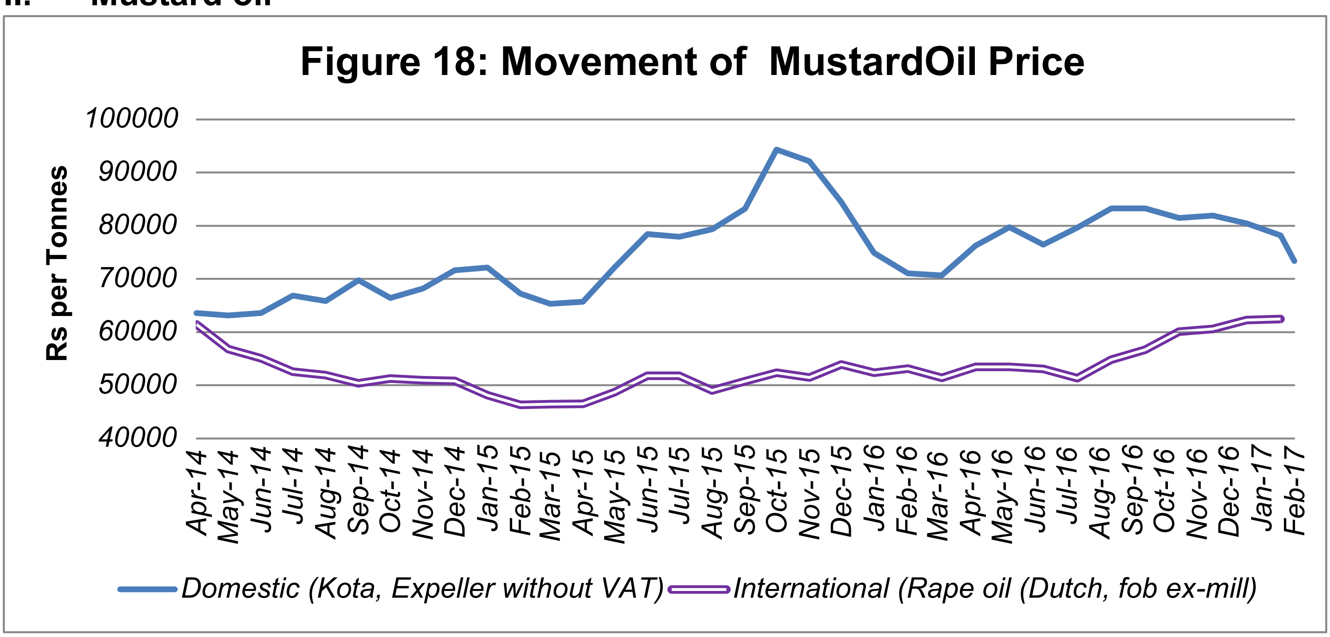
I. Groundnut oil



Source: Domestic Price Agriwatch and International Price are FAO Prices.

- Domestic prices of Groundnut oil are showing a decreasing trend from August, 2016.

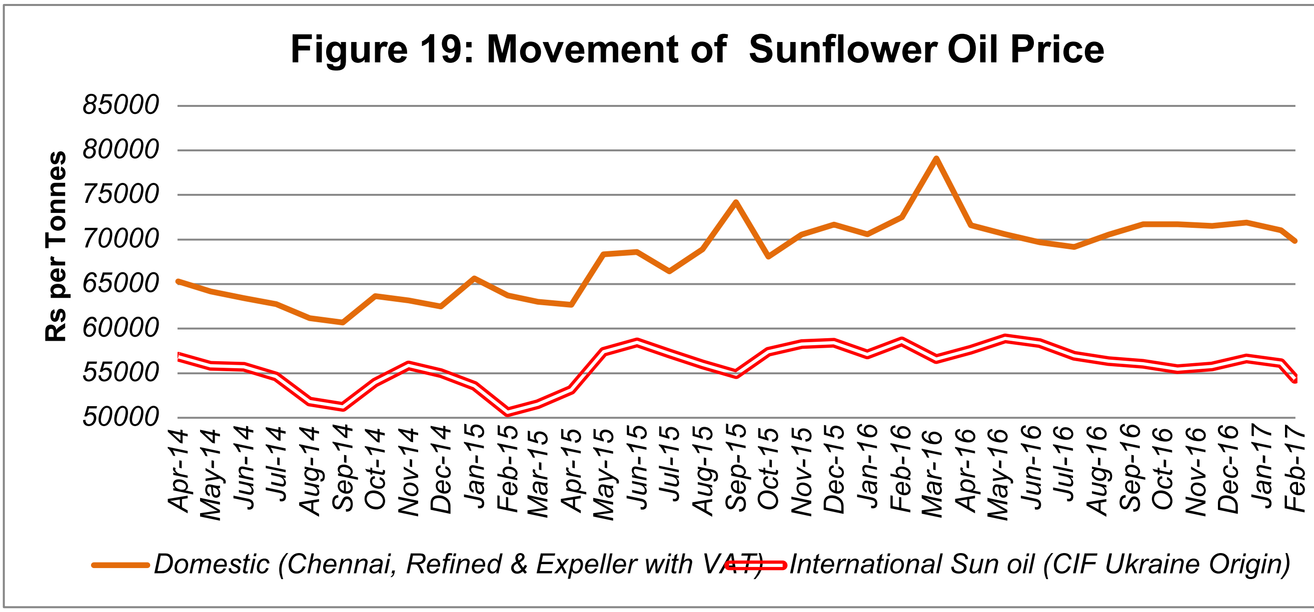
II. Mustard oil



Source: Domestic Price Agriwatch and International Price are FAO Prices.

- Domestic price of Mustard Oil is higher than that of International prices throughout the years.

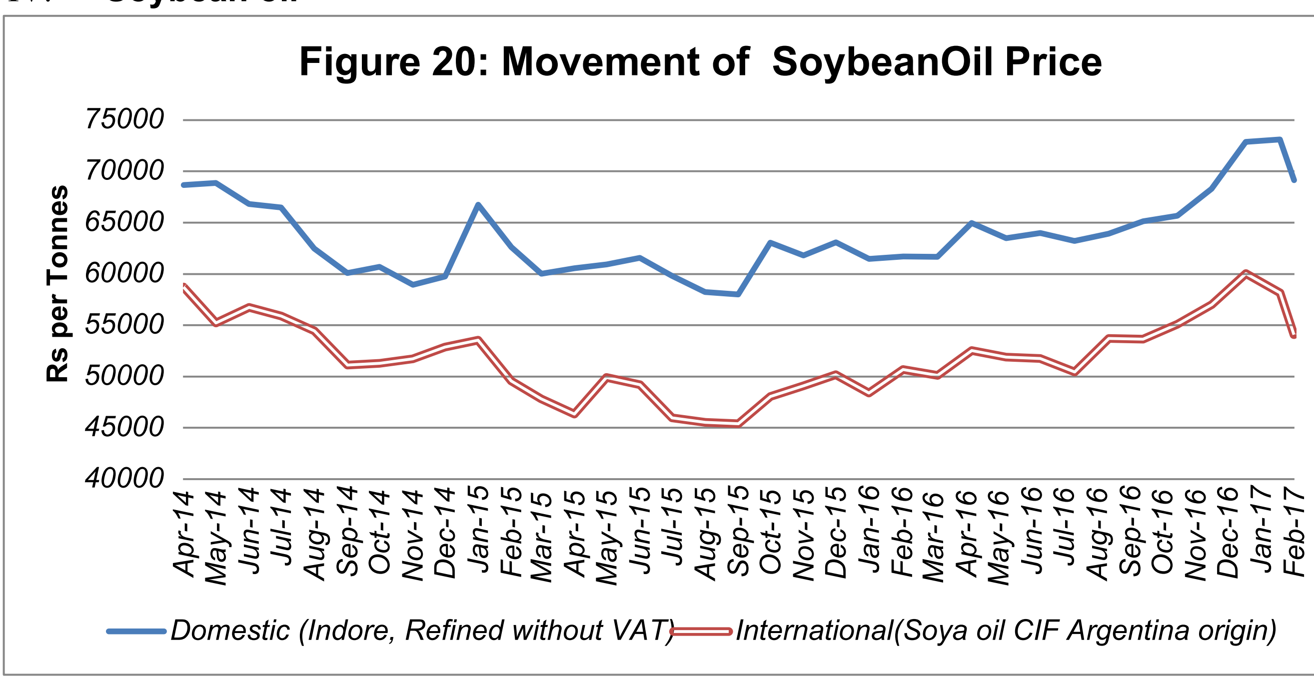
III. Sunflower oil



Source: Domestic Price Agriwatch and International Price are CIF Ukraine origin Prices.

- Domestic prices of Sunflower oil are higher that International prices throughout.

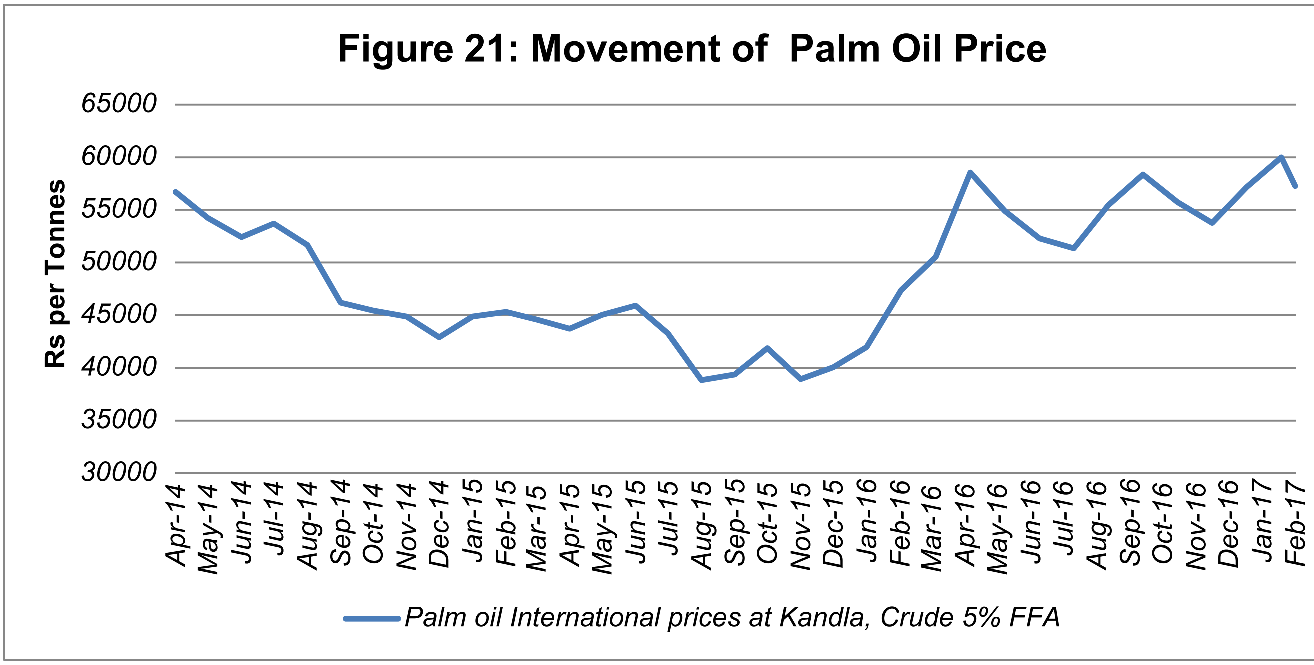
IV. Soybean oil



Source: Domestic Price Agriwatch and International Price are CIF Argentina origin Prices.

- Domestic price of soybean oil are higher than International prices throughout period.

V. Palm oil



Source: International landing Price at Kandla, Agriwatch.

- International price of palm oils are showing mixed trend from April 2016.

Domestic future price of soyabean oil and Palm oil

Unit: Rs/Quintal

Table– 4: Soya bean oil future prices							
Contract Month	As on 16.03.17	Week ago 9.03.17	Month ago 16.2.17	3 Months ago 16.12.16	6 Months ago 16.09.16	Year ago 16.3.16	% Change over previous year
Mar-17	6528.5	6601.5	6666.5	7218	6506	6169	5.83
Apr-17	6341	6512	6615	7170	6511	6380	-0.61
May-17	6221	6458.5	6582	7198	6527	6436.5	-3.35

Source: National Commodity & Derivatives Exchange Limited

≠ Domestic future price for Crude Soya bean oil is expected to decrease over the previous year.

Unit: Rs/Quintal

Table– 5: Crude Palm oil future prices							
Contract Month	As on 16.03.17	Week ago 9.3.17	Month ago 16.2.17	3 Months ago 16.12.16	6 Months ago 16.09.16	Year ago 16.3.16	% Change over previous year
Mar-17	5286	5342	5495	5651	5360	5130	**3.04**
Apr-17	5135	5249	5410	5600	4944	5190	**-1.06**
May-17	5017	5190	5336	5667	5360	5168	**-2.92**

Source:Multi Commodity Exchange of India Ltd

≠ Domestic future price for Crude Palm oil is expected to decrease over the previous year.

International future price of soyabean oil and Palm oil

Unit: USD/Ton

Table– 6: Soya bean oil future prices							
Contract Month	As on 16.03.17	Week ago 9.3.17	Month ago 16.2.17	3 Months ago 16.12.16	6 Months ago 16.09.16	Year ago 16.3.16	% Change over previous year
May-17	*711.2*	*729.94*	*745.38*	*820.33*	*724.21*	*720.68*	**-1.32**
Jul-17	*717.38*	*735.9*	*750.67*	*824.3*	*727.08*	*725.75*	**-1.15**
Aug-17	*719.36*	*737.88*	*752.43*	*821.21*	*727.3*	*727.52*	**-1.12**
Sept-17	*721.12*	*739.86*	*753.75*	*816.36*	*727.3*	*729.5*	**-1.15**

Source: CME Soybean Oil Prices

≠ International future prices of Soya bean are expected to decrease over the last year.

Unit: USD/Ton

Table– 7: Palm oil future prices							
Contract Month	As on 17.3.17	Week ago 10.3.17	Month ago 17.2.17	3 Months ago 17.12.16	6 Months ago 17.9.16	Year ago 17.03.16	% Change over previous year
Apr-17	*661.75*	*641.72*	*663.9*	*697.58*	*620.01*	*641.44*	**3.17**
May-17	*646.08*	*624.86*	*643*	*688.64*	*627.02*	*650.56*	**-0.69**
June-17	*632.72*	*613.62*	*625.03*	*706.29*	*627.02*	*651.79*	**-2.93**

Source: BMD Malaysian Palm Oil Prices

≠ International future prices of Palm oil are expected to decrease over the last year.

11.1 Import Policy

Table-8: Import Policy			
HS Code	Item Description	Policy Conditions	Remarks
1507	Soya-bean oil and its fractions, whether or not refined, but not chemically modified		
1507 10 00	Crude, whether or not degummed	Free	
1507 90	Other:		
1507 90 10	Edible grade	Free	
1507 90 90	Other	Free	
1508	Groundnut Oil and its fractions, whether or not refined but not chemically modified		
1508 10 00	Crude	Free	
1508 90	Other:		
1508 90 10	Deodorized (Salad Oil)	Free	
	Other :		
1508 90 91	Edible Grade	Free	
1508 90 99	Other	Free	
1509	Olive Oil and its fractions, whether or not refined but not chemically modified		
1509 10 00	Virgin	Free	

1509 90	Other:		
1509 90 10	Edible grade	Free	
1509 90 90	Other	Free	
1510	Other Oils and their fractions, obtained, solely from olives, whether or not refined, but not chemically modified, including blends of these oils or fractions with oils or fractions of heading 1509		
1510 00 10	Crude oil	Free	
1510 00 91	Edible Grade	Free	
1510 00 99	Other	Free	
1511	Palm Oil and its fractions, whether or not refined, but not chemically modified		
1511 10 00	Crude	Free	Import not permitted through any port in Kerala.
1511 90	Other:		
1511 90 10	Refined bleached deodorised palm oil	Free	Import not permitted through any port in Kerala.
1511 90 20	Refined bleached deodorized palmolein	Free	Import not permitted through any port in Kerala.
1511 90 90	Other	Free	Import not permitted through any port in Kerala.
1512	Sunflower Seed, Safflower or Cotton Seed Oil and their fractions thereof, whether or not refined, but not chemically modified		
	Sunflower Seed or Safflower Oil and fractions thereof :		
1512 11	Crude Oil:		
1512 11 10	Sunflower Seed Oil	Free	
1512 11 20	Safflower Seed Oil (Kardi Seed Oil)	Free	
1512 19	Other:		
1512 19 10	Sunflower oil, edible grade	Free	
1512 19 20	Sunflower oil, non-edible grade(other than crude oil)	Free	
1512 19 30	Saffola oil, edible grade	Free	
1512 19 40	Saffola oil, non-edible grade	Free	
1512 19 90	Other	Free	
	Cotton Seed Oil and its fractions:		
1512 21 00	Crude Oil, whether or not gossypol has been removed	Free	
1512 29	Other:		
1512 29 10	Edible grade	Free	
1512 29 90	Other	Free	
1513	Coconut (Copra), Palm Kernel or Babassu oil and fractions thereof, whether or not refined, but not chemically modified		
	Coconut (Copra) oil and its fractions:		
1513 11 00	Crude oil		Import allowed through STC subject to para 2.11 of Foreign Trade Policy.
1513 19 00	Other		Import allowed through STC subject to para 2.11 of Foreign Trade Policy.
	Palm Kernel or Babassu oil and fractions thereof:		
1513 21	Crude Oil:		
1513 21 10	Palm Kernel Oil	Free	Import not permitted through any port in Kerala.
1513 29	Other:		
1513 29 10	Palm Kernel Oil and its fractions	Free	Import not permitted through any port in Kerala.
1513 29 20	Babassu Oil and fractions edible grade	Free	

1513 29 30	Babassu Oil and fractions, other than edible grade	Free	
1513 29 90	Other	Free	
1514	Rape, Colza or Mustard oil and its fractions thereof, whether or not refined , but not chemically modified		
	Low erucic acid rape or colza oil and its factions:		
1514 11	Crude oil:		
1514 11 10	Colza Oil	Free	
1514 11 20	Rape Oil	Free	
1514 11 90	Other	Free	
1514 19	Other:		
1514 19 10	Refined colza oil of edible grade	Free	
1514 19 20	Refined mustard oil of edible grade	Free	
1514 19 90	Other	Free	
	Other:		
1514 91	Crude oil:		
1514 91 10	Colza Oil	Free	
1514 91 20	Mustard Oil	Free	
1514 91 90	Rapeseed Oil	Free	
1514 99	Other:		
1514 99 10	Refined colza oil of edible grade	Free	
1514 99 20	Refined mustard oil of edible grade	Free	
1514 99 30	Refined rapeseed oil of edible	Free	
1514 99 90	Other	Free	
1515	Other fixed vegetable fats and Oils (including Jojoba oil) and their fractions, whether or not refined, but not chemically modified		
	Linseed Oil and its fractions :		
1515 11 00	Crude Oil	Free	
1515 19	Other:		
1515 19 10	Edible grade	Free	
1515 19 90	Other	Free	
	Maize (Corn) Oil and its fractions:		
1515 21 00	Crude oil	Free	
1515 29	Other:		
1515 29 10	Edible grade	Free	
1515 29 90	Other	Free	
1515 30	Castor Oil and its fractions:		
1515 30 10	Edible grade	Free	
1515 30 90	Other	Free	
1515 50	Seasame oil and its fractions:		
1515 50 10	Crude oil	Free	
	Other:		
1515 50 91	Edible grade	Free	
1515 50 99	Other	Free	
1515 90	Other:		
1515 90 10	Fixed vegetable oils, namely the following:Chulmoogra oil, Mawra oil, Kokam oil, Tabacco seed Oil, Sal Oil	Free	
1515 90 20	Fixed vegetable Oils, namely the following: Neem Seed Oil, Karanj Oil, Silk cotton Seed Oil, Khakhon Oil, Water Melon Oil, Kusum Oil, Rubber seed Oil, Dhup Oil, Undi Oil, Maroti Oil, Pisa Oil, Nahar Oil	Free	
1515 90 30	Fixed Vegetable Oils, namely the following : Cardamom Oil, Chillies/ Capsicum Oil, Turmeric Oil, Ajwain Seed Oil, Niger Seed Oil, Garlic Oil	Free	
1515 90 40	Fixed Vegetable Oils of edible grade namely: Mango Kernel Oil, Mahua Oil, Rice bran Oil	Free	

	Other:		
1515 90 91	Edible grade	Free	
1515 90 99	Other	Free	
1516	Animal or Vegetable fats and oils and their fractions, partly or wholly hydrogenated, inter-esterified, re-esterified or eladlnised, whether or not refined, but not further prepared		
1516 10 00	Animal fats and oils and their fractions	Prohibited	Not permitted to be imported
1516 20	Vegetable fats and oils and their fractions:		
	Cotton Seed oil :		
1516 20 11	Edible grade	Free	
1516 20 19	Other	Free	
	Ground nut oil:		
1516 20 21	Edible grade	Free	
1516 20 29	Other	Free	
	Hydrogenated Castor oil (opal wax):		
1516 20 31	Edible grade	Free	
1516 20 39	Other	Free	
	Other:		
1516 20 91	Edible grade	Free	
1516 20 99	Other	Free	

Source: Directorate General of Foreign Trade(DGFT)

11.2 Export Policy

At present, export of edible oils is prohibited*. The following exemptions are permitted from prohibition on export of edible oils:

a) Castor oil
b) Coconut oil from all EDI Ports and through all Land Custom Stations (LCS) on Indo-Nepal, Indo-Bangladesh, Indo-Bhutan and Indo-Pakistan borders.
c) Deemed export of edible oils(as input raw material) from DTA to 100% EOUs for production of non-edible goods to be exported
d) Edible oils from Domestic Tariff Area (DTA) to Special Economic Zones (SEZs) to be consumed by SEZ units for manufacture of processed food products, subject to applicable value addition norms
e) Edible oils produced out of minor forest produce, ITC (HS) Code 15159010, 15159020, 15159030, 15159040, 15179010 and 15219020.
f) 10,000 MTs of Organic edible oils per annum. The conditions notified in Notification No. 50 dated 03.06.2011 for export of organic edible oils will continue to apply.
g) Rice Bran oil in bulk.**

*i) *DGFT's* Notification No 22 (RE – 2013)/2009-2014 dated 18 June, 2013)

ii) Export of edible oils in branded consumer packs of upto 5 Kgs is permitted with a Minimum Export Price of USD 900 per MT *(vide DGFT's Notification No* 108 (RE–2013)/2009-14dated6th Feb, 2015)

iii) The prohibition will not apply to export of Peanut Butter, ITC (HS) Code 15179020.
(Source: DGFT)

** iv) Bulk export of rice bran oil *is allowed vide DGFT's notification no. 17/2015*-16 dt 6th Aug 2015.

11.3 Bound Duty, Standard Duty and Current Applied Duty

Table 9: Bound Duty, Standard Duty and Current Applied Duty				
HS Code	**Description**	**Bound Duty**	**Standard Duty**	**Current Applied Duty#**
15071000	Soya- bean Crude Oil	45	45	12.5
15079010	Soya- bean Edible grade	45	45	20
15081000	Groundnut oil crude	300	100	12.5
15089091	Groundnut edible Grade	300	100	20
15091000	Olive oil virgin	45	45	12.5
15099010	Olive Edible grade	40	40	20
15111000	Palm Crude Oil	300	100	7.5*
151190	Other refined palm oil	300	100	15*
151211	Crude sunflower-seed or safflower oil	300	100	12.5
15121910	Sunflower oil edible Grade	300	100	20
15131100	Crude coconut oil	300	100	12.5
15131900	Other coconut oil	300	100	20
15141120	Low erucic rape oil	75	75	12.5
15141910	Refined colza oil of edible grade	75	75	20
15149120	Crude mustard oil	75	75	12.5
15149920	Refined mustard oil	75	75	20
15149920	Refined rapeseed oil of edible grade	75	75	20

Source: DGFT, Department of Revenue, Government of India and World Trade Organisation (WTO)

applied duty on crude edible oil has been increased from 7.5% to 12.5% and on refined edible oil from 15% to 20% by Department of Revenue vide Notification No. 46/2014-Customs dated 17.09.2015.

*Current Applied Duty on Crude Palm has been decreased from 12.5% to 7.5% and on refined palm oil from 20% to 15% by Department of Revenue vide Notification No. 51/2016-Customs dated 23.09.2016.

Health News

Olive oil may offer diabetes protection

Oleic acid found to regulate insulin secretion and minimize blood sugar spikes. Oleic acid is found in olives and olive oil

Spanish scientists say increasing the amount of olive oil in your diet could reduce your risk of developing metabolic syndrome and type 2 diabetes.

Sergio Lopez and co-workers from the Institute of Fat in Seville studied the connection between different types of dietary fat and blood glucose control in humans with normal and high fasting triglycerides. They found that unlike other dietary fatty acids, oleic acid, which is found in olive oil, helps to regulate insulin secretion and minimise spikes in blood sugar levels after meals.

Insulin, a hormone produced by ß-cells in the pancreas, is released into the blood stream in response to elevated blood sugar levels after the ingestion of carbohydrate-containing foods. The effectiveness of cells to use insulin to reduce blood sugar levels is measured by postprandial insulin sensitivity.

The research showed that while saturated fatty acids such as palmitic acid, found in many common foods such as meat and dairy products, impaired postprandial ß-cell function and insulin sensitivity, oleic acid (a monounsaturated fatty acid) protected glycaemic control by optimising the pancreatic production of insulin and improving whole-body sugar use, leading to the immediate lowering of blood glucose levels after meals. The beneficial effect of oleic acid in promoting insulin sensitivity was highlighted, and it was found that high levels of palmitic acid increase the demand for insulin secretion and insulin resistance, a condition that is considered a predictor of ß-cell exhaustion and progression to diabetes in the long-term.

'This is an interesting study that clearly shows the importance of the type of dietary fatty acids in determining the insulin requirements and the insulin sensitivity to regulate glycemia,' explains Lucía Quevedo, an expert in dietary effects on insulin resistance from the National Polytechnic Institute in Mexico. The findings may be particularly beneficial to those who suffer from metabolic syndrome or type 2 diabetes, as elevated blood glucose levels and decreased insulin sensitivity are key features of these diseases.

Lopez's team hope to further the work by gaining a 'greater understanding of the postprandial phenomenon to develop better strategies for the prevention and management of metabolic diseases.'

Courtesy: Food Funct.

Trans fatty acid restrictions in NY linked to lower hospitalizations for MI, stroke

Hospitalizations for MI and stroke declined in New York 10 years after the implementation of trans fatty acid restrictions in eateries, according to findings published in JAMA Cardiology.

The restriction was enforced in bakeries, restaurants, cafeterias, caterers, senior meal programs, soup kitchens, mobile food-vending units and other establishments.

Data for MI and stroke hospitalizations for New York state from 2002 to 2013 were reviewed from December 2014 to July 2016. As the restriction was only executed in vastly urban counties, researchers compared those counties with counties without restrictions and similar urban settings. Eleven counties with restrictions and 25 counties without restrictions were analyzed.

To ensure that New York City did not guide the results, sensitivity analyses were performed. The primary outcome was a composite of stroke and MI event rates. Individual events of MI and stroke were the secondary outcomes.

Before the trans fatty acid restrictions were enforced, hospital admission rates were declining in New York. A significant decline was noted for hospitalizations for the primary outcome 3 or more years after the restrictions were enacted vs. counties without restrictions (–6.2%; 95% CI, –9.2 to –3.2), which equals to 43 events that were avoided for every 100,000 people.

According to the researchers, there was a significant decline in MI (–7.8%; 95% CI, –12.7 to –2.8), but the decline was not as substantial for stroke (–3.6%; 95% CI, –7.6 to –0.4). Men and women experienced similar results for secondary outcomes.

After sensitivity analyses for the removal of results from New York City, results remained unchanged.

The restriction on trans fatty acids was implemented when other health regulations were enforced, which may have also lowered hospitalizations for stroke and MI. In

New York City, smoking was banned in parks and beaches, and caloric information was required to be posted on food menus.

“However, our results remained significant for [Urban Influence Code 1] populations when excluding NYC from the analyses,” Eric J. Brandt, MD, clinical fellow at Yale University School of Medicine, and colleagues wrote. “As a result, it is unlikely that our results were confounded by the public health measures.” – by Darlene Dobkowski

PERSPECTIVE

Trans fatty acids have been blamed for adverse CV outcomes, including sudden cardiac death, increased risk for stroke and CHD. Trans fatty acids primarily enter the diet via partially hydrogenated oils, and the FDA has prohibited the unrestricted use of partially hydrogenated oils in all foods without prior approval by 2018.

The current retrospective observational study by Brandt and colleagues goes a step further by showing that by restricting the use of trans fatty acids in both large and small counties in New York State had beneficial effects on the primary discharge diagnosis of a combined endpoint of stroke and MI. It is of interest that this was mainly due to a statistically significant reduction in rates of MI. Although the trend of stroke reduction rate was in the right direction, it did not reach statistical significance. Similar was the case with total mortality rates.

The study has its limitations, as it was a retrospective observational study, and many of the unknown confounding variables could have accounted for these results. Also, the authors were unable to address the influence of restricting trans fatty acids from food in high-risk African American and Hispanic populations. It remains unknown if there is a link between intake of trans fatty acids and increased CV risk. One will need a very large, controlled, randomized outcome study to confirm these results. However, until such time, it seems prudent to restrict or warn patients regarding the use of trans fatty acids in foods. This could be akin to the recommended abstinence from smoking tobacco to improve public health, by reducing the incidence of adverse CV outcomes.

Courtesy: Healio, Cardiology Today

Time for an oil change? Next-gen fats and oils offer health-boosting options

The switch to the so-called tropical oils has led to the indsutry-wide adoption of palm oil, which has not been without its controversies.

Oils and fats that provide the taste and food qualities while providing a rich source of the ‘good’ fats is an ongoing issue that has resulted in a range of oils that have laid claim to being the ‘next big thing.’

The enthusiasm now is about what’s next. What fats and oils can contribute to agreeable food textures and mouthfeel along with longer shelf lives all at a competitive cost?

Industry guidelines designed to reduce exposure to trans-fats or partially hydrogenated oils (PHOs) found in baked goods, fried foods, chips and margarine were voluntarily adopted by European food makers around 2007.

The approach appears to have yielded better health outcomes but also more new-product innovation and progress that meets consumer health needs while maintaining taste expectations.

“The food industry has been searching for a replacement for palm and hydrogenated vegetable oils that maintains quality, taste and functionality and also meets their rigorous criteria for sustainable sourcing," said Mark Brooks, senior vice president of TerraVia, an algae-based food ingredients specialist based in San Francisco.

"We believe algae butter is a game changer for the structuring fats industry in terms of sustainability and nutrition."

Sustainably-sourced oil

The use of microalgae-based ingredients in food are by and large not new. Spirulina, a type of algae, has been used in juice drinks and in supplements for many years. In addition, the majority of infant formulas commercially available use algae oil as the source of their healthy fats.

Only last week TerraVia received a generally recognised as safe (GRAS) approval from the US Food and Drug Administration (FDA) for its algae butter.

TerraVia's product lines also include its AlgaWise brand - two oils created with either a high monounsaturated fat content or stability.

Although not currently approved in Europe, the firm said a novel foods application was being prepared for submission and was aiming to have a European Food and safety Authority (EFSA) approval by 2018.

Tropical oils

The differences of these oils, produced to address specific consumer needs, is both an opportunity and a challenge in assuring its adoption over more established oils in the marketplace.

Plant-based liquid oils such as olive and avocado oil as well as foods such as peanut butter, nuts and seeds continue to prove popular amongst consumers eager to switch to the healthier mono- or polyunsaturated fats.

The issue here is these oils are great for some applications, but not for others. Olive oil is naturally high in monounsaturated fat, but also high in polyunsaturated fats. This makes it suitable for light frying but its low shelf-stability makes it unsuitable for commercial baked goods.

The ongoing challenge now is to develop products with non-hydrogenated oils that combine the health benefits with product characteristics that consumers have come to expect.

Food makers have turned to the so-called tropical fats such as coconut, palm kernel or palm oil but these alternative oils can contain a high level of saturated fat up to 60%.

Fortunately, they can be successfully blended with other fats like canola (rapeseed) oil. The resultant product is the best of both worlds possessing a lower saturated fat content and the desired physical qualities.

It's not all good news though. Palm oil's use in food has been blighted with controversy with accusations of mass deforestation, illegal displacement of people from their land and violations of workers' rights amongst other malpractices.

Enter the soybean

So what are the alternatives? Late last year, news filtered through of a novel processing technology that prepares soybean oil without producing unhealthy trans-fats.

The method was said to improve on the traditional soybean oil hydrogenation process, which lessened the nutritional value by the formation of undesirable trans-fatty acids up to 45%.

Soybean oil has traditionally been the main vegetable oil used for hydrogenation due to its low cost, availability and longer frying time. Its susceptibility to turn rancid is perhaps its main drawback.

But with new advanced extraction and blending technologies, high-oleic soybean oil and stearidonic acid (SDA)-rich soybean oil have made their way into many existing foods without losing consumer acceptance.

Agrochemical and agricultural corporations Monsanto and DuPont have arguably made the most strides in this field.

Their products - DuPont's Plenish and Monsanto's Roundup-ready Vistive Gold - are the result of efforts to make soybean oil suitable for processed foods.

Likewise SDA-rich soybean oil aims to become a functional ingredient that can be added to a variety of foods, such as soups, sauces, beverages, yogurts and breads.

It is also said to be a more superior source of omega-3 fatty acid as they are more efficiently converted by the body into eicosapentaenoic acid (EPA) than the alpha-linolenic acid (ALA) omega-3s found in plant sources.

EU activity

The European Food Safety Authority (EFSA) gave a positive scientific opinion for Monsanto's MON 87769 × MON 89788 soybean crop back in 2015.

The crop, which had been genetically modified to contain SDA, was not considered by the Panel to impact on food safety.

Since then, more of Monsanto's genetically modified soybean varieties (MON 87708 x MON 89788) and (MON 87705 x MON 89788) have gained further approval.

Along with soybean FG 72 from Bayer's CropScience division, the rulings have paved the way for these soybeans to be included in food or animal feed, but not for planting within the EU region.

Courtesy: foodnavigator.com

Eating cheese does not raise risk of heart attack or stroke, study finds

Consumption of even full-fat dairy products does not increase risk, international team of experts says.

Consuming cheese, milk and yoghurt – even full-fat versions – does not increase the risk of a heart attack or stroke, according to research that challenges the widely held belief that dairy products can damage health.

The findings, from an international team of experts, contradict the view that dairy products can be harmful because of their high saturated fat content. The experts dismiss that fear as "a misconception [and] mistaken belief".

The results come from a new meta-analysis of 29 previous studies of whether dairy products increase the risk of death from any cause and from either serious heart problems or cardiovascular disease. The study concluded that such foodstuffs did not raise the risk of any of those events and had a "neutral" impact on human health.

"This meta-analysis showed there were no associations between total dairy, high- and low-fat dairy, milk and the health outcomes including all-cause mortality, coronary heart disease or cardiovascular disease," says the report, published in the European Journal of Epidemiology.

Ian Givens, a professor of food chain nutrition at Reading University, who was one of the researchers, said: "There's quite a widespread but mistaken belief among the public that dairy products in general can be bad for you, but that's a misconception. While it is a widely held belief, our research shows that that's wrong.

"There's been a lot of publicity over the last five to 10 years about how saturated fats increase the risk of cardiovascular disease and a belief has grown up that they must increase the risk, but they don't."

However, the government's health advisers urged consumers to continue to exercise caution about eating too many products high in saturated fat and to stick to low-fat versions instead.

"Dairy products form an important part of a healthy balanced diet; however, many are high in saturated fat and salt. We're all consuming too much of both, increasing our risk of heart disease," said a spokesman for Public Health England. "We recommend choosing lower-fat varieties of milk and dairy products or eating smaller amounts to reduce saturated fat and salt in the diet."

Givens and colleagues from Reading, Copenhagen University in Denmark and Wageningen University in the Netherlands analysed 29 studies involving 938,465 participants from around the world undertaken over the last 35 years, including five done in the UK.

"No associations were found for total (high-fat/low-fat) dairy and milk with the health outcomes of mortality, CHD or CVD," they said. In fact, they added, fermented dairy products may potentially slightly lower the risk of having a heart attack or stroke.

Doctors, public health experts and official healthy eating guidelines have for many years identified saturated fats as potentially harmful for heart and cardiovascular health and advised consumers to minimise their intake.

That has led to consumers increasingly buying lower-fat versions of dairy products. For example, 85% of all milk sold in the UK is now semi-skimmed or skimmed.

Givens said consumers were shunning full-fat versions of cheese, milk or yoghurt in the mistaken view that they could harm their health. Young people, especially young

Apricot Kernel Oil

Apricot kernel oil is obtained from the kernels (seeds) of Apricots. After eating these delicious fruits, the seeds are used to make this light oil. Apricot kernel oil is great for use as a massage oil as it is very light and makes the skin soft. Apricot kernels themselves are quite healthy and are being researched for a number of health conditions including cancer. Apricot kernel oil is quite similar to almond oil and its applications are also similar. This oil has a deep, nutty flavor which makes it an excellent ingredient for desserts and other recipes.

Apricot kernel oil is extracted from seeds of Apricot (Prunus armeniaca). Apricots are native to Armenia, although it is believed that Apricots may have originated in China. The fruit is widely cultivated in Mediterranean and Central Asia. The largest producer of Apricots is Turkey. The seeds of apricot have a high percentage of oil. It is quite possible that this seed has been used to extract oil since ancient times. Apricot kernel oil has been mentioned in TCM (Traditional Chinese medicine) where it is used for treating tumors and ulcers. This use of apricot kernel spread far and wide with time and was used for this purpose in England in 17th century. Apricots themselves are great for a number of conditions. Eating just a few dried apricots can alleviate constipation because of the high fiber content in them.

There are two types of Apricot kernel oil.

- Cosmetic only – This variety is only meant for topical application.
- Edible – This variety can be used like sweet almond oil in cooking.

Production

The oil can be obtained from kernels using solvent extraction or cold pressed method. Cold pressed is better as it does not alter the chemical compounds in the oil. One should go for organic, high quality apricot .

Properties

Apricot kernel oil possesses many therapeutic properties which make it suitable for its various uses.

- Emollient – Apricot seed oil is a brilliant emollient (moisturizer).
- Anti – Inflammatory – It reduces inflammation when applied topically or when ingested.
- Anti-Aging – It provides nutrition and support to the skin so that aging is reduced.
- Anti – Bacterial – This effect is made use of to treat clothes and other products to keep bacteria away.
- Anti Septic – reduces risk of infection in open wounds and cuts.
- Antioxidant – prevents the skin from damage by free radicals.

Color, Taste and Aroma

Apricot kernel oil is generally light yellow in color. It can also be slighter darker yellow depending on the variety of apricots and the extraction process. There is a slight nutty aroma in this oil. The taste is nutty, somewhat like almonds. It is ideal for making confections like marzipan.

Health Benefits

Apricot kernel oil can be use for a variety of personal uses and many home remedies. It is also used in alternative medicine for treatment of cancer, although it has not been proved.

1. Apricot kernel oil for Skin

Apricot kernel oil is good for people with sensitive skin. It is non-irritant and soothing for the skin. It is light and quickly makes the skin soft and smooth. Apricot oil percolates deep into the skin. It is easy to apply on the skin as it quickly spreads on the skin. It soothes irritated skin. A massage with apricot kernel oil is good for dry, parched skin. One can use it after a shower to seal the moisture into the skin. Since it is light, it does not feel too oily. Once it is absorbed into skin, it provides moisturization for a long time.

Apricot kernel oil is one of the best carrier oils for massage. It penetrates nicely into the skin and also improves the delivery of essential oils and other herbal agents. This oil is also good for infusing with herbs and absorbing their essence. It can be utilized for various kinds of massage that require an oil.

2. Apricot kernel oil for Hair

Apricot oil is loved by many people around the world for their hair care. When applied to the hair shafts,it helps to detangle hair. These are the health benefits that organic apricot oil provides to hair.

- It promotes hair growth because of the nutrients in it, especially Vitamin E.
- It reduces dry scalp problems.
- It helps to achieve gorgeous shiny hair without any greasiness.
- When used as a hot oil treatment, it conditions the hair and provides them nutrition.
- It softens the hair, so that they are more manageable and easily combed.

3. As an Under Eye Cream

Apricot oil can be applied just like almond oil for healing under eye skin. It aids in reducing dark circles, puffiness and helps to strengthen the skin around this region. With regular application of apricot kernel oil, one can reduce the appearance of fine lines and wrinkles around the eyes.

4. Face Oil

Apricot kernel oil is a nice face oil, especially when compared to other heavier oils. It helps to improve skin tone, nourish the skin and lower the appearance of aging signs, like wrinkles, lines and blemishes. However, this oil should be avoided by people who are suffering from acne or are prone to acne. That is because it has a comedogenicity of 2. This means that the oil is mildly comedogenic and it can clog skin pores. This may result in acne breakouts and blackheads.

5. Heart Health

Consumption of apricot kernel oil can be healthier for the heart and the cardiovascular system. This oil has demonstrated ability to lower the risk of myocardial infarction (heart attack) in rats and can possibly perform the same function in humans . One can take apricot oil in food as a salad dressing and by using it for cooking certain recipes that go well with the flavour of this oil.

6. Carrier Oil

According to Phyllis Balch, certified nutritional consultant and author of the book "Prescription for Nutritional Healing," apricot oil provides a prime option for use as a carrier oil in aromatherapy. When using apricot oil topically, you can blend it with multiple different essential oils, including lavender, chamomile, rose, lilac, jasmine and ylang-ylang to create a pleasing yet mild massage oil. Balch recommends 25 drops of essential oil per 2 oz. of apricot oil for use in massages for adults.

Apricot oil is great for use in homemade skin care products like facial toners, scrubs, dry and wet shampoo and exfoliants.

Uses

Besides its use as a healing agent and a home remedy for skin care, apricot kernel oil has many more uses. It is used in some recipes where it really brings out better flavor. However it is generally used only as a salad dressing on a regular basis. Moreover, it has also got some industrial applications.

1. Apricot kernel oil for making Soap

Apricot oil is used as an ingredient in soaps. One can use it in home made soap recipes to have a lesser oily and slippery oil. It makes a nice base oil for the soap, in combination with coconut oil and palm oil, which are very common in soap making. Apricot oil adds a slight nutty aroma to the oil. It is also a good carrier for essential oils which are used in soap making like lemon essential oil, lavender oil and jasmine essential oil.

2. Production of Biodiesel

Apricot kernel oil is being evaluated for its potential to generate biodiesel and the results so far look good. Especially the oil from wild apricot varieties can be used for this purpose.

Side Effects, Safety and Toxicity Issues

Apricot kernel oil is generally safe to use topically. However, when used internally, there is one thing to note. Apricot kernels contain a substance called amygdalin. This is converted by the body into cyanide, which is poisonous. This can lead to respiratory failure and may even be fatal.

Amygdalin is usually removed from oil products. This is done to ensure that the oil product contains much less amygdalin than the safety limit. This is the case with almond oil, apricot oil and peach oil. However, one should be absolutely sure that the oil product has been processed to remove this poisonous substance.

Interactions

There is currently no information about the interactions of apricot oil with medication or other herbal products.

Nutritional and Medicinal Information

Apricot kernel oil is quite nutritious and it borrows its nutritional value from apricot kernels. Apricot oil is great for heart health as it contains mostly unsaturated fats. If taken in small amounts, one can expect to have cardiovascular health benefits and it may also help in lowering blood cholesterol levels, like other oils that are rich in unsaturated fats.

All the nutrition data is for 100 gm of apricot kernel oil.

Fatty Acid profile of Apricot kernel oil

The most important part about nutrition of any oil is its fatty acid profile, that is the fats that it contains. Apricot kernel oil is rich in oleic acid and linoleic acid. This is a breakdown of the fatty acids present in apricot kernel oil.

100 gm of apricot oil contains :

- Saturated fatty acids – 6.3 gm
- Monounsaturated fatty acids (MUFA) – 60 gm
- Polyunsaturated fatty acids (PUFA) – 29.3 gm

This shows that overall apricot kernel oil is very healthy heart wise. It has a very small amount of saturated fats.

Fatty Acid Profile : Apricot Kernel Oil

Nutrient	**Percentage**	**Property**
Gamma Linoleic Acid (18:3)	–	PUFA
Stearic Acid (18:0)	0.5 %	Saturated fat
Palmitic Acid (16:0)	5.8 %	Saturated fat
Palmitoleic Acid (16:1)	1.5 %	MUFA
Oleic Acid (18:1)	58.5 %	MUFA
Linoleic Acid (18:2)	29.3 %	PUFA
Alpha Linolenic Acid(18:3)	–	PUFA
Erucic Acid (22:1)	–	MUFA
Gadoleic Acid (20:1)	–	MUFA
Behenic Acid (22:0)	–	Saturated fat
Arachidic Acid (20:0)	–	Saturated fat

(Source: USDA)

From this data on the fatty acid nutritional value of apricot kernel oil, we infer that the oil is rich in omega – 9 (oleic acid) fatty acid. This is mainly responsible for the oil's powerful emollient property. The oil is also rich in omega – 6 (linoleic acid). This makes it important to have omega sources in diet to match up with the omega 6 intake. This is important because our body needs a healthy ratio of omega – 3 to omega – 6 fatty acid in order to keep inflammation in check.

Besides healthy fats, apricot kernel oil is also rich in one particular nutrient, Vitamin E. 100 gm of apricot kernel oil provides about 20 % of RDI of Vitamin E.

Complete Nutritional Profile : Apricot Kernel Oil

Nutrient	Value	Percentage
Energy (Calories)	884	44%
Carbohydrates	0	0
Proteins	0	0
Fats	100	100%
Dietary fiber	0	0
Cholesterol	0	0
Sugars	0	0
Vitamins	Value	Percentage
Vitamin A	0	0
Thiamine (B1)	0	0
Riboflavin (B2)	0	0
Niacin (B3)	0	0
Pantothenic Acid (B5)	0	0
Pyridoxine (B6)	0	0
Biotin (B7)	0	0
Folic Acid (B9)	0	0
Vitamin B12	0	0
Vitamin C	0	0
Vitamin D	0	0
Vitamin E	4 mg	20%
Vitamin K	0	0
Electrolytes	Value	Percentage
Potassium	0	0
Sodium	0	0
Minerals	Value	Percentage
Iron	0	0
Calcium	0	0
Magnesium	0	0
Phosphorus	0	0
Zinc	0	0
Manganese	0	0
Copper	0	0
Selenium	0	0
Micro-Nutrients	Value	Percentage
Phytosterols	266 mg	–
Caffeine	0	–
Theobromine	0	–

(Source : USDA)

Chemical properties of Apricot Kernel Oil

Besides the nutrients, there are some chemical properties of an oil which are of great significance. They tell us about the broad chemical behavior of an oil. One of the most important of such properties is ORAC (oxygen radical absorbance capacity). It is a measure of how many oxygen free radicals a substance can mop up, which is equivalent to its antioxidant power.

Chemical Properties : Apricot Kernel Oil

Nutrient	Percentage	Property
Density	0.910 g/ml	great for massage oil
Storage temperature	–	Ideal temperature for storage
Comedogenicity	2	Pore clogging potential (0 – 5)
ORAC	–	Antioxidant Power
pH	4.3	Measure of Acidity
Peroxide Value	less than 0.1	Measure of Initial Rancidity
Saponification Value	191.4	Measure of the average carbon chain length
Iodine Value	107	Measure of unsaturation of oil
Free Fatty Acids	0.015 %	Percentage of volatile oils

(Source : USDA)

Buying and Storage

Before buying apricot kernel oil, one should make sure that the oil conforms to the safety standards regarding amygdalin and other such compounds. The healthiest variety of oil is the cold pressed, organic oil. This oil is quite sensitive to light and heat and can get rancid quickly. Such a change is usually easily noticed in the taste of the oil. However, one should always keep this oil in a cool environment, away from light. The shelf life of this oil varies from 6 months to a year, which is low. If it is kept refrigerated, the shelf life increases.

Laugh Out Loud

● **Never Joke with an Engineer :**

Engineers Can Prove Anything For **10 Marks**

Question : **Prove : PAPA = MAMA.**

Medical Doctor : **"Out Of Course"**

Chartered Accountant: **"No Way"**

Barrister: **"Cannot Be Proven"**

Social sciences: **"Not in this world,"**

but…..

Engineer: **It's a Simple Solution**

As we know,

Pressure(P)= Force/Area

i.e. P = F/A,

F = PA ························ (i)

Now, aacording to Newtons 2nd law of Motion, Force(F) = Mass(M) × Acceleration (A)

i.e. F =MA ···················(ii)

From equation (i) and (ii)

PA = MA

Squaring both sides

$(PA)^2 = (MA)^2$

PAPA = MAMA

● An astronaut in space was asked by a Reporter, " How do you feel"?

How would you feel, the Astronaut replied, "If you were stuck here on top of 20,000 parts each one supplied by the lowest bidder ".

● An Engineer was mistakenly thrown to hell. On getting there he noticed that things weren't comfortable for him and made certain changes by installing Air conditioning system and others. Another day God asked Devil , how is hell over there?. Hell is Fine and I am enjoying this Engineer who has done lot of changes here. God asked devil to send back the Engineer as it was mistakenly send to hell.

No, I won't I love having Engines on board, replied the Devil

● Q.--What is the simplest way to observe the Opticle Doppler Effect ?

A.--Go out and look at the moving cars during night. The lights of the ones coming towards you are white while the lights of the one moving away from you are Red.

● Q. Why it is so easy to stay awake until 6 am but so hard to wake up at 6am ?

A. Things in motion tend to stay in motion while things at rest need more Force to get into motion

● The Optimist sees the glass half full. He pessimist the glass half empty. The Chemist sees the glass completely full. Half with water and half with air.

● So Oxygen went on a date with Potassium today.

It went OK

I thought Oxygen was dating with Magnesium ….. OMg.

Actually Oxygen first asked Nitrogen, but Nitrogen was all like NO.

I thought Oxygen had that double bond with the Hydrogen the twins--- H2O

● I had to make these bad chemistry jokes because all good ones 'ARGON'

Member's PAGE

INDIRECT COMMERCIAL USES OF OILS AND FATS

The significance of any food product to our diet depends on its total consumption. The Oil and Fat in our diet requires not only for eating pleasure but mainly for its nutritional advantage of its highly Caloric Energy.

As one gram of Oil /Fat provide 9kcal Energy.

Edible Oil and Fats for human consumption are used widely in two forms :-

1 Liquid Oils prepared from Vegetable Oils that are Refined , Bleached , Deodorised, Winterised and Interesterfied.

2 Plastic Fats, such as Butter, Salad Dressing, confectioner's coating, Shortening and Margarines etc. In this category a wide variety of Oils and Fats have commercial uses .

A) BISCUITS AND PASTRY :

The Major component of these products are Flour, Fat and Sugar in various proportions. The eating properties , texture of Biscuits Pastries made, varied over a wide range.

B) PUFF PASTRIES :

The property of Fat in Puff pastry is very important as Fat does not mix into dough during process. It must be very resistance to work softening as a high degree of Plasticity is required. Palm Oil , Palm stearin are suitable for pastry margarine.

C) CAKES :

shortening is used in cake manufacturing preferably for two important functions. Firstly they enable Air to be incorporated in the butter and secondly they contribute to the tender 'shore' each eating quality of baked cake.

D) IMITATION CREAM:

These are made by homogenizing an emulsion of vegetable Fats in skimmed milk with added sugar. By selection of selected fat ,this cream has greater stability then Real Cream.

E) ICE CREAM :

It is made from an emulsion of Fat with milk portions and added sugar. The fat may be butter fat or vegetable oil. The rigid structure of Ice cream is formed on freezing and partly linking of fat globules.

F) FILLER FAT SHORTENING :

The manufacture of sandwiches and wafers requires a filler mixtures between the cookies and wafers. The mixtures is composed of 1/3 shortening and 2/3 finally ground sugar with suitable flavours added.

G) SNACK SPRAY FATS:

This is very popular type of fat used by the snack industry for spraying on snacks crackers to improving eating quality and glossy surface appearance. The oil must possess two important qualities, Good oxidative stability and low melting point to avoid a very waxy -greasy feel and dull surface appearance.

H) COATING FATS :

These are hard butter, as substitute for cocoa butter, and imitation dairy products. These are made from combination of Soyabean Oil and small quantity of Cotton Seed Oil with special hydrogenation techniques.

I) FLUID SHORTENING :

These covers for frying and baking products and are removed from the traditional plastic or semisolid products . These consist of hydrogenated Soybean Oil which is added with hard emulsifiers. This fluid shortening has distinct advantage of being pourable at room temperature and can be used for frying or for bread baking.

J) BUTTERS:

All butters/ Margarines are water in oil emulsion, margarines and spread contain added emulsifiers, such as Lecithin, Mono Diglycerides to aid in emulsion preparation. Butter in contrast contains milk fat, lecithin and natural Emulsifier.

K) BREADS AND ROLLS:

The primary function of Fat or Oil is lubrication. In the expansion of dough and improves dough handling during sheeting and moulding are needed for proper slicing.

CONCLUSION :- Hence Oil and Fat , now a days are widely utilized for other than deep frying for different types of Spreads , Margarines, Shortenings, Butters, as per consumer choices for bread and bakery products.

M.C Pandey

Joint Secretary

OTAI (N.Z)

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All Correspondence to:
C. S. Joshi, Editor, LIPID UNIVERSE
C/o FARE LABS Pvt. Ltd., L-17/3, DLF Phase-II,
IFFCO Ckowk, M. G. Road, Gurgaon-122002, Haryana, INDIA
Phone : +91-124-4034205
Telefax : +91-124-4036038
E-mail : lipiduniverse@gmail.com
: csjoshi@farelabs.com
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Telefax : +91-124-4036038
E-mail : lipiduniverse@gmail.com
: csjoshi@farelabs.com

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