LIPID UNIVERSE

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Lipid based Antioxidants in Food : An Overview

Lipids and Nanotechnology

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Health Tips

Published by : Oil Technologists' Association of India (North Zone)

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Editor's desk

The oil seeds are rich source of plant based protein. For a country like India consumption of oil seeds can be an important source of calories and protein in food. The consumption of seed as whole should be encouraged so that it can supply oil and protein both. Though more and more groundnut is being consumed directly but same is not in case of soya bean. Consumption of whole soya bean can be a good start.

The de oiled cake is being used either for cheap export or is being used for poultry feed production. It can be more useful if used as a source of protein. Protein isolate from de-oiled cake of soya bean, sunflower, mustard seed can be of great use. These protein rich de-oiled cakes can be converted into dal analogues (e.g. Soya dal analogue), which will help in reducing our dependence on import of pulses. For this no new method is required and can be achieved by slightly changing the available technologies. Encouragement from Government agencies and the organizations working in the field is required.

Our country produces plenty of grains and we are exporting the same at very competitive rates in international market. There is requirement of some mechanism that encourage grain producer to shift to oil seed production. Technology Mission on oil seed has done good job in the past, needs to be revived with new determination and foresightedness. With change in approach and determination, India can considerably reduce its dependence on import.

Yours truly,

C. S. Joshi, Editor

Oil Technologists' Association of India
(North Zone)

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Lipid based Antioxidants in Food : An Overview

(Swapnil G. Jaiswal, S. V. N. Naik*
Center for Rural Development and Technology, IIT, Delhi)

Antioxidant is any substance that when present at low concentrations as compared with those of an oxidizable substrate (such as lipid, proteins, DNA or carbohydrate), significantly delays or prevents oxidation of that substrate. This is the standard definition of antioxidants described by Halliwell and Guteredge in the book entitled Separation, Extraction & Concentration Processes in the Food, Beverage and Nutraceutical Industries. Oils and fats are the major part of the human diet in the form of food or food ingredient but many times these food ingredient contain unsaturated fatty acids that are quite susceptible to quality deterioration under oxidative stress. Hence addition of antioxidant in food or vegetable oil (more unsaturated fatty acids) is the best strategy to retard the oxidation and used as preservative. Many studies have revealed that antioxidants may play important role in preventing the diseases caused by free-radicals. With evolving health consciousness in the consumer, well-being food and health food is the new trend that has caught the attention of food processors and scientists equally. This has led to incorporation of antioxidants in foods from various sources (plant, animal, chemical).

Antioxidants: global scenario

The survey carried out by food marketing institutes (2011) on "shopping for health" shows that antioxidants are among the top five health components that U.S. consumers want in their food products. "Mintel also reported that new product launches in the category of antioxidants (food & food supplements) increased by about 10% between 2010 & 2011." A report from market analysts revealed that consumer pressure and revised legislation is causing a shift in antioxidant trends. From the year 2000 to 2009, the €15 million, total European antioxidant market was estimated to grow merely by 1.7 per cent; while a compound annual growth rate of 35% was foreseen for natural antioxidants. But today's report for antioxidant market revealed that natural antioxidants have 50% more market than synthetic antioxidants and that the food and beverage market for antioxidants is a $500 billion industry that is growing at 5-7% per year up to 2015.

Lipid oxidation

Fats contained in food are chemically composed of triglycerides and oxidation leading to the rancidity of foods occurs at the unsaturated sites of the triglycerides. This lipid based food also contain lipid soluble vitamins and other nutrients and their deterioration can lead to decreased palatability, destruction of nutrients and formation of toxic compounds. Antioxidants helps to prevent these negative developments. The reaction causing the oxidation of these unsaturated sites is an auto-catalyzed radical chain reaction consisting of three steps: initiation, propagation and termination.

- Initiation : In the first stage of this reaction free radicals attacks on the lipid molecule and forms free fatty acid radicals.

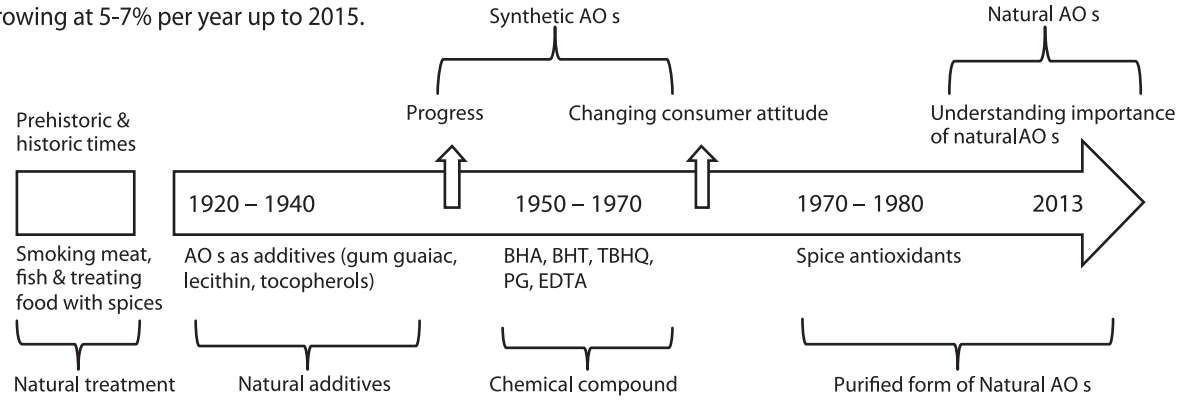
  $$RH \rightarrow R\bullet + H\bullet$$

  Factors responsible for formation of free fatty acid radicals are heat, light, metal ions, pigments, degree of unsaturation.

- Propagation : Fatty acid radicals react readily with oxygen to form peroxides. Peroxides react with other fatty acids to form hydro peroxides and new fatty acid radicals.
  Peroxides : $R\bullet + O2 \rightarrow ROO\bullet$.....(1)
  Hydro peroxides : $ROO\bullet + RH \rightarrow ROOH + R\bullet$.....(2)

- Termination : The propagation can become a runway process unless it is stopped by antioxidants. Otherwise it is terminated when fatty acids are not available and peroxides combine to form inactive products.
  $R\bullet + R\bullet \rightarrow RR$….....(3)
  $R\bullet + ROO\bullet \rightarrow ROOR$.....(4)
  $ROO\bullet + ROO\bullet \rightarrow ROOOOR$.....(5)
  $ROO\bullet$ + phenol (H) $\rightarrow ROOH$ + phenol•……(6)

Key developments in antioxidants (AO s)



Touchstone of antioxidants for food

- Inexpensive
- Nontoxic
- Effective at low concentrations
- Compatibility with the food
- Stable in the finished products
- No change in the color, odour, taste and other characteristics of the food
- Good thermal stability
- Good synergism

Sources of natural antioxidants

Source	Antioxidant constituents
Spices & Herbs	Flavonoids, phenolic acids, coumarins
Teas	Catechins and other condensed tannins
Fruits & vegetables	Ascorbic acids, flavonoids, carotenoids, hydroxylated carboxylic acids
Cereals & grains	Flavonoids, phenolic acids, esters, lignans, sterols
Oils & oilseeds	Tocopherols, lignans, flavonoids, phenolic acids, phospholipids
Legumes	Isoflavonoids, phenolic acids
Proteins & protein hydrolysates	Amino acids, peptides, carnosine, malliard reaction products

Health benefits

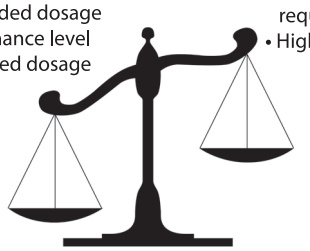
- Support and improve immune power of the body
- Anti-inflammatory, anti-aging, anti-cancer
- Preventing oxidation of LDL (bad cholesterol) and reduce risk of cardiovascular disease.
- Improve functions of reproductive and nervous systems.
- Improve quality of sleep.
- Offer protection against digestive disorders.
- Reduce obesity and protect liver.
- Maintain good dental health.

Types of antioxidants

Depending on the availability & preparations antioxidants are classified into two group's namely natural and synthetic antioxidants.

Natural Antioxidant
- Phenotic compounds
- No health hazards
- No recommended dosage
- Lower performance level at recommended dosage

Synthetic Antioxidant
- BHA, BHT, TBHQ
- Carcinogenic, toxic
- Recommended dosage required (0.01-0.02%)
- Higher performance level



The use of antioxidants in food products is governed by regulatory laws of the individual country or by internal standards. Even though many natural and synthetic compounds have antioxidant properties, only a few of them have been accepted as generally recognized as safe (GRAS) substances for use in food products by international bodies such as the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and the European Community's Scientific Committee for Food (SCF).According to PFA, BHA, NDGA, hydroquinone, citric acid, ascorbylpalmitate have gained legal sanctioned. From these, the legal permissible limit of synthetic antioxidants (BHA, BHT, TBHQ and PG) for different food products are mentioned in Table 1.

Table 1. Legal permissible limit of synthetic antioxidants in oil and fat based products

NAME	TALLOW	LARD	EDIBLE OIL/FAT	MARGARINE/BAKERY/ FAT SPREAD/ INDUS -TRIAL MARGARINE
Antioxidants	ppm	ppm	ppm	ppm
BHT	200	200	200	200
BHA	200	200	200	200
TBHQ	200	200	200	200
Propyl gallate	100	100	100	200

(Source : The Food Safety and Standards Act, Rules and Regulations, 2011)

Natural antioxidants as a preservative

Ascorbic acid and tocopherol are the most important commercial natural antioxidant as well as several other naturally occurring phenolic antioxidant have been identified as in plant sources and vegetable extracts that may lend themselves for use in a variety of food applications. Tocopherols and tocotrienols, collectively known as tocols, are monophenolic and lipophilic compounds that are widely distributed in plant tissues. The main commercial source of natural tocopherols is the soybean oil. They are soluble in vegetable oils but insoluble in water. Tocotrienols have a stronger antioxidant effect on lipid oxidation than tocopherols.

They function as a free radical terminator in autoxidation reactions, and often used in food products deficient in natural antioxidants, such as animal fats, waxes, and butterfat. Tocopherols act synergistically with ascorbic acid, citric acid, and phospholipids. In the study of sardine oil model system which was carried out by the scientist of department of food science and technology, Tokyo University of fisheries for sardine oil preservation. The research findings showedα- tocopherol – rosemary mixture (0.05% + 0.02%) had strong antioxidant activity. The mixture delayed the sardine-oil system oxidation five days longer than either α- tocopherol or rosemary extract alone, and its antioxidant activities was comparable to BHA.

Carotenoids are yellow, orange, and red lipid-soluble pigments that occur widely in plants, fruits, and vegetables and can be classified as carotene and xanthophyll. Carotenoids are antioxidant nutrients that act mainly as secondary antioxidants in foods by quenching singlet oxygen. Carotenoids are a good synergist with tocopherols.

Phospholipids are a new and essential type of oil component participating in the excellent oxidative stability of edible Argan oil, in addition to the Maillard-reaction products, phenols, and tocopherols.

Some of the natural components which are added to dairy products like ice cream, flavoured milk etc., during processing or after processing are proved to be as antioxidants such as amla (Indian gooseberry) juice, aromatic herbs (rosemary, sage, fennel and rue), betel, curry and drumstick leaves, mango seed kernel, onion skin extract, tulsi (Indian sacred basil) leaves, sorghum grain powder, orange peel and black cumin, ragi powder, soybean seed phospholipids.

Kirby C. J. and his workmates investigated the methods of microencapsulating ascorbic acid with liposomes as another way to increase its stability and availability as an antioxidant in food systems.

Another possibility is to use natural food ingredients such as spices. More pungency of gingerol (ginger), gives strong pungent aroma to the food, but synergism action of natural antioxidants is very helpful to minimize perceptible aroma or flavour. Ginger extract gives satisfactory results in protecting processed, cooked and frozen beef sausages against lipid oxidation.

Curcumin, antioxidant constituent of turmeric is listed for use in dairy products, oils and fat emulsions, edible spices, fruit and vegetable products, confectionery, cereal products, bakery wares, meat and meat products, fish and fish products, eggs and eggs products, spices, soups, sauces and protein products, foodstuffs intended for particular nutritional uses, beverages, ready-to-eat savouries and composite foods. As per the FAO, permissible level of curcumin are in the range from 5 to 500 mg/kg depending on the food category. Another food ingredients includes cereals, nuts, fruits and vegetables because they are regarded as safe and no special approval is required for their application.

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Trade News

European Parliament put cap on use of bio fuels

The European Parliament voted on draft legislation September 11, calling for a cap on first-generation bio fuels and a swift transition second-generation renewable fuels.

A press release published by the European Commission specifies the Members of European Parliament (MEPs) voted to place a 6 percent cap on first-generation bio fuels used to meet renewable transportation goals through 2020. The Renewable Energy Directive requires renewable energy to account for at least 10 percent of transportation fuel by 2020.

According to the REA, the 6 percent cap is higher than the 5.5 percent cap the Environment Committee proposed, but lower than the 8 percent the bio fuels industry lobbied for. A specific 2.5 percent target for advanced bio fuels, double-counting for bio fuels made from cooking oil and tallow and a 7.5 percent limit on ethanol in gasoline blends were also approved, said the REA in a statement. In addition, the MEPs voted to keep accounting for indirect land use change (ILUC) factors.

Clare Wenner, head of renewable transport at the REA said the future investments in the bio fuels industry are likely to remain on hold following the vote to cap the use of bio fuel. ePURE, the European renewable ethanol association, said that the vote has put the future of jobs and growth for the bio fuels industry under pressure.

Edible oil Industry in China : Analysis & Trends

The Cooking Oil Production industry in China expanded rapidly in recent years, mainly due to increased industry capacity and high levels of domestic demand. With the country's change in economic focus from exports to domestic demand and the increase of living standards, cooking oil consumption in China is expected to maintain a rigid growth trend. ACMR-IBIS World expects industry revenue to total $171.1 billion in 2013, up 17.3% for the year. Over the past five years, revenue has been growing at an analysed rate of 16.3%.

In 2011, China's edible vegetable oil output registered 43.319 million tons, rising by 19.6% from the year earlier; the apparent consumption reached 49.767 million tons, up 8.3% YoY; and the revenue increased by 27.9% YoY to RMB735.06 billion.

The small-package cooking oil segment accounted for 15.0% of total industry revenue in 2008 and its share has been increasing rapidly in recent years. Arawana, Fortune and Luhua are the top three brands in China and together they account for 60.0% of market.

Due to the scarcity of raw materials, rising costs, and the government's restriction on product prices for social stability, the gross margin of Chinese edible vegetable oil industry is merely 7.9%-9.1%. Affected by this, enterprises with weaker cost control abilities are exposed to losses even bankruptcy, while those advantageous in raw materials and brand channels benefit. In 2011, small-n package edible oil market share of Yihai Kerry Group, COFCO and Shandong Luhua Group reached 50%, 15% and 8% respectively, and Chinese edible vegetable oil industry presented an oligopolistic competition pattern.

Record production of Sunflower Seed, Rapeseed

As per the Oil World estimate, global production of sunflower seeds may register substantial growth from last year's production. This will happen because of improved crops production from Canada to Russia. At the same time Palm oil supplies will also improve.

Sunflower seed production may be a record 40.2 million metric tons, 13 percent larger than last year. And global production of rapeseed and canola may reach an all-time high 67.7 million tons in the 2013-14 season, including 21.01 million tons from the European Union and 16.5 million tons in Canada.

Rising production for everything from corn to canola this season sapped crop prices globally, with rapeseed prices on NYSE Liffe in Paris sliding 17 percent since Jan. 1. The sunflower seed production forecasts for Russia and Ukraine rose by a combined 500,000 tons, The output in the world's top two growers probably will reach a record 19.1 million tons, even though excess rain slowed harvesting in recent months.

The "sunflower complex continues to be the weakest member of the global oil seed balance thanks to the glut of this year's supplies in both the producing and the importing countries," Oil World said. "The ample world rapeseed availability only adds to the bearish tone."Rapeseed planting in the European Union may be as low as 6.5 million hectares in 2014.

Mallee Plantation farmer's problem

Due to large scale cutting of tree in last 200 years, the western Australian agricultural land is drastically under threat from rising salinity. To address the problem of rising salinity, in 1997, a group of WA farmers formed the Oil Mallee Association (OMA) of WA, and worked with the Western Australian Department of Conservation and Land Management (CALM). The research indicated that growing mallees as a short term woody rotational crop is capable of providing both environmental and economic benefits such as combating the problem of rising salinity and oil production. The mallee trees are native to Western Australia and known for their oil content.

In 1998 the OMA received a $2.2 million grant from the Australian Government's Natural Heritage Trust (NHT) to propagate plant and maintain plantings of mallees and increase the number of plantings throughout the WA wheat belt by encouraging farmers to plant on a larger scale than had been done previously.

For 10 years farmers have planted mallees in anticipation of developing a fully sustainable industry based around the use of short rotations where the trees are coppiced for financial return. Farmers were also aware that the trees were a valuable Land care tool in managing groundwater issues on their farms. To date, considerable work has been done to attempt to attract private industry to the wheat belt to utilise the product, as well as developing harvesting technologies and new products.

Over the past decade, successive governments have thrown their support behind the biofuel industry, starting with a pilot processing plant in Narrogin. Western Power began operating the plant in 2002, proving it was possible to generate power from mallee trees. But the trial ended a few years later and the plant has since been gathering dust.

More than 30 million mallee trees have been planted across the state in recent years, half of which are within the South West and Great Southern regions. Now the huge plantation is ready to be used for energy generation, but there is no taker of the product. The biofuel industry falls across three different State Government ministries, environment, agriculture and forestry. These departments are not aware of the farmer's problems, who have invested time, money and resources in anticipation of earning well from mallees.

If not harvested regularly mallee tree pose many problems especially for the farmers in crop cultivation. But those who have adopted plantation along with animal farming have minimum affect. Now it is to be seen that if farmers get return of their investments or compelled to uproot trees in want to productive outlet.

Crisis of Argentina's olive oil Industry

Due to financial mismanagement and faulty import export policies, the Argentinean olive oil industry is at the verge of closure. The olive oil industry in Argentina is largely export-based, with 75 percent of the roughly 30,000 metric tons of oil produced annually being sold abroad. The table olive market is even more lopsided, exporting about 95 percent of its yearly production.

Due to high inflation which has outpaced the devaluation of peso, the olive oil produced in the Argentina is hardly competitive in international market. The production volume has remained more or less constant, exports are down and there's not a big enough internal market to absorb the difference. The resulting surplus and lackluster sales have pushed the industry into a desperate situation, with layoffs and factory closings becoming the norm, particularly among the larger producers.

Right now it's cheaper to bring in olives from Spain than it is to produce them in Mendoza," said Rafael Camacho head of a processing facility in Mendoza owned by the Spanish company Angel Camacho.

The controversial policy of forcing companies to import and export the same amount of products — everything from auto parts to electronic gadgets — has further discouraged the big olive oil producers from staying in the game, especially those which are foreign-owned.

Olive oil industry that saw a huge influx of foreign and local investors in the last decade is now witnessing many of those same players pack up and leave. AgroSevilla, a Spanish olive producer that had operated in Mendoza since 2,000. The company relocated to Chile at the end of 2012, lying off 91 workers in the process.

Interestingly, this situation seems to have benefited some of the smaller olive oil producers, at least in the short run. A handful of non-food related companies have purchased small olive oil brands in order to export their products under their company name, thus increasing their import quotas. This grants them access to high-demand products from abroad which can then be sold for profit in the internal market.

Lipids & Nanotechnology

(Compiled by C. S. Joshi)

What is nanotechnology?

Nanotechnology is science, engineering, and technology conducted at the nanoscale, which is about 1 to 100 nanometers.

The ideas & concepts behind nanoscience & nanotechnology started with a talk entitled "There's Plenty of Room at the Bottom" by physicist Richard Feynman at an American Physical Society meeting at the California Institute of Technology (CalTech) on December 29, 1959, long before the term nanotechnology was used.

One nanometer is a billionth of a meter, or 10-9 of a meter. Here are a few illustrative examples:

- There are 25,400,000 nanometers in an inch
- A sheet of newspaper is about 100,000 nanometers thick
- On a comparative scale, if a marble were a nanometer, then one meter would be the size of the Earth

Although modern nanoscience & nanotechnology are quite new, nanoscale materials were used for centuries. Alternate-sized gold and silver particles created colors in the stained glass windows of medieval churches hundreds of years ago. The artists back then just didn't know that the process they used to create these beautiful works of art actually led to changes in the composition of the materials they were working with.

Today's scientists and engineers are finding a wide variety of ways to deliberately make materials at the nanoscale to take advantage of their enhanced properties such as higher strength, lighter weight, increased control of light spectrum, and greater chemical reactivity than their larger-scale counterparts.

Nanoscience and nanotechnology are the study and application of extremely small things and can be used across all the other science fields, such as chemistry, biology, physics, materials science, & engineering. Nanoscience & nanotechnology involve the ability to see and to control individual atoms & molecules.

Advantages of nanotechnology in food and Lipids:

- Nanocapsules to improve bioavailability of neutraccuticals in standard ingredients such as cooking oil & fortified drinks.
- Nanotechnology will enable junk foods like ice cream & chocolate to be modified to reduce the amount of fats & sugars that the body can absorb.
- The inclusion of medically beneficial nano-capsules will enable chocolate chip cookies or hot chips as health promoting or artery cleansing food.
- Kraft and Nestle are designing smart foods that will interact with consumers to personalize food by changing color, flavor, and nutrients on demand.
- Kraft is developing a clear tasteless drink that contains hundreds of flavors in latent nanocapsules and a domestic microwave could be used to trigger release of color, flavor, concentration, and texture of the individual's choice.
- Smart foods developed with the help of nanotechnology will also sense when an individual is allergic to a food's ingredients.
- Nano-bubbles of ozone with micro-bubbles of an ozone/oxygen mix is used to clean seafood.
- Nanocomposites are used in food packaging to improve the barrier of plastic films and bottles which results in food staying fresh longer
- Nanoparticles are being developed that will deliver vitamins or other nutrients in food and beverages without affecting the taste or appearance.
- Oil Fresh 1000 is a thin ceramic plate used in deep fat fryers to slow the breakdown of the oil so that products can be fried faster. This helps consumers to use less oil and save money. This will also reduce the oil absorption by the food.
- Nano technology allows the processers to combine the ingredients in the food, which were previously not possible. Now manufacturing companies are marketing white bread enriched with Omega-3 fatty acid.
- Cavitation Technologies, Inc. (CTi) is an innovative leader in processing liquids, fluidic mixtures, emulsions and suspended solids, has commercialized its patent-pending CTi Nano Neutralization process with Desmet Ballestra. The Company's claims that its patented Nano Reactor significantly reduces the processing costs increase the yield and perfect the oil's quality. CTi is exploring opportunities for additional applications in edible oil refining, including water degumming, bleaching and deodorization.

Following are the advantages of the nano neutralization process

- It increase Yield by 0.2% - 0.8%
- Reduces excess phosphoric acid by 90%
- Reduction in caustic soda consumption by 30-50%
- Low to zero silica consumption
- Lower soaps at primary separation
- And CO_2 reduction by 33.4%

A 400 TPD plant based on the above technology is running on soya been oil for one and half years.

Lipids and Soft Nanotechnology :

Nanotechnology involves fabrication of nano-devices with length scales of the order of 100 nm or smaller. Traditionally, nano-devices were made of metals, ceramics and inorganic semiconductors. However, nano-devices can also be made of organic polymers, colloids or biomolecules, including DNA, proteins and lipids. This alternative approach is known as soft nanotechnology. Soft nanotechnology has brought new concepts to electronics, medicine & the energy industry, complementing hard nanotechnological approaches.

Lipids have a range of desirable properties for use in nanotechnology. Lipids can self-assemble into nano-films and other nano-structures such as micelles, reverse micelles and liposomes. While lipid molecules self-interact to make nanostructures, the resulting structures display virtually no non-specific binding of other biomolecules, a property which allows lipid-based nano-devices to function within the human body. Lipid assemblies may, however, be glued to other soft or hard nano-devices via specific chemical linkages. These features, along with transparency of lipid structures in visible light and their heat conductivity, have made lipids an important soft matter building block for nanotechnology.

Hard and soft nano-devices for medical applications typically interface lipids while in use. Sensitive sensing platforms are for instance being developed that allow high-throughput sensing of biomolecular processes, building on advances in nano- and micro fabrication and in nanophotonics. These sensing devices often include lipid molecules and lipid assemblies. Another device category are drug nanocarriers that encounter numerous barriers en route to their target, such as mucosal barriers and cellular membranes, both containing a repertoire of phospholipids & other lipid molecules. Therefore, understanding the interactions between lipids & these nano-devices is essential for the optimal design of the nano-devices.

Computational tools have also become increasingly important in lipid nanotechnology and nanotechnology in general. Computational nanotechnology provides a convenient way to explore the wide range of possible designs, allowing rapid evaluation and elimination of obvious dead ends and screening for more promising designs.

Phospholipids - the dominant lipids in biomembranes - are amphiphilic molecules with hydrophobic tails and hydrophilic head groups. The head groups can be charged (positively or negatively) or neutral. Phosphatidylcholine (PC) - the most prevalent phospholipid - is a zwitterionic lipid with a significant electric dipole, which governs inter-lipid interactions. Hydrophobic interactions drive spontaneous assembly of lipids in an aqueous environment into lipid bilayers. Bilayers are quasi-2D (4 nm thick) nano-films which show rich phase behavior depending on temperature and pressure. Bilayers can be in fluid, gel, interdigitated and ripple phases. Phospholipids vary in their melting temperatures and influence the melting of the neighbouring lipids in the bilayer in a cooperative manner. For bilayers with mixed compositions, at certain temperatures and pressures, different bilayer phases may coexist.

Lipids are being used in nanomedical products, particularly in gene and drug delivery technologies. When DNA/RNA molecules or drugs are enclosed in a lipid-based container, they last longer with lower degradation rates compared to molecules in solution. Such enclosure also increases the chance for endocytosis and uptake of DNA/RNA or drugs by cells. Another important usage of lipids in constructing nanoparticles and nanocontainers has been to increase the targeting specificity, transport efficiency and potency of drugs. Moreover, lipid membranes prevent nonspecific binding of the nanoparticles, thus further enhancing the targeting specificity. This increased specificity has brought new hope for preventing drug resistance in cancer therapy. Drug-loaded vesicles with lenticular morphology have been designed to specifically target atherosclerotic sites in blood vessels.

The combination of micro-nanofluidics and lipid science has benefited both fields. On the one hand, microfluidics has been used to produce liposomes with diameters of the order of tens of nanometers as well as giant vesicles. On the other hand, lipids have been used for passivation of fluidic channels, for material transport within fluid environments and for droplet engineering.

By controlled microfluidic mixing and nanoparticle determination (by light scattering and asymmetric Flow Field-Flow Fractionation), unilamellar vesicles with control on liposome size can be generated. On the other hand, lipids provide complete long-term passivation of nanochannel surfaces to a range of reagents, including proteins and nucleic acids.

The phospholipids and phosphocholine derivatives have been proposed and used for passivation of surfaces, particularly in nano- and microfluidics. Biofouling or biocontamination is relevant in a wide range of applications, including medical equipment and implants, biosensors, textiles, food packaging, water purification systems, and marine equipment. Phosphorylcholine derivatives and PEG are two main categories of nonfouling materials that resist protein adsorption and cell adhesion. Phosphatidylcholine helps to suppress nonspecific binding of cellular membranes, while accommodating specific functional binding of membrane proteins.

Lipid nanoassemblies have been designed and used in various fields including soft matter physics and synthetic biology where lipids are used to generate bio-mimetic systems. Besides bilayer films, liposomes and micelles, lipids can also form lipid nanotubes (LNTs). LNTs can modulate the nucleation, growth, and deposition of inorganic substances both on their external surface and in their hollow core. The LNTs can thus be used as scaffolds for fabrication of 1-D nanostructures, including 1-D arrays of quantum dots and hybrid nanotubes consisting of functional inorganic nanoparticles embedded in the lipid membrane wall. Lipid nanoassemblies can be manipulated and deformed optically and electrically in a controlled manner. Lipid structures such as liposomes and tubes can

enclose reagents and nanoparticles and can be glued to other nano-devices using a variety of strategies, including covalent linkages, bonds formed between biotin and members of the avidin family, and electrostatic gluing.

An interesting property of lipid vesicles is their passive remodelling capability when supported by elastic materials. Lipid bilayers are themselves usually fluid, do not support shear stress, and have a low lysis tension. However, when combined with an elastic material, the membrane acquires shear and tensile strength, while at the same time the bilayer allows for surface-area regulation. Lipid bilayers have also been extensively used to solubilize carbon nanotubes.

Lipid Nanoelectronics :

The term "nanoelectronics" refer to the use of nanotechnology to develop miniaturized electronic components to be applied in information processing, telecommunications and signal processing. Biological systems are inherently designed to handle material and information transport on a small scale in a crowded cellular interior. Biological design principles as well as building blocks can be incorporated into nanoelectronic devices to enable new generations of electronic circuits that use biomimetics to carry out complex tasks. For instance, by inserting proteins in a lipid bilayer shell covering the nanotube or nanowire, ion channels and pumps can be integrated into single-walled carbon nanotube (CNT) and silicon nanowire (SiNW) transistor devices. These hybrid devices have been used for example to couple biological transport to electronic signalling. Lipid bilayers with embedded protein pores have also been used to construct a light sensor, a battery, and half- and full-wave rectifiers. One important issue is the scalability of such designs. Recently lipid monolayer-coated hydrogel shapes (e.g., sphere, cube, hexagon, crescent and cross) have been proposed as building blocks for constructing scalable nano-microelectronic structures and nano-micromechanical devices such as switches, magnetic field driven rotors and painted circuits.

Lipids have also been interfaced with graphene, a single layer of carbon atoms in a honeycomb lattice with exceptional physical properties that make it a promising material for a wide range of applications, particularly in electronic devices. Graphene oxides (graphene with OH and COOH functional groups) have also been combined with lipid bilayers to make hybrid structures including alternating supported lipid membrane and graphene oxide layers. Another widely explored area of research is fabrication of hollow cylindrical lipid tubules filled with various optical and magnetic materials.

Finally, lipids have also been used to create multilayer structures with useful optical properties. One interesting design is a multilayer optical diffraction grating, printed by dip-pen nanolithography (DPN) of biofunctional lipid multilayers with controllable heights between ~5 and 100 nm and period of larger than 100 nm. DPN is a unique technique in having a constructive and parallel nature that enables integration of multiple materials on structured surfaces that have been pre-fabricated by top-down lithographic methods. The size and shape of the grating can be modulated by analyte binding, which is a property that allows for biosensing applications. Nanostructured lipid multilayer arrays have been developed by combining microcontact printing with nanoimprint lithography and DPN.

Who is monitoring nano in foods?

The European Commission (EC) considers that current regulations suffice for nanotechnologies. A review of the Novel Foods Regulation that was designed to 'allow for safe and innovative foods to reach the European market faster' and to 'encourage the development of new types of foods and food production techniques (such as nanotechnologies)', collapsed in 2011 (29 March).

While the collapse of this amendment wasn't related specifically to the provisions for nanotechnologies (it was related to genetically modified livestock), the impact of this collapse is that nano-foods remain unregulated and are not subject to European labelling.

In early 2010, the mandatory labelling of nanomaterials in cosmetics came into force. Although in a different sector, it set a precedent that could spread to other sectors.

In April 2012, the US Food and Drug Administration issued guidance documents that address the use of nanotechnology in the food and cosmetics sectors.

Companies are 'encouraged' to contact the FDA about nano-enabled food items as they no longer fall under the automatic heading of 'generally recognised as safe', as was previously the case.

Without a clear regulatory landscape calibrated to standards, there is limited incentive for industry to invest in developing nano-food innovations. This is in part because of liability issues, but is also due to the risk of being seen as less than cautious by watchdogs and consumer groups, which are already anxious about new food technologies and their safety.

There are significant challenges for the food industry in its adoption of the technology in terms of potential legislative and consumer acceptance hurdles. However, nanotechnology may hold the key to solving many critical issues facing the world's food supply today. Only time will tell how this technology will continue to develop in the future.

Despite the widespread use of lipids in nanotechnology, lipid nanotechnology has not yet been recognized as a field.

Important Figures :
Oil and Oilseed in Pakistan

Cotton Area Planted as of June 25, 2012 ('000 Hectares)			
Province	**Area Planted**		**% of 2011 Planting**
	2012	**2011**	
Punjab	2335	2536	92.07
Sindh	552	631	87.48
Pakistan	2887	3167	91.15

Source : Provincial Crop Reporting Service & FAS Islamabad)

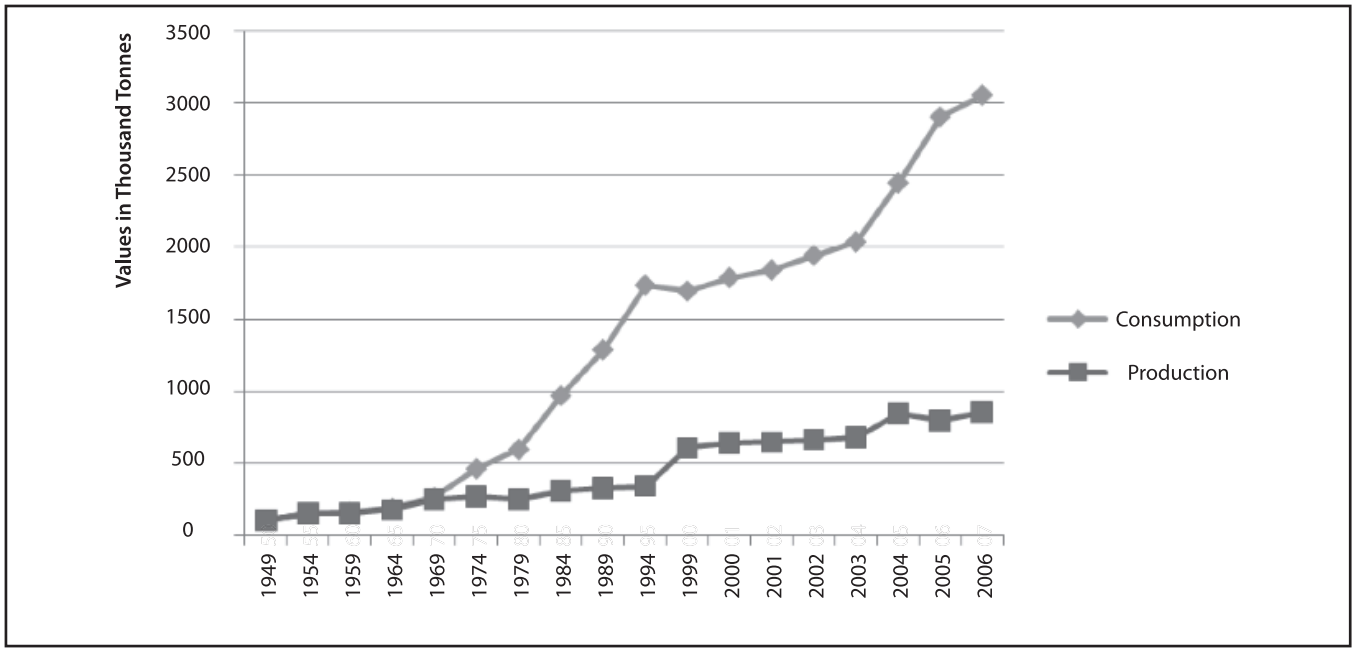
Oilseed Import Statistics (figures in Metric Tons)			
Product	**CY - 2010**	**CY - 2011**	**Jan-May - 2012**
Rapeseed / Canola	1164914	736539	397030
Sunflower	0	186208	10570
Soybean	10	10	0
TOTAL	1164924	922757	407600

Source : Ministry of Commerce (MOC), Government of Pakistan & FAS Islamabad

Edible Oil Import Statistics (figures in Metric Tons)			
Product	**CY - 2010**	**CY - 2011**	**Jan-May - 2012**
Palm Olien	1211367	970747	255586
RBDPO	184202	263443	296383
CPO	491898	749000	185434
CDSBO	45950	51200	0
TOTAL	1887467	2034390	737413

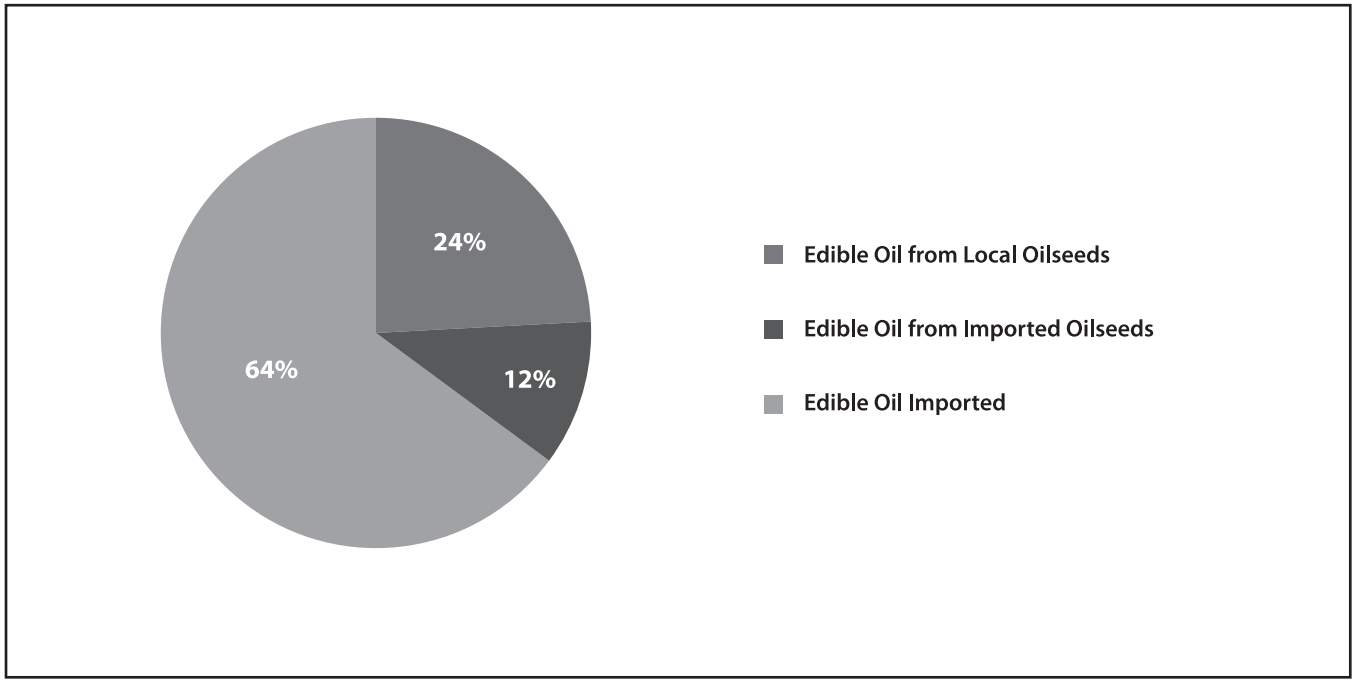
Source : Ministry of Commerce (MOC), Government of Pakistan & FAS Islamabad
RBDPO - Refined bleached Deodorized Palm Oil.
CPO - Crude Palm Oil, CDSBO - Crude Deodorized Soybean Oil.

Increasing Gap between Demand and Domestic Production of Edible Oils



Source : Author's Estimation based on Agriculture Statistics of Pakistan (various issues)

Edible Oil availability in Pakistan MY 2012/2013



Source : USDA Foreign Agricultural Services, GAIN Report.

Oils and Oilseeds in China

Per Capita Consumption of Cooking Oil in China (2000-10) - RURAL			
Year	Total (in Kg.)	Vegetable Oil (in Kg.)	Animal Oil (in Kg.)
2000	7.06	5.45	1.61
2001	7.03	5.51	1.52
2002	7.53	5.77	1.76
2003	6.30	5.30	1.00
2004	5.30	4.30	1.00
2005	6.00	4.90	1.10
2006	5.80	4.70	1.10
2007	6.00	5.10	0.90
2008	6.20	5.40	0.90
2009	6.25	5.42	0.83
2010	6.31	5.52	0.79

Source : Per capita rural consumption data is from SSBb, various issues.

Per Capita Consumption of Cooking Oil in China (2000-10) - URBAN			
Year	Total (in Kg.)	Vegetable Oil (in Kg.)	Animal Oil (in Kg.)
2000	8.61	8.16	0.45
2001	8.47	8.08	0.39
2002	9.00	8.52	0.48
2003	9.59	9.20	0.39
2004	9.70	9.40	0.30
2005	9.61	9.25	0.36
2006	9.67	9.38	0.29
2007	9.63	9.63	n.a.
2008	10.27	10.27	n.a.
2009	9.67	9.67	n.a.
2010	8.84	8.84	n.a.

Sources : Per capita urban consumption data is from SSBc, various issues.

Import and Export of Oilseeds

Import and Export of Oilseeds in China (1996-2010, Tonnes) Soybeans			
Year	Import	Export	Net Import
1996	1107539	191744	915795
1997	2875907	185719	2690188
1998	3192490	169874	3022616
1999	4318634	204366	4114268
2000	10419057	210840	10208216
2001	13939479	248399	13691080
2002	11314372	275863	11038509
2003	20741006	267470	20473537
2004	20229966	334560	19895406
2005	26589957	396454	26193503
2006	28236901	379024	27857877
2007	30816562	456452	30360110
2008	37436262	465143	36971119
2009	42551649	346557	42205092
2010	54797749	163598	54634152

Source : UNcomtrade Database

Import and Export of Oilseeds in China (1996-2010, Tonnes) Rapeseed			
Year	Import	Export	Net Import
1996	413	6042	-5629
1997	55134	42	55092
1998	1386413	1114	1385299
1999	2595305	153	2595153
2000	2968936	1131	2967806
2001	1724251	65	1724186
2002	618170	2335	615836
2003	166714	2913	163801
2004	424014	269	423745
2005	296236	147	296089
2006	737997	144	737853
2007	833105	849	832255
2008	1303023	55	1302968
2009	3285852	221	3285631
2010	1599848	110	1599738

Source : UNcomtrade Database

Import and Export of Oilseeds in China (1996-2010, Tonnes) Ground nuts			
Year	Import	Export	Net Import
1996	346	351068	-350722
1997	4758	171473	-166714
1998	3546	214860	-211314
1999	943	340558	-339615
2000	447	399968	-399521
2001	342	493454	-493112
2002	1506	520616	-519110
2003	392	490170	-489778
2004	1333	402996	-401663
2005	326	454083	-453757
2006	5171	324281	-319110
2007	3358	291680	-288322
2008	9682	231512	-221830
2009	2387	236943	-234556
2010	14233	191172	-176939

Source : UNcomtrade Database

Import and Export of Edible Oil in China (1996-2010, Tonnes) Soybean oil			
Year	Import	Export	Net Import
1996	1295396	127093	1168303
1997	1225160	555770	669390
1998	831689	185891	645798
1999	803691	53394	750297
2000	307619	35284	272335
2001	69888	60007	9881
2002	870275	47298	822977
2003	1884320	10650	1873670
2004	2516495	19442	2497053
2005	1694327	63034	1631292
2006	1542635	117709	1424927
2007	2822787	65717	2757070
2008	2585604	133912	2451693
2009	2391222	69246	2321977
2010	1340717	59297	1281420

Source : UNcomtrade Database

Import and Export of Edible Oil in China (1996-2010, Tonnes) Ground Nut Oil			
Year	Import	Export	Net Import
1996	5218	5887	-669
1997	10670	8602	2068
1998	8723	10059	-1336
1999	9616	12978	-3362
2000	9954	14738	-4785
2001	8612	13572	-4960
2002	3992	11039	-7047
2003	6633	25303	-18669
2004	419	14201	-13783
2005	381	20242	-19861
2006	312	12961	-12649
2007	11163	10288	876
2008	5896	10703	-4807
2009	20726	9798	10928
2010	68458	7789	60668

Source : UNcomtrade Database

Import and Export of Edible Oil in China (1996-2010, Tonnes) Rapeseeds Oil			
Year	Import	Export	Net Import
1996	316047	174155	141892
1997	350634	141287	209347
1998	284706	73333	211373
1999	69184	25977	43207
2000	74663	54147	20516
2001	49423	54326	-4904
2002	77830	18349	59481
2003	151578	5419	146158
2004	352933	5455	347478
2005	177558	30637	146922
2006	43995	144763	-100768
2007	374767	21692	353075
2008	269777	7104	262673
2009	467526	9135	458391
2010	985309	3804	981505

Source : UNcomtrade Database

Import and Export of Edible Oil in China (1996-2010, Tonnes) Olive oil			
Year	Import	Export	Net Import
1996	3028	n.a	n.a
1997	7	52	-45
1998	73	n.a	n.a
1999	120	26	94
2000	228	51	177
2001	302	8	295
2002	454	30	425
2003	763	29	734
2004	2296	14	2282
2005	3826	120	3706
2006	4518	4	4514
2007	7124	160	6964
2008	10179	113	10067
2009	12504	188	12316
2010	21253	70	21183

Source : UNcomtrade Database

Import and Export of Edible Oil in China (1996-2010, Tonnes) Palm oil			
Year	Import	Export	Net Import
1996	1009184	160444	848739
1997	1156455	109023	1047431
1998	929908	34544	895364
1999	1193510	261	1193248
2000	1390701	334	1390367
2001	1517352	132	1517220
2002	2220617	10395	2210221
2003	3324757	16	3324741
2004	3857223	20	3857203
2005	4330056	1203	4328852
2006	5068792	758	5068034
2007	5094752	601	5094151
2008	5282069	1130	5280940
2009	6441284	473	6440811
2010	5695939	1548	5694391

Source : UNcomtrade Database

Import and Export of Protein Feed in China (1996-2010, tonnes) Fish and seafood meal			
Year	Import	Export	Net Import
1996	884478	1494	882985
1997	988455	2401	986053
1998	420035	2288	417747
1999	634298	1898	632400
2000	1189251	2712	1186539
2001	904130	4121	900009
2002	960524	8327	952197
2003	802843	8560	794282
2004	1127883	7037	1120846
2005	1582747	5927	1576821
2006	983211	17973	965238
2007	969832	12298	957535
2008	1351353	5407	1345947
2009	1310528	6229	1304299
2010	1042377	3767	1038610

Source : UNcomtrade Database

Import and Export of Protein Feed in China (1996-2010, tonnes) Rapeseed meal			
Year	Import	Export	Net Import
1996	252	582001	-581749
1997	53366	162689	-109322
1998	107246	6881	100365
1999	29498	339034	-309536
2000	55724	978357	-922633
2001	8	475663	-475655
2002	n.a.	259867	n.a.
2003	14300	182262	-167962
2004	93612	124904	-31292
2005	71562	84932	-13370
2006	253553	48519	205034
2007	289596	93716	195880
2008	308435	49837	258598
2009	247669	335013	-87344
2010	1216219	56308	1159911

Source : UNcomtrade Database

Health Tips

Stabilized Rice Bran – a new super food

Rice bran is in the inner container of the rice seed, which contains all the natural minerals and nutrients needed for the plant to grow. The rice bran is the nutritional store house of the rice grain. Each year 63 – 76 million tons of rice bran are produced in the world and more than 90% of the rice bran is sold cheaply as animal feed. This stabilization has created an opportunity to turn something nutritionally unusable into one of the world's most powerful super foods.

Rice bran is a by product of rice milling industry. Bran is produced whiling milling the paddy for production of rice. Lipase enzyme in present in the layers of paddy and becomes active as soon as bran is produced. Because of enzyme and its rapid reaction, the oil present in the bran becomes rancid within few hours of production of bran. So it is required to be stabilized as soon as produced. Stabilised rice bran can be used for production of good quality rice bran oil and can also be used as a health supplement.

Tested by the U.S.D.A., stabilized rice bran is an extremely powerful source of vitamins and minerals, essential amino acids, Omega-3, 6, 9 fatty acids, and complete soluble and insoluble fibre. Stabilized rice bran is considered by many to be one of the world's great super foods. It's high in fibre, obviously, but also high in protein and is one of the premier sources of antioxidants -- containing over 100 of them.

Some of the major health components of stabilized rice bran are :

- Hypoallergenic protein with all essential amino acids
- Rich in E complex vitamins (contains the highest natural source of tocopherols and tocotrienols in nature)
- Rich in B complex vitamins
- IP6 (inositol hexaphosphate)
- The only source of Gamma-Oryzanol in nature
- Minerals (including high amounts of potassium, magnesium and manganese) and trace minerals
- Polyphenols, phytosterols, and sterolins (high quantities of Beta-sitosterol and Beta-sitosterolin)
- Mixed carotenoids, including lutein and zeaxanthin
- Dimethylglycine (DMG)
- Trimethylglycine (TMG)
- Lecithin (phosphatidyl choline, phosphatidyl serine)
- Ferulic Acid
- CoQ10
- Squalene
- Alpha Lipoic Acid

Use of stabilize bran will not only improve the availability of good quality plant based protein , but also has potential to address the problem of protein deficiency in developing world , where it is mostly grown. The use of rice bran as a source of protein will also be helpful in value addition in rice cultivation and bran processing industry.

Saturated Fats Reclassified :

According to a paper published by cardiologist Dr. Aseem Malhotra of the Croyden University Hospital in London, the saturated fat are not as harmful for cardiovascular health, as suggested by previous studies. He asserts that our obsession with cutting down on dietary fat has "paradoxically increased our cardiovascular risks." In fact, Dr. Malhotra says, reducing saturated fats in the diet actually may lead to weight gain.

To make his case, Dr. Malhotra points out that while overall saturated fat consumption has dropped in the US from 40 percent of the typical diet to 30 percent, obesity rates have skyrocketed. He attributes this trend, at least in part, to the fact that as manufacturers have cut the fat in food products, and compensated by increasing the sugars and carbohydrates.

"Recent prospective cohort studies have not supported any significant association between saturated fat intake & cardiovascular risk," says Dr. Malhotra. "Instead, saturated fat has been found to be protective."

The low-fat diet has been religion in the mainstream medicine camp since the 1970's, when the Framingham Heart study discovered a link between overall high cholesterol and heart disease. It was assumed at that time that high cholesterol came from eating saturated fat. The problem with that conclusion is that the correlation the study found did not prove that high cholesterol causes heart disease; only that it tends to be present in those with cardiovascular problems. In fact, several subsequent studies have discovered that high cholesterol tends to develop more as a result of consuming carbohydrates, sugar, and trans fats rather than because of eating too much saturated fat.

Dr. Robert Lustic of the University of California in San Francisco comments, "When saturated fat got mixed up with the high sugar added to processed food in the second half of the 20th century, it got a bad name. On the question of which is worse -- saturated fat or added sugar, Lustig added, "The American Heart Association has weighed in -- the sugar [is worse than saturated fat] many times over."

Dr. Malhotra says, "Recent research has also shown that Mediterranean diets -- admittedly skimpy on red meat but hardly light on saturated fats -- have outpaced both statins and low-fat diets as a means of preventing repeat heart

attacks. Adopting a Mediterranean diet after a heart attack is almost three times as powerful in reducing mortality as taking a statin."

New approach for treatment of memory loss:

According to a study published online today in Nature Neuroscience, Indicates that the memory deficits can be reversed by eating a diet rich in polyamines.

Polyamines, which include the putrescine, cadaverine and spermidine, are small molecules that are essential for cells to survive and grow. But their cellular levels decline with age.

The study was conducted on the fruit flies (Drosophila fruitflies), which like humans, become forgetful with age. Some foods that are popularly considered to have health benefits — such as wheat germ and fermented soya beans — contain high levels of polyamines. Japanese scientists have shown that natto, a fermented soya-bean product, raises the level of polyamines in the blood in humans.

Other scientists had already shown that feeding polyamines to fruitflies, as well as worms or yeast, increases the organisms' lifespan. It seems to do so by reversing the age-related decline in autophagy — a mechanism that cells use to clear themselves of debris. Longevity in fruitflies can also be increased by promoting autophagy, either by genetic techniques or by restricting calorie intake. But neither tactic had been clearly proven to be effective against age-related memory decline.

The team trained their flies to associate a particular odour with a mild electric shock. Youthful flies quickly learn to avoid the odour and remember to avoid it for many hours. Older flies learn more slowly. But when the researchers fed the older flies a polyamine-rich diet, the insects' polyamine levels were restored to youthful levels — and the age difference in learning and memory was nearly wiped out.

The researchers are now starting studies to see whether a polyamine-rich diet has a similar effect in mice and humans.

Flaxseed may prevent prostate cancer

Mice fed a diet rich in flaxseed were less likely to develop a prostate tumor. Previous studies have suggested that flaxseed may help prevent prostate cancer. Now researchers at Duke University show how a diet rich in flaxseed reduced tumor size, aggressiveness and severity in a group of mice genetically modified to develop prostate cancer.

A group of 135 mice were given either a regular diet, or one containing five per cent flaxseed. The latter developed tumors that were, on the whole, half the size of those in the control group. These were also less aggressive and some animals did not develop the disease at all.

Flaxseed may be beneficial because it contains omega-3 fatty acids, being the richest plant source of these compounds. It also contains a lot of lignin – a fiber-related compound that may regulate the hormone testosterone, which is important in prostate cancer. All of this suggests that flaxseed in the diet is a very promising line of research for the prevention of human prostate cancer.

Fish Oil and Stress

Fish oil supplementation may protect the heart in stressful situations, according to a double-blind study. Over a two-month period, Michigan Technological University conducted the study with 67 healthy volunteer test participants in their 20s who were either given nine grams of fish oil pills or nine grams of olive oil as a placebo. They were screened for heart rate, blood pressure, and other related metrics. At the end of the test period, both groups took an arithmetic test (similar to a test administered on day three) that involved adding and subtracting numbers in their head. Their stress response was measured at that time. "Those in the fish oil group showed blunted heart rate reactivity while they were stressed compared to those who took olive oil. Similarly, the total [muscle sympathetic nerve activity] reactivity to mental stress was also blunted in the fish oil group. However," there was not much difference between the two groups at rest of parameters".

The authors of this latest fish oil study summarized their findings stating that "8 wk of fish oil supplementation significantly attenuated both HR and total MSNA reactivity to mental stress and elicited a paradoxical blunting of calf vascular conductance. These findings support and extend the growing evidence that fish oil may have positive health benefits regarding neural cardiovascular control in humans DHA (docosahexaenoic acid) is one of the two most important omega-3 fatty acids found in fish oil. EPA (eicosapentaenoic acid) is the other important fatty acid.

Previous studies have suggested that fish oil may protect individuals from Alzheimer's and other forms of dementia. For ordinary consumption, salmon, herring, mackerel, anchovies, and sardines are among the cold water oily fish sources of Omega-3 fatty acids. Many holistic-oriented consumers also take fish oil supplements for both brain and heart health.

It is desirable that "Future studies might examine the influence of longer duration (i.e., chronic) fish oil supplementation on neural cardiovascular reactivity to mental stress, with a particular focus on aged and/or diseased populations."

Argan Oil

The argan tree (Lat. Argania spinosa) is one of the oldest trees in the world and the only place in the world where it still grows is in Southwest Morocco, between Essaouira und Agadir. From its fruits, Morocco's liquid gold, the argan oil is extracted.

Around 25 million years ago, the argan tree developed into a specialist for desert-like, dry regions. Today, only 20 million trees are left in Southwest Morocco, while the argan tree has died out worldwide. Trials to establish the tree in other countries have remained unsuccessful. Its life expectancy is in the mid-200 years. Due to this fact, this last region with existing argan trees was declared by UNESCO as a "biosphere reserve" in 1998 and elevated to a World Cultural Heritage Site. From 30 kilograms of argan fruits, around 4.5 kilograms of argan pits are extracted and then finally one liter of argan oil is produced.

Argan oil is rich in unsaturated fatty acids (80%), principally oleic, & linoleic acids (44.8 & 33.7%, resp.). The unsaponifiable fraction (1% of the oil constituents) of argan oil is mainly rich in antioxidant compounds such as tocopherols, which is present in a higher proportion compared to olive oil (637 mg/kg versus 258 mg/kg, resp.) and especially in its γ-isoform (75%). Moreover, this nonglyceric fraction is rich in phenolic compounds, principally ferulic & syringic acids (3147 and 37 μ g/kg, resp.), which are absent in olive oil. Also, it is rich in some sterols such as schottenol (1420 mg/kg) and spinasterol (1150 mg/kg). These two families of sterols, known for their anticancer properties, are rarely encountered in other vegetable oils. Argan oil also contains good amount of squalene (3140 mg/kg) which is anti cancerous in nature. These compounds prevent oxidation, contributing to the stability of the oil.

Benefits of Argan oil :

Argan oil is used for edible as well as cosmetic purposes.

It tastes like a smokier sesame oil and is exceptionally good for internal organs. Virgin argan oil is characterized by high levels of linoleic and oleic acids, tocopherols (especially γ-tocopherol), and minor compounds such as sterols, carotenoids, and squalene. The total antioxidant capacity of virgin argan oil is higher than that of other vegetable oils. Recent studies suggest that this edible oil, as a functional food, may play a role in disease prevention. In some studies it is found to have hypolipidemic, hypocholesterolemic, hypoglycemic, & antihypertensive effects as well as a possible role in cancer prevention. Thus it helps in reducing the body's resistance to insulin; helping treat diabetes, protect the body from cardiovascular & inflammatory diseases.

Argan oil is known as one of the most effective natural treatments for most skin and hair conditions. Berber women in Southwest Morocco have relied on their beauty elixir for centuries. They eat it, combine it with some honey and use it externally as a care product that virtually works wonders, and has multiple effects. The Berber women themselves are the best proof of this effect. Despite intense sunshine and extreme living conditions, they have youthful skin, firm fingernails and shiny hair.

Argan oil provides valuable micronutrients to combat cell damage, early signs of aging and has anti-neoplastic (anti-cancer) properties. It penetrates deeply and faster that most other oils. This is a natural bactericide, antioxidant, and has been effective in the treatment of dermatitis and skin cancer. Ferulic acid is the most abundant phenolic compound in argan oil, which prevents damage caused by ultraviolet light.

Pure Argan oil's proven and observed benefits for hair, skin, and nails are extensive. It is helpful in

Dry Skin : Nourishes and moisturizes dry, scaly, flaky skin and protects against infection.

Oily Skin : Regulates sebum production to keep the skin's natural oils at a healthy level. With regular use, the skin will no longer look or feel oily.

Irritated/Itchy Skin : Protects skin from allergens that may cause itchiness.

Acne : Controls overproduction of acne-causing sebum and soothes the inflammation brought about by acne; also prevents the ugly scars acne can leave behind.

Aging : Stimulates renewal of skin cells and boosts elasticity while smoothing wrinkles and lines.

Sun Damage : The oil is rich in antioxidants that protect cells from UV light.

Eczema and Psoriasis : Helps alleviate inflammatory symptoms associated with psoriasis. Also addresses immunity problems and allergies that trigger eczema symptoms.

Hair : Repairs damaged hair. Moisturizes instantly, and prevents split ends while restoring shine. Increases hair growth and helps control, cure, and prevent dry and itchy scalp.

Scalp : Keeps scalp healthy and well nourished. A few drops will protect against dandruff. Keeps the roots of the hair hydrated, protected, and well nourished.

Nails : Keeps nails strong and healthy and restores natural shine while easily resolving brittle nail problems.

Because of above mentioned qualities, Argan oil has emerged as one of the healthiest oil. It has sparked a lot of interest among cosmetic manufacturers and the food industry across the globe.

Laugh Out Loud

1. One day a group of scientists got together and decided that man had come a long way and no longer needed God. So they picked one scientist to go and tell Him that they were done with Him.

   The scientist walked up to God and said, "God, we've decided that we no longer need you. We're to the point that we can clone people and do many miraculous things, so why don't you just go on and get lost?"

   God listened very patiently and kindly to the man. After the scientist was done talking, God said, "Very well, how about this? Let's say we have a man-making contest." To which the scientist replied, "Okay, great!"

   But, God added, "Now, we're going to do this just like I did back in the old days with Adam."

   The scientist said, "Sure, no problem" and bent down and grabbed himself a handful of dirt.

   God looked at him and said, "No, no, no. You go get your own dirt."

2. There are three people applying for the same job. One is a physicist, one a statistician, and one an accountant.

   The interviewing committee first calls in the physicist. They say "we have only one question. What is 500 plus 500?" The physicist, without hesitation, says "1000." The committee sends him out and calls in the statistician.

   When the statistician comes in, they ask the same question. The statistician ponders the question for a moment, and then answers "1000... I'm 95% confident." He is then also thanked for his time and sent on his way.

   When the accountant enters the room, he is asked the same question: "what is 500 plus 500?" The accountant replies, "What would you like it to be?"

   They hire the accountant.

3. A group of wealthy investors wanted to be able to predict the outcome of a horse race. So they hired a group of biologists, a group of statisticians, and a group of physicists. Each group was given a year to research the issue. After one year, the groups all reported to the investors. The biologists said that they could genetically engineer an unbeatable racehorse, but it would take 200 years and $100bn. The statisticians reported next. They said that they could predict the outcome of any race, at a cost of $100m per race, and they would only be right 10% of the time. Finally, the physicists reported that they could also predict the outcome of any race, and that their process was cheap and simple. The investors listened eagerly to this proposal. The head physicist reported, "We have made several simplifying assumptions: first, let each horse be a perfect rolling sphere… "

4. A female student wished to make some potassium hydroxide solution (aqueous) and decided to throw a large lump of potassium into a bucket of water.

   Her professor observed what she was about to do, out of the corner of his eye and hurried towards her, and after confirming this was what she was intending to do, asked her first to stir the water in the bucket for five minutes before adding the potassium.

   She was puzzled and ran after him to ask the purpose of this action.

   'It will give me time to get away' said the professor.

5. They have just found the gene for shyness. They would have found it earlier, but it was hiding behind two other genes.

6. A chemistry teacher is recruited as a radio operator in the First World War. He soon becomes familiar with the military habit of abbreviating everything. As his unit comes under sustained attack, he is asked to urgently inform his HQ. "NaCl over NaOH! NaCl over NaOH!" he says. "NaCl over NaOH?" shouts his officer. "What do you mean?" "The base is under a salt!" came the reply.

7. At a party for functions, ex is at the bar looking despondent. The barman says: "Why don't you go and integrate?" To which ex replies: "It would not make any difference."

8. A physicist, a mathematician and a computer scientist discuss what is better: a wife or a girlfriend.

   The physicist: "A girlfriend. You still have freedom to experiment."

   The mathematician: "A wife. You have security."

   The computer scientist: "Both. When I'm not with my wife, she thinks I'm with my girlfriend. With my girlfriend it's vice versa. And I can be with my computer without anyone disturbing me..."

9. A statistician is someone who tells you, when you've got your head in the fridge and your feet in the oven , that you're – on average - very comfortable.

10. A psychoanalyst shows a patient an inkblot, and asks him what he sees. The patient says: "A man and woman making love." The psychoanalyst shows him a second inkblot, and the patient says: "That's also a man and woman making love." The psychoanalyst says: "You are obsessed with sex." The patient says: "What do you mean I am obsessed? You are the one with all the dirty pictures."

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Member's PAGE

Shea Butter

EXTRAORDINARY USES

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Shea butter : A naturally healing emollient

Shea butter, also known as karite butter, is a cream-colored fatty substance made from the nuts of karite nut trees (also called Mangifolia trees) that grow in the savannah regions of West and Central Africa. Karite trees, or shea trees, are not cultivated. They grow only in the wild, and can take up to 50 years to mature. The Shea tree begins to bear fruit after about 15 years, and can take up to 30 years to bear a quality crop of nuts with a high content of irremovable fatty acid. In most parts of West Africa, destruction of the shea tree is prohibited because this little nut provides a valuable source of food, medicine and income for the population. In fact, shea butter is sometimes referred to as "women's gold" in Africa, because so many women are employed in the production of shea butter. Traditionally, Shea Butter was extracted by people who picked the nuts, cracked them, grilled them and pounded them. They were boiled in water for hours until the Shea Butter rose to the surface. It was then scooped into gourds and left to cool and set. Shea Butter is solid at room temperature although it quickly liquefies right around body temperature. Pure Shea Butter can be found in three types of extractions. Also, recently, Shea Butter has begun to be graded as below:

- Raw or unrefined - extracted using water: The color ranges from like cream (similar to whipped butter) to grayish yellow. This is the original form of Shea Butter.
- Refined - is more highly processed: Has many of its natural components still intact, however the nutritional value is compromised.
- Highly refined or processed : Solvents are used to increase the yield, like hexane. The color is pure white. This type of Shea Butter is available to the consumers for a great price.

Storage Conditions of Shea Butter :

Shea Butter does not need to be refrigerated unless the room temperature has the potential of getting over 80^0C. However, over a period of two or three years, the Shea Butter begins to lose some of its effectiveness. As the natural ingredients begin to break, some of the healing benefits are reduced, but the Shea Butter will continue to be an effective moisturizer. Shea butter can be stored in a cool place, if we are going to use it within a couple of years. If there is the potential of rodents or ants, then it is best kept it in a sealed container; remembering, that Shea Butter is a food in Africa.

How does Shea Butter benefit the skin?

Shea Butter contains Vitamins A, K, E and F (essential fatty acids: omega 3 & omega 6). Vitamins A and E helps in maintaining the skin and keeps it clear and healthy. Shea Butter is extremely therapeutic to heal rough, cracked, aged, and damaged skin and prevent premature wrinkles and facial lines. Vitamin F acts as a skin protector and rejuvenator. Shea Butter has between 7-12% unsaponifiables which have healing properties. Also, Shea Butter easily penetrates the skin allowing the skin to breathe and not clogging pores. Shea Butter has a high level of cinnamic acid, a natural sun screen. So, it provides some degree of protection from the sun. Stigmasterol is also found in shea butter, which is known as the anti-stiffness factor because it has the ability to relax tired muscles, provide relief for swelling and arthritis. Shea Butter is also anti-inflammatory making it useful in treating rheumatism and also known to increase cell growth and improves skin elasticity.

How does Shea Butter benefit hair?

Shea Butter provides moisture to dry or damaged hair from the roots to the very tips, repairing & protecting against weather damage, dryness & brittleness. It also absorbs quickly & completely into the scalp to re-hydrate without clogging pores. It is particularly beneficial for processed and heat-treated hair. It is an excellent treatment for dry scalp. It restores luster to damaged hair.

Reasons to use Shea Butter :

Shea Butter can provide relief from dry skin to many dermatological diseases & has been clinically shown in various studies. Here are some of the benefits of Shea Butter for the skin :

■ Daily skin moisturizer (face & body), ■ Dry skin relief
■ Dry scalp, ■ Skin rash, ■ Skin peeling, after tanning
■ Blemishes and wrinkles, ■ Itching skin due to dryness
■ Sunburn, ■ Frost bites, ■ Small skin wounds, ■ Skin cracks,
■ Shaving cream to reduce razor irritation, ■ Minor burns,
■ Stretch mark prevention during pregnancy
■ Eczema, psoriasis & dermatitis, ■ Even skin tone
■ Sun & wind protection, ■ Preventing bumps after shaving,
■ Reduce blemishes & scarring, ■ Eliminating scalp irritation from dryness or chemical processing, ■ Reducing acne,
■ Absorbs quickly without leaving a greasy residue
■ Helps restore elasticity to skin, ■ Restores luster to hair
■ Soften tough skin on feet (especially heels)

(Dr. Meenakshi Tripathi, Vice President
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