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Frying Perfrormance of Vegetable Oils

Adulteration & Food Fraud

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Health Tips

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

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Editor's desk

Due to fall in rupee the coming time may be very challenging for lipid based industries. The impact becomes more severe because India heavily relied upon import to meet its consumer and industrial demand. Falling rupee, depleting forex reserve and sluggish stock market may pose a bigger problem. If we start acting on self reliance in production of edible oil, this problem may turn into an opportunity. The bumper crop of pulses can a ray of hope and inspiration.

Food fraud and adulteration has assumed new dimension both in terms of value and vastness. Now it is emerging as a global challenge. The assumption that food fraud and adulteration is prevalent in India only is partially true. The occurrence of adulteration in developed countries is also frequent. Though the extent, spread and intensity may be less damaging. Taking advantage of technology and scientific knowledge, the adulterants are being mixed selectively to beat the existing standards. Taming greed is a difficult challenge, which is prime motive behind most of the food fraud and adulteration. Tougher laws, strict monitoring, heavy penalties and new regimen of food standards along with costumer awareness can minimize the damage.

There is welcome shift in attitude of health conscious people and oil is no more painted as devil responsible for all the health woes. Shift will encourage processing, distribution and consumption of oil in a far healthier way, so that it is full of natural micro nutrients and phyto-chemical when consumed. Perception that oil is source of empty energy will die in due course of time.

Yours truly,

C. S. Joshi, Editor

Oil Technologists' Association of India
(North Zone)

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Frying Performance of Vegetable Oils

(Dr. Y. C. Nijhawan, Chief Director, Directorate of Vanaspati Vegetable Oils & Fats)

Deep fat frying is a simultaneous heat and mass transfer process. Heat transfer is by convection between the oil and the food surface, and by conduction within the food. When the food is immersed in hot oil, water vapour is formed due to high temperature, and it is transferred through the surface of the product due to pressure and concentration gradients. As a result, crust is formed and pores are developed. Characteristic hydrophilicity of the raw sample is lost as the crust is developed, which results in a higher rate of oil absorption. Pores affect oil absorption. Oil enters into pores provided by moisture loss mainly during the cooling stage. In addition, shrinkage may be observed during frying. It is important to examine these changes at the micro level. Variation of the physical properties of food products during frying should be known because they affect the rate of heat and mass transfer during frying. Geometric properties such as shape, size, surface area, volume and density of foods change during frying. Due to changes in composition (moisture and oil content), Introduction temperature and porosity, thermal properties also change during frying. Convective heat transfer coefficient changes with oil temperature & oil degradation. It also changes during frying, and it is different at the top and bottom surfaces of the product due to the effect of steam bubbling. Changes in pore structure influence moisture diffusivity and oil uptake. Moisture diffusivity is also affected by frying time, temperature, and product moisture content. Biochemical changes in food material being fried and also in frying oil or fat are important in frying.

Gelatinization of starch, denaturation of proteins, inactivation of enzymes, & destruction of microorganisms are also observed in the product being fried depending on its constituents, as in other food processes (e.g. drying, baking). However, various flavor components found in fried products are not developed during other cooking methods such as baking, Frying is a complex process. The coupling between reactions and heat and mass transfer are poorly understood. Oil is exposed to high temperature in air and moisture during frying. A number of chemical reactions such as hydrolysis, and oxidative & thermal degradations take place under these conditions. Consequently, the quality of the frying oil and of the fried food is lost. Some desirable chemical compounds are also formed in the oils during frying. It is important to assess the quality of oil because it is absorbed by the food and becomes part of the product. Frying temperature and time, surface area of the material being fried, and usage of pretreatments such as blanching, drying, coating, or immersion in sugar solutions affect the quality of the product.

Moisture content, oil content, acrylamide content, density, porosity, shrinkage, color and texture are the most important quality parameters in fried products.

The temperature of the food is much less than the oil. The fat must be kept hot enough to keep the water in the food boiling and producing steam and to swell the starch granules in the interior of the food. The fat must not be so hot that it chars the outside before the inside is cooked or strips the water from the starch gel, which leads to collapse of the interior structure of foods. If the food is cooked for too long after all the water has steamed off it will absorb excess fat. The amount of oil entering the food is directly proportional to the amount of moisture lost. It is also proposed that the oil enters the food during frying and, probably to a greater extent from adhering oil being pulled into the food when it is removed from the fat due to condensation of steam producing a vacuum. It is suggested that oil uptake is primarily a surface phenomenon with oil penetrating the potato after it is removed from the frying pan due to adhesion of oil to the surface of the food. The core of the product absorbs little oil. As food absorbs the frying fat, food lipids and colour pigments from the food are solubilised and released into the frying fat.

Vegetable oil frying process :

1. Frying uses fats and oils as a heat transfer medium. A crust is formed which seals in the water keeping the centre moist and reducing uptake of fat.
2. Prolonged heating, high temperatures, moisture, light impurities and oxygen cause hydrolysis, oxidation and polymerization of fats resulting in darker fat, strong flavors, lowers smoke point, foaming and viscosity. The more unsaturated a fat the faster it will breakdown.
3. Older fat cooks food less efficiently resulting is greasy, under cooked food.
4. Heating fats causes the formation of substances, which may be atherogenic, but these tend to occur after the point when sensory evaluation indicates the fat is unacceptable to use.
5. Sensory evaluation and total polar compounds are useful methods to indicate when to discard fats.
6. The fat content of the food is influenced by the size, cut and moisture level, frying temperature, quality of the oil and post-frying practice related to drainage.

Study on frying performance of edible oils

Study has been carried out by frying with different blends of oils like Rice bran oil, Sunflower oil and groundnut oil. Different combinations of the selected blends were made in the ratio of 20:80 and vice versa. During the frying process all the selected oils were used to fry the potato chips and the oil left was used for second and third subsequent frying. All the oils and their combination were tested upto five repeated frying trials at temperature 175^{0}C $\pm$ 5^{0}C. Different analytical parameters like iodine value, acid value, flash point and rancidity were conducted before and after frying.

Changes observed by repeated frying.

i) **Foaming** - Foaming is increased as the oil degrades. The bubbles get larger as the flat ages and viscosity increases.

ii) **Viscosity** - Viscosity increases during frying due to oxidation and formation of larger molecules through polymerization.

iii) **Flash Point** - The higher the smoke point, the better the quality of fat for frying, preferably above 200^{0}C. It gets lowered each time after repeated frying due to hydrolysis of some fat molecules .

iv) **Breakdown Products** - A wide variety of end-products are formed which can have adverse effects on the flavor, colour and texture of the fried food as well as reducing the time an oil can be used for frying.

v) **Changes in fatty acids** - An increase in saturated fatty acids and a reduction in polyunsaturated fatty acids in the cooking fat during deep-frying. There was a tremendous increase in the acid value after every repeated frying making the oil undesirable for health.

vi) **Fat degradation process observed during and after frying** - As oil degrades the specific gravity increases, heat capacity, and surface tension decrease and contact time between the oil and the food increases causing changes in heat transfer. Volatile & non-volatile decomposition products are formed, free fatty acid content increases, iodine value decreases, fat darkens, strong flavors develop, the smoke point is lowered and there is increased foaming and viscosity.

This can be summarized below:-

- Stability (iodine value) - Decreases
- Free Fatty Acids(acidity) - Increases
- Odour - Increases
- Colour darkens - Increase
- Taste - becomes poor - unpleasant
- Viscosity - Increases
- Foaming - Increases

Conclusion

Among the selected edible oils it has been observed that no oil is stable after first frying, however the combination of oils could be used to reach to desired number of frying for commercial purposes. Among the combinations selected it is observed that the combination of Groundnut oil and Sunflower Oil in the ratio of 40:60, 60:40 and 80:20 respectively are recommended. It has been observed that in any of the oils as the percentage of groundnut increases the stability increases. Also as the percentage of Rice bran oil increases the stability decreases. A higher temperature increases fat degradation. It was observed that temperatures of 190^{0}C compared to 170^{0}C resulted in a higher amount of decomposition products, increased colour, viscosity, free fatty acids and reduced iodine values. Excess energy in the oil leads to a tough outer layer of the food, polymer formation in the oil and faster degradation. If the temperature is too low there is a lack of crust formation on the surface of the food allowing extra fat to penetrate resulting in high absorption of oil in the food and keeping frying food partially fried with higher moisture content in the food. The correct temperature balances the rate of surface water loss with the inherent thermo-dynamics of the food which is found to be 175^{0}C $\pm$ 5^{0}C as optimum.

Trade News

Indonesia palm exports seen up as much as 9 percentage in 2013

Due to improving global financial conditions, palm oil export from Indonesia may increase up to 9% this year. Palm oil exports were little changed in 2012 at 16.5 million tonnes but this will rise to between 17 million - 18 million tonnes in 2013, as per the Fadhil Hasan, executive director at the Indonesian Palm Oil Association (GAPKI).

Demand for the edible oil eased last year due to the global economic slowdown, which has led to record-high inventories. Benchmark palm oil futures notched its worst annual performance since the financial crisis in 2008, losing more than one-fifth.

Hasan said that current palm oil inventory levels in Southeast Asia's largest economy were between 3 million - 4 million tonnes versus typical levels of around 1.5 million tonnes.

China may emerge as major producer of Olive oil

Ambitious olive plantation in China can result into replacement of Spain as major olive oil producer. In few years china could have 59 million olive trees in full production. This will match the plantation area of Jaén, the biggest olive oil producing region globally.

Cheap labour and availability of abundance of water is major advantage in growing olive plantation on large scale. During spring the melted ice make large quantity of water available mountain side plantation in the provinces such as Gansu, Sichuan and Shaanxi.

As per the estimates of International Olive Council, olive oil and olive pomace oil import in china has increased 38% in year 2011-12.

With current pace of expansion, China within a decade will be in position of challenging the prominence of Spain.

2.5% duty on import of crude edible oils

Indian Government has slapped 2.5% duty of import of edible oils. This move will help domestic oil seed growers. Though, the duty on refined palm oil will remain unchanged.

Indian farmers lobby was demanding duty on import of edible oil after Malaysia removed export duty on crude palm oil in January 2013.

Royalty free soyabean in lieu of Patent dispute

In a royalty dispute with Monsanto, Brazilian farmers reached court late last year, which ordered the company to suspend royalty collection in the state of Mato Grosso.

Monsanto, which is world's biggest seed company, supplied Roundup Ready soyabean to the farmers. The soyabean seed that is genetically modified to tolerate glyphosate herbicide is marketed as Roundup.

Dispute arises when growers stopped payment of royalty claiming patent on the original Roundup ready soyabean expired in 2010. Company's argument was that Brazilian law extends the patent to late 2014, when it expires in the USA.

The farmers signed an agreement in which company shall waive royalty on roundup variety for two years while the farmers will leave their demand to recoup the royalties previously paid.

The agreement resolves uncertainty about Monsanto's ability to collect fees on its new Intacta soybean, which is scheduled to begin sales in Brazil during the next growing season. Intacta is engineered to produce an insecticide as well as to tolerate Roundup.

Solazyme tie-up with Mitsui

Algal oil producer Solazyme has entered a $20m multi- year deal with Japan-based Mitsui & Co. Ltd. to jointly develop a suite of triglyceride oils for use in the oleo chemical industry.

The deal includes further development of Solazyme's high myristic algal oil as well as other oils that Solazyme said it is developing for the oleo chemical and industrial sectors. End user applications can include high-performance polymer additives, aviation lubricants, and toiletry and household products.

Solazyme's technology enables manipulation of algae to produce oils that are tailored with specific fatty acid components. For example, the company was able to produce tailored algal oils with high levels of lauric acid or high levels of myristic acid, or even oils that have increased or decreased saturated fatty acid components.

Mitsui said it is looking forward to strengthening its position in the oleo chemical industry through the successful development and commercialization of Solazyme's oils as potential source of new sustainable materials to oleo chemical companies including Mitsui's oleo chemical subsidiary, Palm-Oleo Sdn.Bhd based in Malaysia.

Asia, by the way, accounts for 58% of the total world production of fatty acids, and Malaysia, China, Indonesia and India account for 92% of Asia's fatty acid production, according to IHS' Natural Fatty Acids report released last year in July. Global fatty acid consumption is reportedly expected to grow at a rate of 3% per year during the next five years.

Edible oil imports likely to surge 33% to 14 mt by 2020

In a presentation regarding import estimate, before Agricultural Ministry, SEA (Solvent Extractors Association) is of opinion that edible oil imports are pegged to rise 33 per cent to 14 million ton by 2020 so as to meet the rising domestic demand.

The edible oil imports are pegged to rise to over 13.9 million ton by 2020, from 10.5 million ton estimated in the ongoing 2012-13 marketing year ending October this year. With regard to consumption, SEA stated that the domestic demand is estimated to rise by 3 percent to 23 million ton by 2020 from 17.5 million ton in 2013.

As per the presentation, "due to high growth in income levels, increasing trend in spending and better living standards, India promises to continue high growth in consumption of edible oils. The consumption may reach 23 million tonne by 2020 at 3 percent growth rate."

The presentation further highlighted that the stagnant domestic oil output is leading to higher imports to feed the growing Indian demand.

High – Oleic Soya oil – Rival to Olive oil

High oleic soyabean oil is emerging fast as an alternative to olive oil. The new soyabean oil has better stability and shelf life. In USA the production of high oleic soya oil has increased by twenty fold in less than five years and the biotech giants Monsanto and DuPont expect that its demand will grow fast. About 50,000 tons of the new soybean oil are due to be made in the United States this year. But output is to soar to 143,000 tons next year and more than a million in 2017, with exports then exceeding 31,000 tons and 1.9 million hectares under cultivation.

The Monsanto and DuPont both used the biotech process of gene silencing to increase oleic acid content. DuPont claims a level of more than 75 percent, "similar to olive oil." In comparison, the American Oil Chemists' Society says that the newest generation of high-oleic canola oil is up to 80 percent oleic acid and dominates the high oleic market.

To facilitate global trade in new soya oil, US are seeking inclusion of standards for high oleic soya oil in Codex. Meanwhile, Colombia is also looking for a Codex standard for high-oleic version of regular palm oil. Production of the high oleic palm variety, called OxG, is forecast to reach 210,000 tons in Latin America alone by 2015, with 170,000 tons available for export.

Looking at development and acceptability in market of the mid - oleic sunflower oil which became available in 1998 and by 2005 captured most of the sunflower oil market in North America. With improved functionality and stability, demand for high-oleic soybean oil will increase even more rapidly, than high oleic sunflower oil.

To face the emerging challenges which the high oleic oil are posing to olive oil monopoly, the olive oil manufacturing countries are spreading awareness about the health benefits and suitability of olive oil.

Cargill Expanding Palm-Oil Plantations in Indonesia

To meet the raising global demand, the Cargill is planning to expand its palm oil plantation in Indonesia. As the palm oil is being used extensively for human consumption and other industrial activities, the expansion will strengthen Cargill position in palm oil business.

Palm oil prices have been more than twice the cost of production for several years now, spurring a boom in output not seen in any other farm commodity in Asia for decades. Indonesia's annual palm oil output is now around 26 million tons, up from around 5.8 million tons in 1998.

The John Hartmann, COO of Cargill Tropical Palm Holdings Ltd said that while global demand for edible oils is rising by around 3% annually, palm-oil consumption growth is as high as 7%, and there is a large scope to expand production in waste and degraded lands.

Cargill produces around 300,000 tons of crude palm oil in Indonesia annually and is in the process of acquiring 5,600 hectares of land in South Sumatra, boosting its plantation area in Indonesia by 13%. It has more than 42,000 hectares of oil-palm plantations in the country and production tie-ups with local smallholders in an additional 27,000 hectares.

The expansion of oil palm plantation is in advance stage and will be completed within a year. Cargill has 6,000 hectares of plantations in South Sumatra and it will reach full maturity by next year. This will increase companies' annual crude palm-oil output by 20,000 tons. A new 60 tons per hour crushing facility is being set up to handle the increase in production of palm.

Cargill's annual plantations yield is around 25 tons a hectare, well above the national average of 17 tons. In recent years the Palm oil plantation has attracted attention of environmentalist in Indonesia & Malaysia both, because the large scale palm plantation is increasing deforestation, emissions of greenhouse gases & threatening endangered animal species.

Anthony Yeow, president-director of the company's oil-palm plantations in Sumatra told Dow Jones Newswires said "We are aggressively looking for new areas in Sulawesi, Central Kalimantan and South Sumatra that are environmentally safe to expand our oil-palm footprint,"

Hartmann also stated that Cargill won't invest in peatlands to grow oil palms and favors extension of Indonesia's moratorium on new commercial concessions in primary forests that will expire in a few weeks.

Mr. Hartmann said most of Cargill's Indonesia plantations are certified as "sustainable" by the Roundtable on Sustainable Palm Oil and the remainder will also get the certificate by the end of this year. RSPO is a private body, whose members include both plantations and environmental organizations, which certifies oil palm plantations as sustainable if they meet certain principles and criteria.

India February 2013 Vegetable Oil imports at 9.6 lakh tons, 10.55 % up y/y

MUMBAI (Commodity Online) : India's imports of vegetable oils during February 2013 has been reported at 969,175 tons compared to 876,669 tons in February 2012, up by 10.55 %.

The tranche consists of of 954,176 tons of edible oils and 14,999 tons of non-edible oils, according to Solvent Extractor's Association of India, nation's industrial body on vegetable oils.

The overall import of vegetable oils during November 2012 to February 2013 is reported at 3,735,263 tons compared to 3,061,923 i.e. up by 21.99%.

The stock of edible oils as on 1st March, 2013 at various ports is estimated at 930,000 tons (CPO 680,000 tons, RBD Palmolein 105,000 tons, Degummed Soybean Oil 35,000 tons, Crude Sunflower Oil 110,000 tons and about 1,030,000 tons in pipelines due to excessive import during last 3 months.

Total stock, both at ports and in pipelines has increased to 1,960,000 tons, nearly 40 days consumption requirement by the country against usual stock of 30 days.

Import of refined oil (RBD Palmolein) during November 2012 to February 2013 is reported at 483,291 tons compared to 635,172 tons during the same period of last year. Share of refined oil is 14%, while crude oil share is 86% and reported at 3,163,239 tons compared to 2,368,232 tons during the same period of last year.

During November 2012 to February 2013 Palm Oil import increased to 3,103,835 tons compared to 2,470,692 tons during the same period of last year. Also, Soft oils import marginally increased to 542,695 tons compared to 532,712 tons last year.

In last one year, RBD Palmolein has fallen by $234 (21%), CPO by $257(24%), while Soft Oils remained at more or less same level. Also, in last one year rupee has further depreciated by Rs. 4.63 per dollar (9.41%). Depreciation of rupee was compensated much more by fall in price and hence Indian consumers were insulated from rupee depreciation.

Currently, Malaysia & Indonesia have huge palm oil stock of over 7 million tones. In order to get rid of this excess stock, these palm oil producing countries are pushing aggressively their exports into India, thereby depressing local prices.

Import of Non-edible oils during February 2013 is reported at 14,999 tons compared to 3,356 tons during the same period of last year.

The overall import of non-edible oils during November 2-12 to February 2013 is reported at 88,733 tons compared to 58,518 tons during the same period last year. i.e. up by 52% P.F.A.D., C.P.K.O. and RBD Palm Sterin are the major import of non-edible oils

Adulteration and Food Fraud - A Global Phenomenon

(Compiled by C. S. Joshi)

Food adulteration and food fraud is not new to India. We all are aware about adulteration. But surprisingly it is not only local or Indian issue but is a global phenomenon. The problem of food fraud and economically motivated adulteration has started posing risk to food safety and consumer health globally.

German chemist "Frederick Accum" in 1820 first time investigated the toxic metal coloring in food and drinks. "Arthur Hill Hassall" was a physician who also conducted extensive studies in early 1850 and published finding in the general weekly medical journal "The Lancet". This led to passing of 1860 Food Adulteration act and other legislation in UK. But even before back in 18th century, there were complaints regarding food adulteration.

In 20th century with advent of industrialization in USA, the cases of food adulteration also grew up rapidly. The frequent occurrence of food adulteration led the "New York Evening Post" to parody :

Mary had a little lamb,
And when she saw it sicken,
She shipped it off to Packingtown,
And now it's labeled chicken.

The book "Death in the Pot : The Impact of Food Poisoning on History" by Morton Satin, shed light on the unseen face of food adulteration and poisoning that changed the course of history.

According to FSSAI (Food Safety and Standard Authority of India) Food adulteration is an act of intentionally debasing the quality of food offered for sale by the admixture or substitution of inferior substances or by the removal of some valuable ingredient. An adulterant is any material which is or could be employed for making the food unsafe or sub-standard or misbranded or containing extraneous matter. Food is declared adulterated if :

- A substance is added which depreciates or injuriously affects it.
- Cheaper or inferior substances are substituted wholly or in part.
- Any valuable or necessary constituent has been wholly or in part abstracted.
- It is an imitation.
- It is colored or otherwise treated to improve its appearance or if it contains any added substance injurious to health.
- For whatever reasons its quality is below the standard.

Food adulteration is the act of intentionally debasing the quality of food offered for sale either by the admixture or substitution of inferior substances or by the removal of some valuable ingredient. Food is declared adulterated.

In USA, "Adulteration" in a legal term, that a food product which fails to meet federal or state standards. Adulteration usually refers to noncompliance with health or safety standards as determined, in the United States, by the FDA and the U.S. Department of Agriculture (USDA).

Recently the US organization has reported a number of food frauds in prevalence. US Pharmacopeial Convention (USP), an independent science non-profit, announced that its updated database showed incidences of food fraud increasing dramatically in 2011 and last year. The database is made up of 1,300 academic and news reports of food fraud spanning the 30-year period between 1980 and 2010. However, the updated database records 800 new examples of food fraud published in 2011 and last year. USP's findings show that milk, olive oil and spices continue to have a high vulnerability to food fraud, with dilution the most common cause of problems. According to the USP research, below are the most adulterated foods along with a list of the "fake" ingredients found in them.

1. Olive Oil – non-olive oils such as corn oil, hazelnut oil and palm oil.
2. Milk – whey, bovine milk protein, melamine, and cane sugar.
3. Honey – high fructose corn syrup, glucose, and fructose.
4. Saffron – sandlewood dust, starch, yellow dye, and gelatin threads.
5. Orange Juice – grapefruit juice, marigold flower extract, corn sugar and paprika extract.
6. Coffee – chicory, roasted corn, caramel, malt, glucose, leguminous plants and maltodextrins.
7. Apple Juice – high-fructose corn syrup, raisin sweetener and synthetic malic acid.
8. Grape Wine – apple juice and a toxic sweet chemical called diethyleneglycol.
9. Maple Syrup – corn syrup, beet sugar, and cane sugar.
10. Vanilla Extract – synthetically-produced vanillin and maltol.

Few incidents of adulteration

- In 1987 Beech-Nut was fined for violating the US Federal Food, Drug, and Cosmetic Act by selling flavored sugar water as apple juice.
- In 1997 ConAgra Foods illegally sprayed water on stored grain to increase its weight.
- In 2007 samples of wheat gluten mixed with melamine, presumably to produce inflated results from tests for protein content, were discovered in the USA. They were found to have come from China.
- In 2008 significant portions of China's milk supply were found to have been adulterated with melamine. Infant formula produced from this milk killed at least six children and is believed to have harmed thousands of others.
- In 2012 a study in India across 33 states found that milk was adulterated with detergent, fat and even urea, and diluted with water. Just 31.5% of samples conformed to FSSAI standards.
- The 2013 meat adulteration scandal, in which horse meat was passed off as beef.

Examples of adulteration in food & beverages

Here is the list of some common adulterant found in the consumer items.

- Roasted chicory roots used as an adulterant for coffee
- Diethylene glycol, used dangerously by some winemakers in sweet wines
- Apple jellies (jams), as substitutes for more expensive fruit jellies, with added colorant and sometimes even specks of wood that simulate raspberry or strawberry seeds
- Water, for diluting milk and beer and hard drinks
- Cutting agents used to adulterate illicit drugs - for example, shoe polish in hashish, amphetamines in ecstasy, lactose in cocaine
- Urea, melamine and other non-protein nitrogen sources, added to protein products in order to inflate crude protein content measurements
- High fructose corn syrup or cane sugar, used to adulterate honey
- Water or brine injected into chicken, pork or other meats to increase their weight.

Some fine wines are complimented for their grassy aroma, but if your cup of tea has that earthy, sweet scent, it might be because the tea manufacturer put lawn cuttings in it. This means the instances of food manufacturers doing things such as adding lawn grass and fern leaves to tea is much greater than originally thought. The practice is known as food fraud, and it is used as a cost-cutting measure by food manufacturers.

1. Indian authorities discovered in a study last year that most samples of the country's milk were diluted or contained unappetizing agents such as hydrogen peroxide, detergent and urea. Some South American milk producers replaced milk fat with vegetable oil, another product susceptible to food fraud.
2. Olive oil is most often diluted with lower quality versions of the product. In India edible oil sold in lose are often adulterated with other cheap oils such as palmolein and rice bran. There are reports also show instances of waste oil being used as cooking oil in China.
3. The new reports reveal that seafood, lemon juice and tea are also especially vulnerable to food fraud.
4. A 2009 study showed that sushi restaurants frequently misrepresented what sort of fish they were selling. The USP is particularly concerned with the sale of escolar fish, which is banned in multiple countries because it can cause a special form of food poisoning. Fish sellers will sometimes sell escolar as white tuna or butterfish.
5. Some of the reports contain documents dating back to the 19th century that show how food sellers would dilute gin with water to increase its weight and add cayenne, sugar and cinnamon to gin for taste.
6. Food fraud has caused significant public outcry in recent history. In UK, reports surfaced that some beef burgers sold in British supermarket chains contained horse and pig DNA. One sample of Tesco Everyday Value Beef Burgers showed that horsemeat accounted for 29 percent relative to the burger's beef content.
7. In 2008, china experienced the worst food safety issue of the century, when because of melamine contaminated milk six infants died and 3, 00,000 babies fell ill. Melamine was deliberately added to pass milk powder quality tests.
8. In Myanmar the palm oil mixed with melting point lowering chemical is being sold as peanut oil. Peanut oil is widely consumed in Myanmar. The palm oil is mixed with chemical named "Ma Khel Say"to stop solidifying the at low temperature. This chemical is imported from china.
9. In 2010 the study conducted by UC (University of California) Davis, olive center shows that more the 69% of imported extra Virgin olive oil did not meet the standards of extra virgin.
10. In USA conservation group, Oceana collected 674 fish samples from 21 states. The DNA testing of the collected fish samples shows that 33% of the total 1,215 samples collected were mislabeled.
11. In a recently conducted survey by FSSAI, across India, where a total of 1,791 samples drawn from 33 states and Union Territories, to identify common adulterants like urea, detergent, skimmed milk powder, hydrogen

peroxide, starch, etc. The FSSAI found that out of the total tested samples, 68.4% samples were non-conforming to set standards of which 46.8% were deficient in fat and solid no-fat content (SNF) and 44.69% had skimmed milk powder (SMP). Detergent was found in 8.4% of the total samples.

The non-conforming samples in rural areas numbered 381 (31%) out of which 64 (16.7%) were packet milk and 317 (83.2%) were loose samples.

In urban areas, the number of non-confirming samples were 845 (68.9%) out of which 282 (33.3%) were packed and 563 (66.6%) were loose.

Only in Goa and Pondicherry did 100% of the samples tested conform to required standards. At the other end were West Bengal, Bihar, Chhattisgarh, Jharkhand, Orissa and Mizoram, where not a single sample tested met the norms.

Other prominent states fared just a shade better. Around 89% of the samples tested from Gujarat, 83% from Jammu & Kashmir, 81% from Punjab, 76% from Rajasthan, 70% from Delhi and Haryana and 65% from Maharashtra failed the test. Around half of the samples from Madhya Pradesh (48%) also met a similar fate.

States with comparatively better results included Kerala where 28% of samples did not conform to the FSSAI standards, Karnataka (22%), Tamil Nadu (12%) & Andhra Pradesh (6.7%).

12. The study, by the Indian Medical Academy, said, "About 49% boil milk more than thrice before consumption. Around 56% boil it for more than 5 minutes, and 73% don't stir while boiling," said Dr Pawan Gupta, IMA.

13. Another area of concern is honey. Recently honey samples picked up by FSSAI too found antibiotic residue in honey. Earlier, the food and feed control authorities of the member states of the EU had also found Indian honey contaminated with prohibited antibiotics, like nitrofuran and chloramphenicol, tetracycline and streptomycin. The standards for honey prescribed under prevention of food adulteration rules only specify the maximum limits of heavy metal etc. So far, there are no standards for antibiotics in honey in India. In last few years, there have been reports of antibiotic contamination in honey exported from India and also in honey available in the domestic market.

    Experts say that move gains significance keeping in view the recent reports of drug resistant bugs present in India. "The presence of antibiotics unnecessarily enhances immunity which could harm the body in the long run. The problem of presence of drug resistance bugs can also not be ignored,"

    FSSAI also stated, that "Milk and milk products, atta, edible oils, cereals, condiments (whole and ground), pulses, coffee, tea, confectionery, baking powder, non-alcoholic beverages, vinegar, besan and curry powder are the most common adulterated foods. List of most common adulterant is as given below -

Common Adulterant in India :

a) The green colour of green vegetable, lady fingers, and peas is enhanced by adding Malachite Green.

b) Turmeric and Pulses are colored yellow with highly carcinogenic Metanil Yellow and lead chromate.

c) Pulses are also contaminated with khesri dal.

d) Black pepper is contaminated with dried papaya seeds.

e) Mustard oil, coconut oil, ground nut oil and other oils are often mixed with palmolein and refined rice bran oil to gain profit.

f) Milk & milk products like khoya are often mixed with starch.

g) Coffee powder is mixed with tamarind seed powder & chicory.

h) Gram flour (Besan) is mixed with pea's powder.

i) Butter and desi ghee with animal fats & vanaspati ghee.

j) Salt is mixed in laundry soap and detergents to increase weight.

k) Milk is contaminated with dirty water and synthetic milk produced from liquid detergent, urea and refined oil. It also contaminated with white colored distemper.

l) Cheap ice creams are manufactured with using non edible colour; artificial sweetener and untreated water is perfect recipe for falling ill.

m) Local food items such as jellies and jam are manufacture with non edible colour & artificial sweetener.

n) The fruits such as orange, mausambi and watermelon are injected with non edible colour, artificial sweetener and water to enhance appearance and weight.

o) Milk cream is adulterated with gelatine & formaldehyde is used as a preservative.

p) Unbranded water bottles and water pouch are prepared with untreated water or with water with doubt full quality parameters.

q) Ice is manufactured with water having doubtful quality.

r) Ground spices are adulterated with ber guthli or with substandard spices itself.

s) Honey is mixed with sugar syrup.

t) Wine is mixed with alcohol, burnt sugar and water.

u) Tea leaves are often adulterated with iron filling and colored wood powder.

v) Mangos and bananas are ripened with carbide.

w) Aflatoxins in ground nut.

x) Apples are sprayed with lead arsenate.

y) Oxytocin is present in milk when animal is injected with this hormone to extract milk.

z) Present of methanol in locally brewed wine makes it poisons'.

Consumer awareness is the remedy for eliminating the evil of adulteration and the sale of sub-standard food articles," the country's food regulator said.

The economically motivated food adulteration is not only cheating the consumers but emerging as a serious public health threat also.

Important Figures :
World Scenario

Chart 1 : 2009 World Edible Oil Production

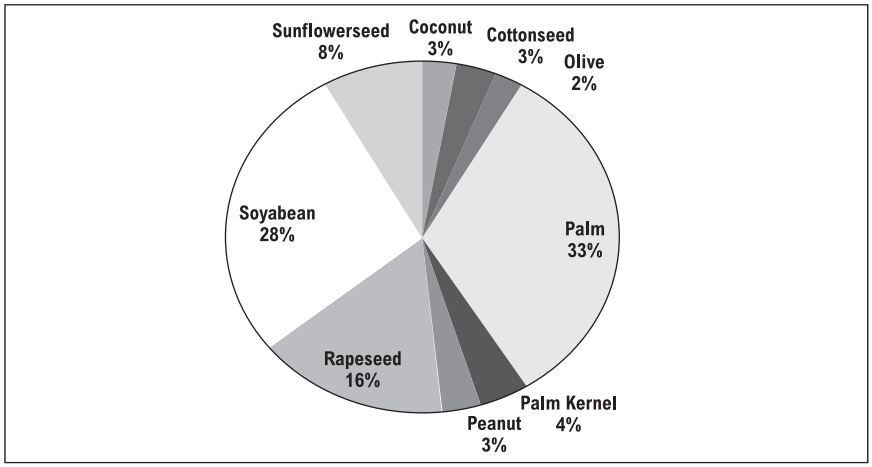


Chart 2 : World Palm Oil Production

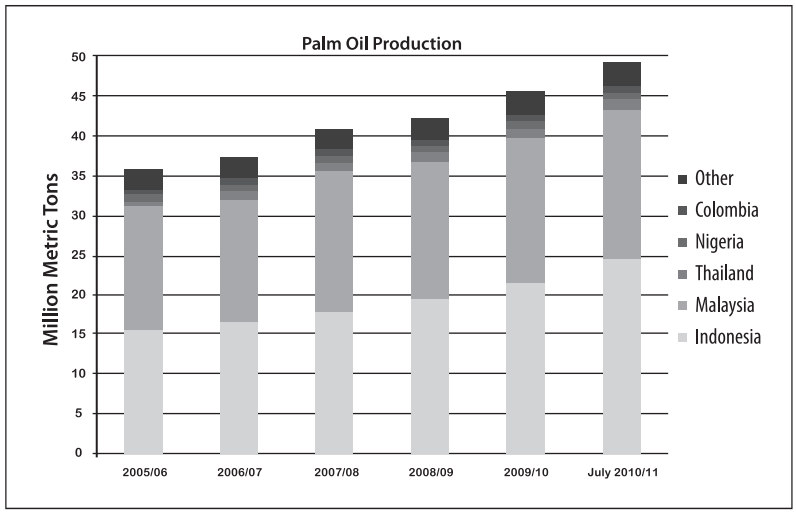


Chart 3 : Palm Oil Imports

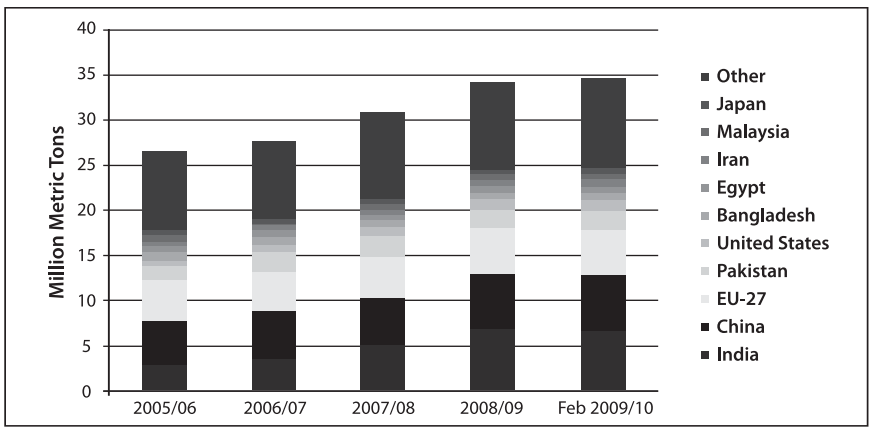


Chart 4 : Palm Oil exports

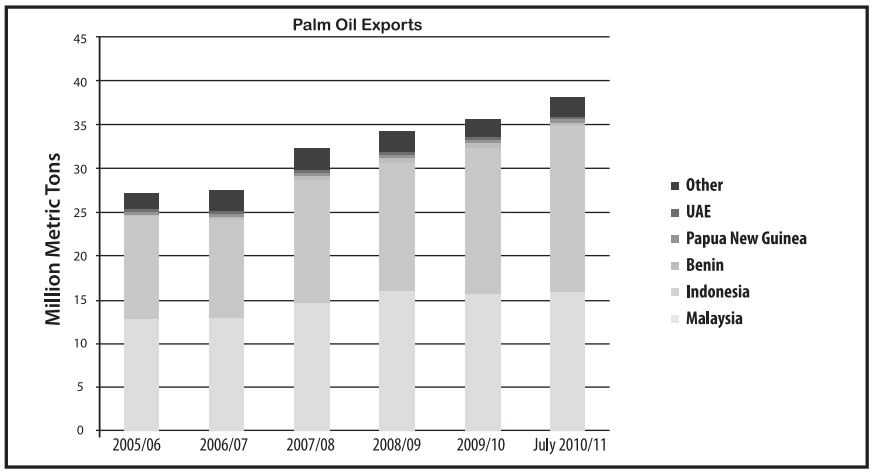


Chart 5 : Domestic Palm Oil Consumption

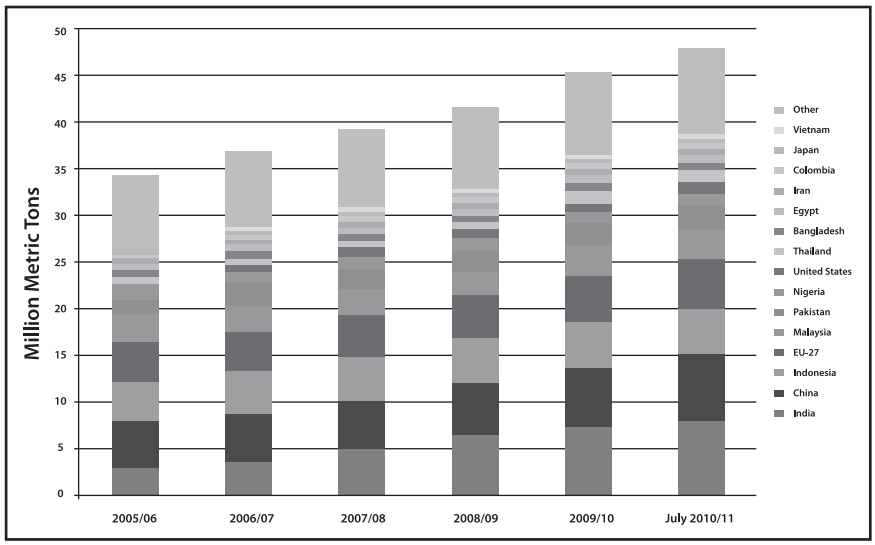


Chart 6 : Palm Oil Ending Stocks

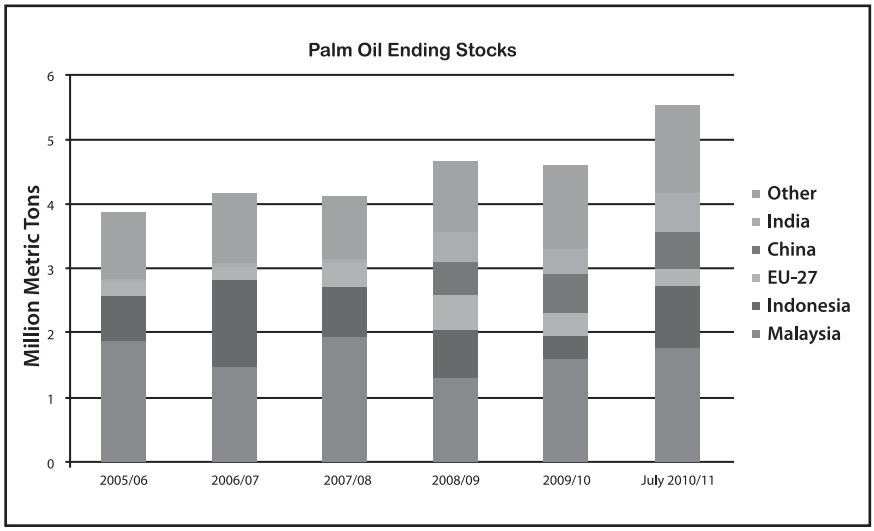


Chart 7 :

Countries and regions with the largest consumption, production, exports & imports of nine major vegetable oils in 2011/12.

	Population (in Millions)	Consumption (kg/person/year)	Production (kg/person/year)	Exports (kg/person/year)	Imports (kg/person/year)	Kg/person (kg/person/year)
China	1354	29.24	21.00		9.23	21.6
EU-27	504	23.54	16.79	2.05	8.68	46.7
India	1210	16.89			10.03	14.0
USA	315	12.81	10.06		3.83	40.7
Indonesia	238	8.92	29.89	20.53		37.4
Brazil	194	6.45	7.92	1.94		33.2
Malaysia	30	4.76	20.38	17.61	2.67	158.7
Pakistan	182	3.49			2.19	19.2
Argentina	40	3.58	8.35	4.64		89.5
Russia	143	3.22				22.5
Mexico	117	2.22				19.0
Egypt	84	2.29			2.29	27.3
Japan	127	2.16				17.0
Nigeria	167	1.86				11.1
Turkey	76	1.79			1.12	23.6
Bangladesh	153				1.40	
Canada	35			2.75		
Ukraine	46			3.33		
Iran	77				1.24	
Other		26.84	41.33	10.63	18.41	
TOTAL	**7072**	**150.03**	**155.71**	**63.47**	**61.09**	**21.2**

Source : (USDA February 2013 for vegetable oils and Wikipedia for population)

Chart 8 : International Price of Oil in US$/Ton

	Period	Groundnut oil	Coconut oil	Palm oil	Rapseed Oil	Soya Oil	Sunflower Oil
January	2011	1,788.00	2,038.00	1,281.00	1,447.00	1,374.00	1,492.00
February	2011	1,730.00	2,256.00	1,292.00	1,402.00	1,365.00	1,456.00
March	2011	1,650.00	1,925.00	1,180.00	1,414.00	1,307.00	1,389.00
April	2011	1,680.00	2,089.00	1,149.00	1,450.00	1,315.00	1,405.00
May	2011	1,680.00	2,097.00	1,159.00	1,412.00	1,294.00	1,411.00
June	2011	1,980.00	1,803.00	1,133.00	1,410.00	1,324.00	1,461.00
July	2011	2,120.00	1,662.00	1,089.00	1,391.00	1,337.00	1,433.00
August	2011	2,120.00	1,454.00	1,083.00	1,363.00	1,330.00	1,327.00
September	2011	2,120.00	1,305.00	1,065.00	1,315.00	1,305.00	1,299.00
October	2011	2,120.00	1,208.00	994.00	1,275.00	1,220.00	1,212.00
November	2011	2,225.00	1,479.00	1,053.00	1,290.00	1,217.00	1,248.00
December	2011	2,225.00	1,445.00	1,027.00	1,252.00	1,204.00	1,190.00
January	2012	2,225.00	1,451.00	1,061.00	1,257.00	1,218.00	1,208.00
February	2012	2,225.00	1,411.00	1,106.00	1,295.00	1,255.00	1,249.00
March	2012	2,225.00	1,338.00	1,153.00	1,292.00	1,287.00	1,266.00
April	2012	2,225.00	1,348.00	1,181.00	1,305.00	1,310.00	1,324.00
May	2012	2,555.00	1,155.00	1,085.00	1,235.00	1,218.00	1,275.00
June	2012	2,520.00	1,058.00	999.00	1,185.00	1,180.00	1,192.00
July	2012	2,468.00	1,070.00	1,015.00	1,212.00	1,239.00	1,258.00
August	2012	2,553.00	1,001.00	997.00	1,232.00	1,252.00	1,300.00
September	2012	2,408.00	967.00	967.00	1,271.00	1,283.00	1,331.00
October	2012	2,375.00	898.00	839.00	1,217.00	1,175.00	1,245.00
November	2012	2,303.00	NA	813.00	1,188.00	1,135.00	1,237.00
December	2012	2,216.00	785.00	776.00	1,190.00	1,163.00	1,165.00
January	2013			740.00		1,148.00	1,165.00

Source : FAO

Chart-10 : Soy oil Balance Sheet (2012-13) (Values in million MT)

Soya Oil						
Country	**Opening Stock**	Production Estimates	Domestic Consumption	**Exports**	**Imports**	**Ending Stocks**
Argentina	0.28	7.30	4.07	4.07	0.00	0.19
Brazil	0.40	7.08	1.73	1.73	0.00	0.38
China	0.62	11.71	1.46	0.06	1.40	0.85
India	0.37	1.77	1.16	0.01	1.15	0.23
United States	1.15	8.30	0.98	0.82	0.16	0.67

Source : Directorate of Economics & Statistics

Chart-11 : Rapeseed oil Balance Sheet (2012-13) (Values in million MT)

Country	**Opening Stock**	Production Estimates	Domestic Consumption	**Exports**	**Imports**	**Ending Stocks**
Canada	0.001	0.292	0.05	0.25	0.009	0.002
China	0.0836	0.5195	0.6072	0.0005	0.075	0.0704
EU-27	0.0156	0.9059	0.9315	0.02	0.05	0.02
India	0.0233	0.227	0.245	0.001	0.003	0.0073

Source : Directorate of Economics & Statistics

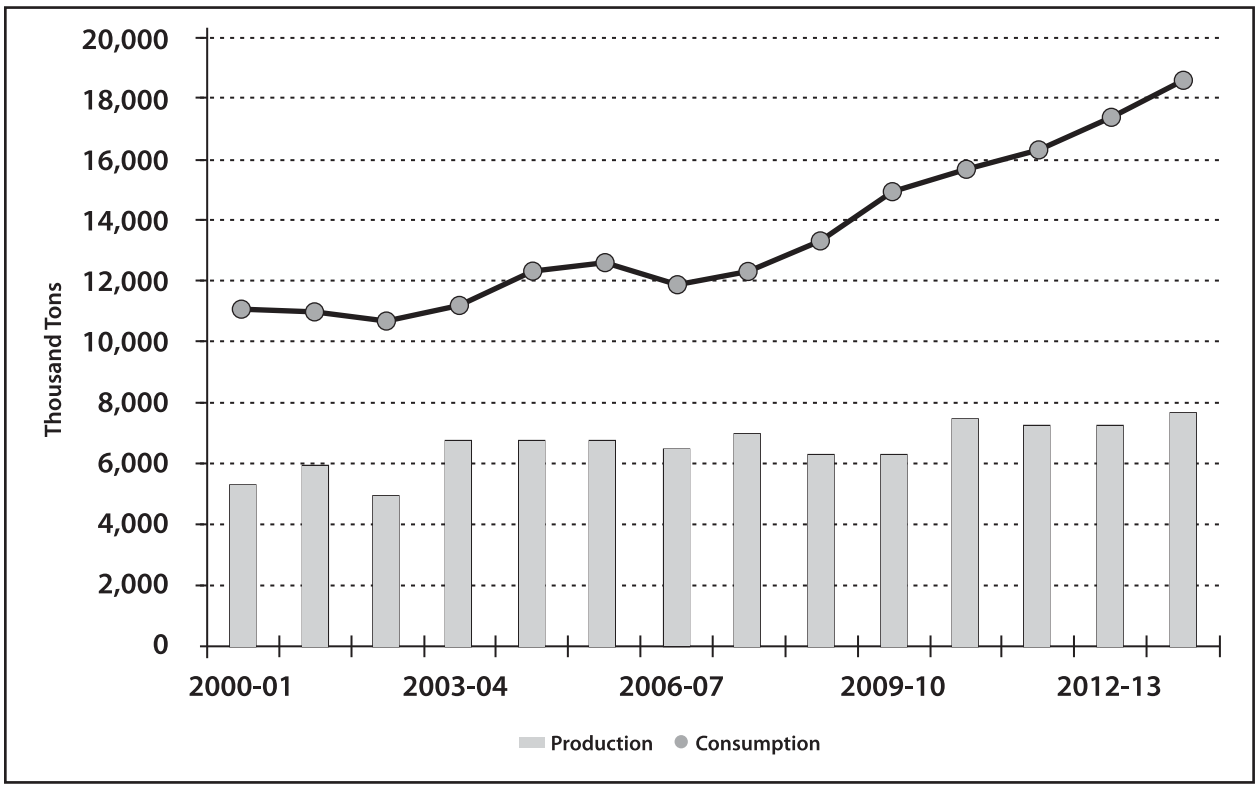
Chart-12 : Sunflower oil Balance Sheet (2012-13) (Values in million MT)

Country	**Opening Stock**	Production Estimates	Domestic Consumption	**Exports**	**Imports**	**Ending Stocks**
Argentina	0.572	1.425	0.517	1.1	0	0.38
India	0.137	0.202	1.425	0.002	1.2	0.112
Russia	0.123	2.848	2.09	0.8	0.05	0.131
Ukraine	0.728	3.735	0.555	3.3	0	0.608
United States	0.023	0.238	0.215	0.068	0.045	0.023

Source : Directorate of Economics & Statistics

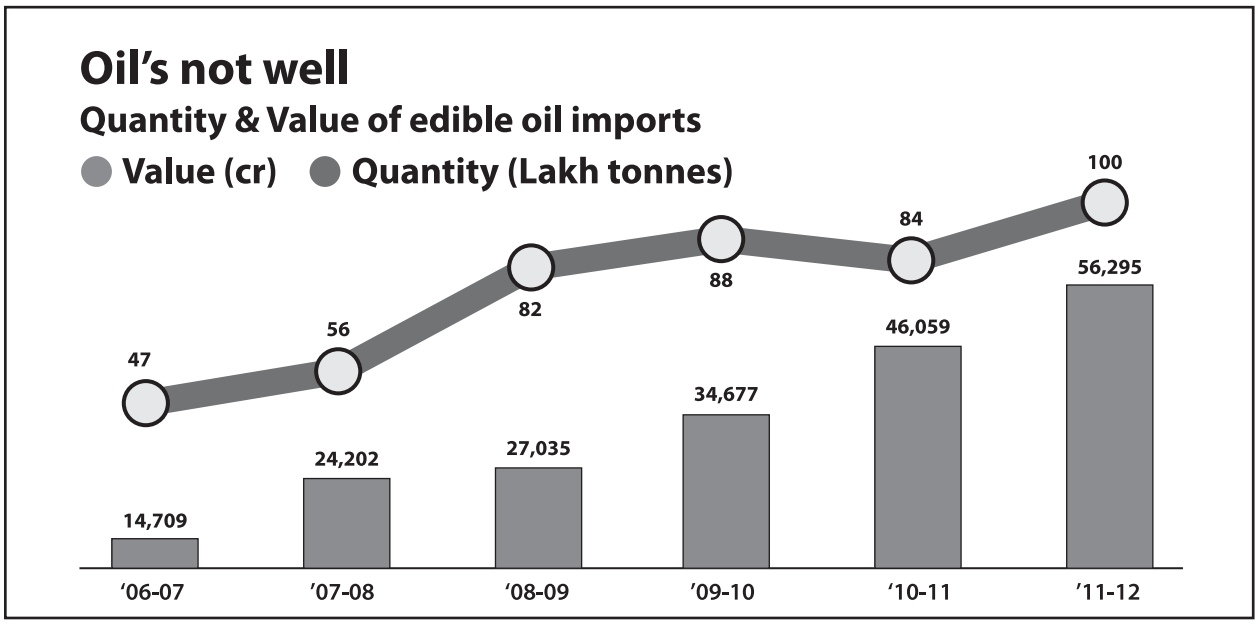
Indian Scenario

Chart 1 : Indian Edible Oil Production and Consumption



Source : USDA, FAS, Note : Forecast year is 2013/14

Chart 2 : Quantity and value of edible oil imports



Source : The Solvent Extractors' Association of India

Chart-3 : Constitution of Oil Import

S. No.	Commodity	Qty Imported in Lakh MT			Unit Value in RS/MT		
		2009-10	2010-11	2011-12	2009-10	2010-11	2011-12
1	Soy Bean Crude	11	11	9	37383	43277	60874
2	Crude Palm Oil	48	41	52	31015	41085	52136
3	Refined Palm Oil	13	9	14	32442	46183	54784
4	Crude Sunflower Oil	5	6	8	40692	49646	62892
5	Crude Palm Kernel	2	2	1	35299	58503	68480
	TOTAL OIL IMPORTS	80	69	84			

Source : Directorate of Economics & Statistics

Chart 4 : Production & Import of Oil in India

Year	Net availability of edible oils from all oilseeds (Lakh MT)	Import of edible oil (Lakh MT)	Total availability/ consumption (Lakh MT)	Proportion of imported oil in total consumption in percentage	Import bill (in Rs. crore)
2005-06	83.16	44.17	127.33	34.69	8961
2006-07	73.7	47.15	120.85	39.02	9540
2007-08	86.54	56.08	142.62	39.32	10301
2008-09	84.56	81.83	166.39	49.18	15837
2009-10	79.46	79.56	159.02	50.03	26484
2010-11	97.82	68.94	166.76	41.34	29442
2011-12	90.21	83.87	174.08	48.10	45940

Source : Directorate of Economics & Statistics

Chart-5 : Balance Sheet of Edible Oil - India

Year	Opening Stock	Production	Consumption	Total Supply	Imports	Ending Stocks
2010-11	0.67	7.98	16.50	17.02	8.37	0.52
2011-12	0.52	8.04	17.25	18.54	9.98	1.29
2012-13	1.29	8.34	18.10	19.53	9.90	1.43
% Change	147.47	3.77	4.93	5.34	-0.80	10.88

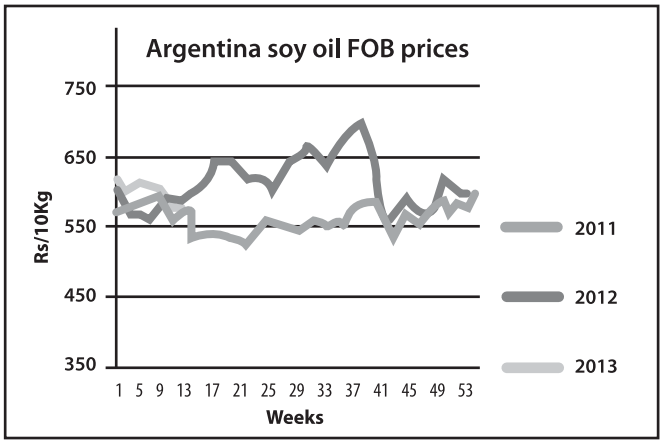
Source : Directorate of Economics & Statistics

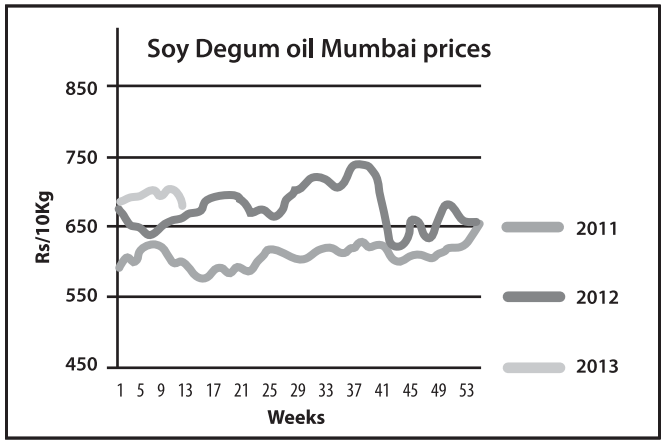
Chart-6 : Monthly Indian Edible Oils Imports (Values in MT)

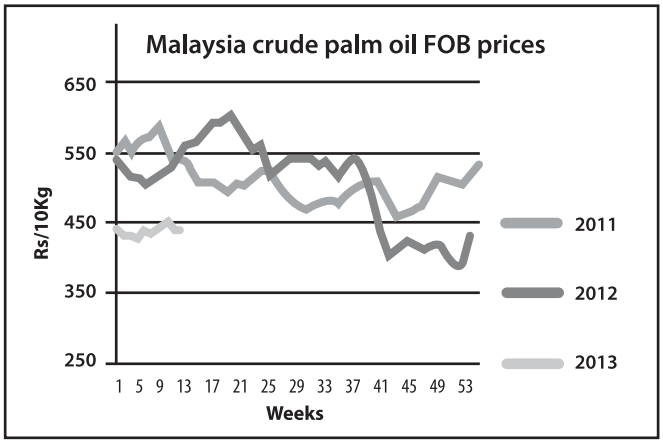
Months	2012-13	2011-12
November	676,234	827,684
December	875,994	654,714
January		647,693
February		873,313
March		702,335
April		897,404
May		883,410
June		769,885
July		848,229
August		882,269
September		976,417
October		1,018,113
Total Edible oil Imports	1,552,228	9,981,466

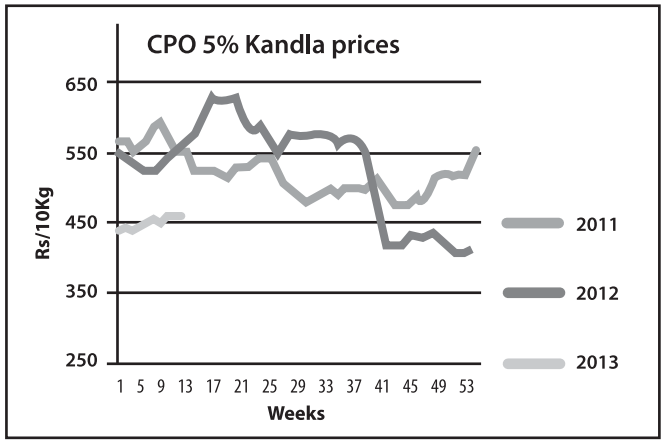
Source : SEA of India

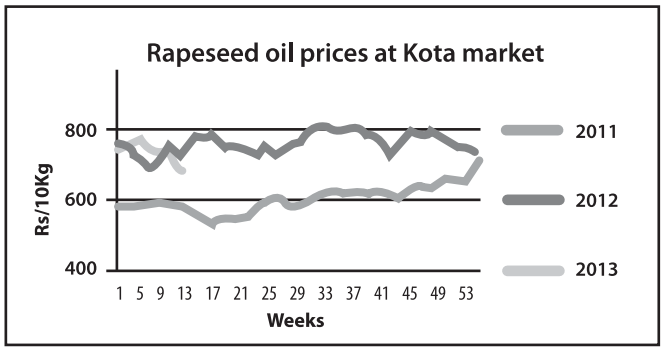
Oil Price - An Overview

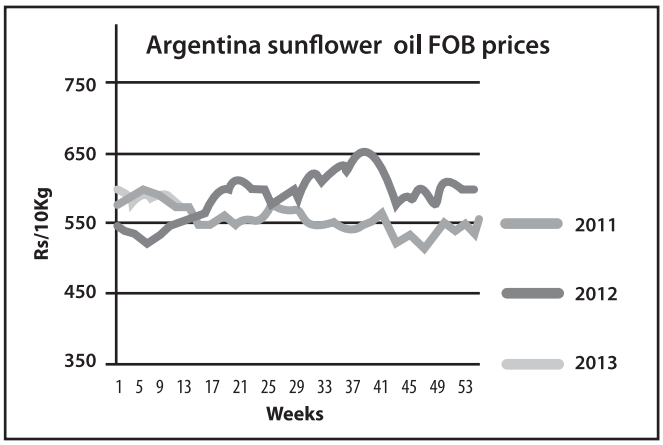


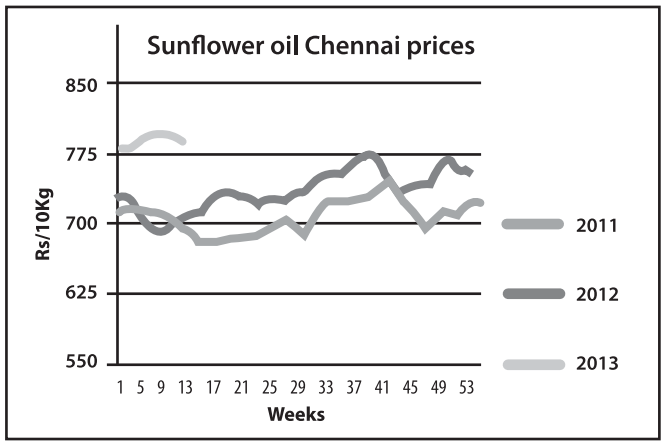












Health Tips

Olive Juice : The new food for Healthy Heart

Olives are a integral part of Mediterranean and supposed to be one of the most healthy ingredient. The recent studies exploring the benefits of olive polyphenols on markers of chronic inflammation, joint health, skin conditions such as eczema, platelet aggregation in the blood, oxidized LDL cholesterol (a risk factor for heart disease), and neurodegenerative disorders are further enhancing its claim as healthy food.

Olive oil juice, a byproduct of olive oil processing industry is very good for cellular inflammation. It is well known that there is a connection between inflammation and joint, and there is increasing understanding that inflammation is related to other health issues such as cardiovascular health, diabetes and even Alzheimer's disease.

Recent research indicates that olive oil juice (by product) contains olive polyphenols. The product is developed from olive oil juice by recovering with solvent free processing of olive oil. This product is being marketed as skin health ingredient, natural antimicrobial and for healthy heart. The olive polyphenols products are emerging as a natural ultimate supplement for healthy heart and cellular inflammation.

High value Rice bran Protein

Rice bran, including the germ, is the outer layer of the brown rice kernel after the husk has been removed. Until recently, the bran and germ was an underutilized by-product of the commercial, rice-milling industry.

Humble rice bran after stabilization, can be a source of high value protein along with healthy rice bran oil, soluble and insoluble fibers. Other rice protein ingredients are derived from white rice endosperm or from germinating rice seeds. But recently a Non-GMO, non-allergenic, easily-digested, with a full range of amino acids and a superior flavor profile protein, from rice bran was derived and launch in the US market. The amino acid profile for rice protein and whey protein is very similar, with differences of 1-3% in some of the amino acids. Rice protein is better for arginine and glutamine, while whey is better for the branched chain amino acids (BCAA).

This type of protein from rice bran can be manufactured when bran oil extracted with super critical extraction.

This type of rice bran protein is particularly attractive to food, beverage and supplement manufacturers because this do not have the bitter off notes associated with some other plant-based proteins such as mustard seed, soy and pea and can be marketed as non-GMO, and are hypoallergenic. It was also found that rice protein isolate administration post resistance exercise decreased fat-mass and increased lean body mass, skeletal muscle hypertrophy, power and strength comparable to whey protein isolate.

Fish Oil Supplements fight hypertension

According to a review in European Journal of Preventive Medicine, taking fish oil supplements helps in reduction of high blood pressure.

F. Campbell from university of Sheffield in Sheffield, UK and colleagues conducted the review and found that participants having high blood pressure while taking fish oil supplements have reduced systolic and diastolic blood pressure by amount up to 2.56 mmHg and 1,47 mmHg respectively.

For the review, the Author identified 17 randomized controlled trials and crossover trials of 1524 and participants with or without hypertension & these studies were intended to examine the effectiveness of fish oil supplements in lowering systolic and diastolic blood pressure and participants were followed up to for at least eight weeks.

However the participants having normal blood pressure have insignificant reduction in their blood pressure.

Mummies too had Clogged Arteries

Assumption that the modern diet is culprit for all the health woes and heart problems, received a setback , when the CT scan of 137 ancient mummies reveled that one third of these mummies subjected to CT scan were suffering from atherosclerosis. The average age of mummies subjected to CT scan was 43.

At present the plaque built up is supposed to be outcome of junk food and sedentary life style.

It was assumed, that Egyptian mummies are of the people of upper class of society, so the chances of rich food and sedentary life may be responsible for the evidence of atherosclerosis. But the CT scan of mummies from Peru, the Aleutian Islands, and the American Southwest also indicates same trends. Both the Aleutians and the Southwestern peoples were most likely hunter-gatherers, which means they got plenty of exercise and not much in the way of fatty foods. The Southwestern subjects, the researchers say, probably worked hard to survive in the desert environment, living mostly on grains. Still, they had the same rate of clogged arteries as the other mummies.

The researchers concluded that the evidence indicates that atherosclerosis may be a natural part of the aging process, triggered in large part by genetics.

This does not mean that we are free to eat junk food. The researcher also says that clogging may be because of unknown reasons such as chronic infection, kidney disease, inhaling smoke while sitting before fire for long hours. But it is not sure that despite deposition of plaque, cause of death was heart attack. Even if heredity does make you more vulnerable to atherosclerosis, eating right and exercising likely diminishes the odds that you're going to clog your arteries and die. If you do have atherosclerosis in your family line, though, you might want to take extra precautions, like introducing proteolytic enzymes, raw foods, and Omega 3's to your regimen if you don't already take them.

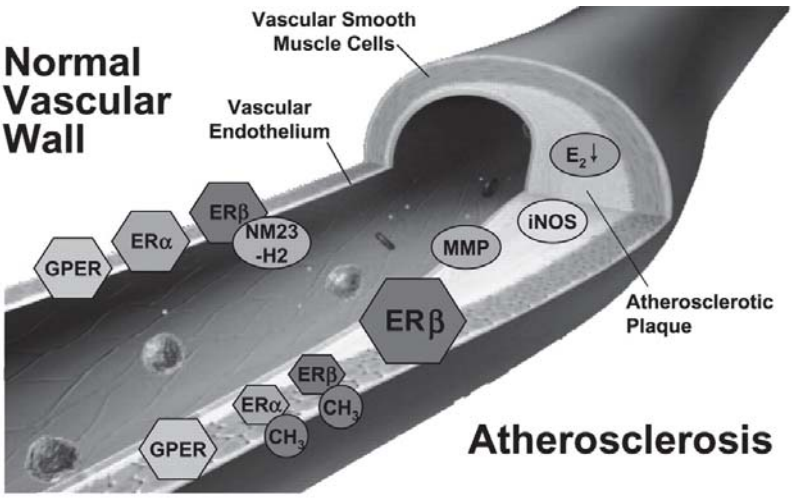
Perilla seed is not less good than Chia.

Chia seed came into notice because of its health benefits and richness of omega -3 fatty acid. Chia seeds' lipid profile is composed of 60 percent omega-3s, making them one of the richest plant-based sources of these fatty acids -- specifically, of alpha-linolenic acid, or ALA. Chia seeds are native to South America and have been a staple in Mayan and Aztec diets for centuries.

In recent times price gone through the roof because of demand. The perilla seed has equally good health benefits and good source of omega-3 fatty acid can be cost effective replacement of chia seed. Perilla is grown for leaves only and seed are the by product.

At 6:1, perilla also has the highest ratio of omega-3 to omega-6 fatty acids of any known seed oil. The "Perilla seeds contain 40-45% oil while chia seeds contain 30-32% oil. And typically 50% to 60% of the oil is ALA content, which is twice that of chia seed extract." The Perilla Seed Flour contains 40% protein and 40% fiber and is ideal for sports nutrition products. The perilla seed have a better taste profile as compared to the grassy taste of chia and paint like taste of flaxseed.

Looking into all these advantage over existing source of omega -3 fatty acid, perilla seed can emerge as a good choice because of less cost, higher concentration of ALA and better taste profile.



Emu Oil

The emu (Dromaius novaehollandiae) is the one of the largest bird from Australia. It is the second-largest bird in the world by height after ostrich. Though all the body parts of the bird are said to be of great medicinal importance, its oil is found to be useful in many health applications. A mature bird gives six to seven liter of emu fat.

Emus were used as a source of food by indigenous Australians and early European settlers. The fat was harvested for oil used for purported healing benefits, for use in cultural activities and for polishing their weapons.

Emu fat is used in cosmetics, dietary supplements, and therapeutic products. The oil is harvested from the subcutaneous and retroperitoneal fat from the macerated adipose tissue, and filtering the liquefied fat to get the oil. The fatty acid composition of emu oil is given here under

Fatty Acid	%
Myristic	0.4
Palmitic	22.0
Stearic	9.6
Palmitoleic	3.5
Oleic	47.4
Linoleic	15.2
Linolenic	0.9

It also contains various anti-oxidants, notably Carotenoids and flavones.

There is some evidence that the oil has anti-inflammatory properties; however, there have not yet been extensive tests, and the US Food and Drug Administration regards pure emu oil product as an unapproved drug. Nevertheless, the oil has been linked to the easing of gastrointestinal inflammation, and tests on rats have shown that it has a significant effect in treating arthritis and joint pain, more so than olive or fish oils. It has been scientifically shown to improve the rate of wound healing, but the mechanism responsible for such aforementioned effects is not understood. A 2008 study has claimed that emu oil has a better anti-oxidative and anti-inflammatory potential than other avian and ratite oils, and linked this to emu oil's higher proportion of unsaturated fatty acids, in comparison to the amount of saturated fatty acids. While there are no scientific studies showing that emu oil is effective in humans, it is marketed and promoted as a dietary supplement with a wide variety of claimed health benefits.

Emu oil is taken by mouth for improving cholesterol levels, as a source of polyunsaturated and monounsaturated fatty acids, for weight loss, and as a cough syrup for colds, H1N1 (swine) flu, and flu.

Emu oil is used on skin for relief from sore muscles, aching joints, pain or inflammation, carpal tunnel syndrome, sciatica, shin splints, and gout. It is also used topically to improve healing of wounds, cuts, and burns from radiation therapy; to reduce bruises and stretch marks; to reduce scarring and keloids; to heal surgical wounds caused by removing skin for skin grafts; to reduce redness due to acne; and to soften dry cuticles and promote healthy nails. Emu oil is also used to treat athlete's foot; diaper rash; canker sores; chapped lips; poor circulation and skin conditions, including cancer, dry skin, dandruff, eczema, psoriasis, wrinkles or age spots. It is also used to protect skin from sun damage and to promote more youthful looking skin.

Emu oil is also applied to the skin to reduce pain and irritation from shingles, bedsores, hemorrhoids, diabetic nerve pain, insect bites, earaches, eye irritation, "growing pains," and frostbite. It is used for rashes, razor burn, and nicks.

Some massage therapists apply emu oil to clients' skin as part of their treatment. Some people put emu oil inside the nose to treat colds and flu.

Emu oil (7%) is used in combination with glycolic acid (10%) for lowering blood fats including triglycerides, and low density lipoprotein (LDL) cholesterol; preventing and treating allergies; preventing scarring; treating headaches, especially migraines; preventing nosebleeds; treating and preventing cold and flu symptoms; and relieving discomfort associated with menstruation.

Looking at the medicinal value of emu oil and other body parts government of India is promoting, emu farming through various schemes. NABARD give subsidy of 25% on the emu farming projects. Emu farming was started in south India, but now gaining popularity in northern India also. It is coming up very fast in Punjab and Haryana.

Laugh Out Loud

- **A limerick about Edmund Halley**

  From the public, his discovery brought cheers.
  From his wife, it drew nothing but torrents of tears.
  "For you see," said Ms. Halley,
  "He used to come daily; once every 70 years! you see," said Ms. Halley,
  "He used to come daily;"

- **Which is more useful, the Sun or the Moon?"**

  A thirteen-year old : [Pause] "I think it's the Moon because the moon shines at night when you want the light, whereas the Sun shines during the day when you don't need it."

- **Biology is the only science in which multiplication is the same thing as division.**

- An unemployed biologist was having considerable difficulty in finding a new job. He finally saw an advertisement in a local newspaper for a position at a zoo. In the interview, the manager told him that their only gorilla, which had been a star attraction, had recently died, and it would be sometime before they could replace it. Meanwhile, they needed someone to dress up as a gorilla and pretend to be the animal. The biologist was quite embarrassed, but, being desperate for money, he accepted the job. The next day, the biologist put on a gorilla skin and headgear and entered a cage from a rear entrance. Visitors smiled at him and threw bread. After a while, the biologist really got into the act. He jumped up and down, beat his chest and roared as people cheered.

  The following day, the biologist entered the wrong cage by accident and found him-self staring at a lion. The lion roared and rushed toward him. The scared biologist turned and ran, while screaming, "Help! Help!" The lion leaped onto the gorilla, knocked him to the ground and whispered in his ear, "Hey, it's me Leonard, your former co-worker. Shut up or we'll both lose our jobs!"

- **Q : What is the chemical formula for the molecules in candy?**

  A : Carbon-Holmium-Cobalt-Lanthanum-Tellurium or CHoCoLaTe

- **A neutron walked into a bar and asked, "How much for a drink?" The bartender replied, "For you, no charge."**

- **Two atoms were walking across a road when one of them said, "I think I lost an electron!" "Really!" the other replied, "Are you sure?" "Yes, I'm absolutely positive."**

- **According to Einstein's Theory of Relatives, the probability of in-laws visiting you is directly proportional to how much you feel like being left alone.**

- A man, complaining of headaches, entered a hospital for diagnostic tests. A doctor examined the results for a brain scan and told the patient, "I have bad news and good news for you. The bad news is that you have a serious brain disease and will die without treatment. The good news is that this hospital has developed a new procedure for brain transplants and due to a car accident this morning two 'fresh' brains are available: one is from a taxi driver and the other is from a scientist. The brain of the taxi driver costs Rs. 2 crores, while that of the scientist is only Rs 2000." Puzzled, the patient asked, "Why is the scientist's brain was so much cheaper?" The doctor replied, "It's used.

- A frog went to visit a fortune teller. "What do you see in my future?" asked the frog.

  "Very soon," replied the fortune teller. "You will meet a pretty young girl who will want to know everything about you."

  "That's great!" said the frog, hopping up and down excitedly. "But when will I meet her?"

  "Next week in science class." said the fortune teller.

- A biologist from UGA, a Chemist from U of Alabama and an engineer from Ga Tech are all captured by the taliban in Afghanistan. They are all sentenced to be executed on the same day. On the morning of the execution all three are brought to the town square where they have set up a guillotine. The Biologist is brought up first.

  The executioner asks him if he has any last words so he shouts : Go Dogs! and puts his head into the guillotine. The executioner pulls the handle and the blade goes halfway down and stops.

  The official in charge shouts" It is Allah's will" and releases the biologist.

  Next they bring up the Chemist and ask him the same question. He shouts "Roll Tide" and puts his head into the guillotine. The same thing happens; the blade stops and the prisoner is released.

  Finally the engineer is brought up and they ask him the same question; "Do you have any last words?" The engineer replied "If you just tighten that bolt, the blade will come all the way down."

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Tea

EXTRAORDINARY USES

EXTRAORDINARY USES

Cool sunburned skin : What can you do when you forget to use sunscreen and have to pay the price with a painful burn? A few wet tea bags applied to the affected skin will take out the sting. This works well for other types of minor burns (i.e. from a teapotor steam iron) too. If the sunburn is too widespread to treat this way, put some tea bags in your bathwater and soak your whole body in the bath.

Make a soothing mouthwash : To ease toothache or any other mouth pain, rinse your mouth with a cup of hot peppermint tea mixed with a pinch or two of salt. Peppermint is an antiseptic and contains menthol, which alleviates pain on contact with skin surfaces. To make peppermint tea, boil 1 tablespoon fresh peppermint leaves in 1 cup water and steep for several minutes.

Reduce razor burn : Ouch! Why didn't you remember to replace that razor blade before you started to shave? To soothe razor burn and relieve painful nicks and cuts, apply a wet tea bag to the affected area. And don't forget to replace the blade before your next shave.

Relieve your tired eyes : Revitalize tired, achy or puffy eyes. Soak two tea bags in warm water and place them over your closed eyes for 20 minutes. The tannins in the tea reduce puffiness and soothe tired eyes.

Get the grey out : Turn grey hair dark again without an expensive trip to the salon or the use of chemical hair dyes. Make your own natural dye using brewed tea and herbs : steep 3 tea bags in 1 cup boiling water. Add 1 tablespoon each of rosemary and sage (either fresh or dried) and let it stand overnight before straining. To use, shampoo as usual, then pour or spray the mixture on your hair, making sure to saturate it thoroughly. Take care not to strain your clothes. Blot with a towel and do not rinse. It may take several treatments to achieve the desired result.

Condition dry hairs : To give a natural shine to dry hair, use a litre (quart) of warm, unsweetened tea (freshly brewed) as a final rinse after your usual shampoo.

Drain a boil : Drain a boil with a boiled tea bag! Cover a boil with a wet tea bag overnight and the boil should drain without pain by the time you wake up next morning.

Stop foot odour : Put an end to smelly feet by giving them a daily tea bath. Just soak your feet in strongly brewed tea for 20 minutes a day and end offensive odours.

Tan your skin with tea : Give pale skin a healthy tanned appearance without exposure to dangerous ultraviolet rays. Brew 2 cups strong black tea, let it cool and pour into a plastic spray bottle. Make sure your skin is clean and dry. Then spray the tea directly onto your skin and let it air-dry. Repeat as desired for a healthy looking glowing tan. This will also work to give a man's face a more natural look after shaving off a beard.

Soothe those bleeding gums : The child may be all smiles later when the tooth fairy arrives, but right now those bleeding gums are no fun whatsoever. To stop the bleeding and soothe the pain from a lost or recently pulled tooth, wet a tea bag with cool water and press it directly onto the site.

Shine your mirror : To make mirrors sparkle and shine, brew a pot of strong tea, let it cool and then use it to clean the mirrors. Then buff with a soft, dry cloth for a sparkly, streak-free shine.

Clean wooden furniture and floors : Freshly brewed tea is great for cleaning wood furniture and floors. Just boil a couple of tea bags in a litre (quart) of water and let it cool. Dip a soft cloth in the tea, wring out the excess and use it to wipe away dirt and grime. Buff dry with a clean, soft cloth.

Prepare a planter for potting : For healthier potted plants, place a few used tea bags on top of the drainage layer at the bottom of the planter before potting. The tea bags will retail water and leach nutrients to the soil.

Compiled by - Hemant Chopra

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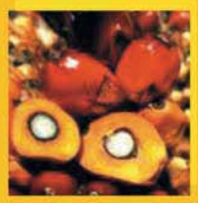

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