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Editor's desk.....

Oils and Fats are integral part of our diet. The visible, invisible, and hidden fats constitute the total intake of oils and fats in our diet. Invisible and hidden fats are equally important as visible oils and fats. We should be very careful while selecting our food keeping in mind the fact. Indian council of medical research (ICMR) has also suggested food item should be selected carefully keeping in mind all types of fats present in it.

Consumption of virgin oils is important as they supply much needed fat-soluble micronutrients. Lesser-known oils, tree based, sea based oils can help in supply of omega-3 fatty acids, vitamin A&D. Chia seed, pumpkin seed, sunflower seed, sesame seed, Hemp seed and flex seed are loaded with protein, Fiber, Magnesium, Manganese, Zinc, Copper, Phosphorus, Vitamin E, Thiamine (vitamin B1) can be consumed directly.

Dietary lipids can be derived from plant and animal sources. Oils and Fats that are used as such at the table or during cooking (vegetable oils, vanaspati, butter, and ghee) are termed as " visible" fats. Fats that are present as an integral component of various foods (milk, egg, almonds, walnut, peanut, sesame seed, wheat, spices etc.) referred to as "invisible" fat. Fats, in processed and ready-to-eat foods are known as "hidden" fats.

Cereals contain only 2-3% of invisible fat. However, their contribution to overall fat intake is significant as they contribute to bulk of our Indian diets. The small amount of invisible fat present in various foods add up to a substantial level in our daily diet (about 15g in rural population and 30g among urban middle - income and high- income groups). Most animal foods provide high amount of invisible fat.

The total fat (visible and invisible) in the diet should provide between 20-30% of total calories. Adults with sedentary lifestyle should consume about 25g of visible fat, while individuals involved in hard physical work require 30-40g of visible fat. Visible fat intake should be increased during pregnancy and lactation to 30g. Diets of young children and adolescents should contain about 30-50g/ day. However, eating too much fat is not conducive to good health.

Oils and fats are important for keeping our body healthy and should not be seen as villains. The zero fats diet has adverse effects not only on the body but on our brain functions also. Moderation is the next way.

Yours truly
C.S. Joshi
Editor

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(North Zone)

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Role of Oils & Fats and Recommendations

By Dr. S . Adhikari

Senior Research and Development Professional in the field of Edible Oils, Cosmetics & Personal Care Products and Bio- diesel

Fats play an important role in promoting the absorption of the four important fat-soluble vitamins (A, D, E and K). Fats also impart a feeling of fullness and satisfaction and so, delay the onset of hunger. Along with proteins, fats constitute major components of body fluids and cell membranes and so play a vital role.

All fats are high in calories. If you are trying to lose weight, you will still want to limit the amount of fat you eat. The American Heart Association (AHA)and National Institution of Nutrition (NIN) recommended that the total fat intake should be limited to 15-30% (20-30% as per ICMR) of total calories.

Fats that increase your chances of heart disease and stroke.:

Saturated fats –
Saturated Fatty Acids (SFA)

Fats / Oils containing saturated fatty acids include butter, coconut oil, ghee, cheese, whole milk, cream, egg yolks, lard, and skin of poultry, red meat a processed meat like sausages, ham and bacon. The vegetarian sources of saturated fats are coconut oil, coco butter and palm kernel oils.

Ghee, butter and coconut oil are easily digested and absorbed and so are recommended for infants, young children and for those suffering from certain medical conditions.

Saturated fatty acids are not very good for your heart. They raise your cholesterol levels and increase your risk of heart disease. That's why the AHA & NIN recommend that your daily intake of saturated fatty acids must be limited to 8-10 per cent of your total calories. You can reduce the amount of saturated fatty acids in your diet by avoiding butter and deep fried foods, giving up bacon and sausage, buying low-fat or fat- free milk & milk products, and avoiding red meat.

Trans Fatty Acids

Years ago, commercial food processors found they could add hydrogen to vegetable oil to make a solid fat product. The result was Vanaspati / Dalda. At first, everybody thought these hydrogenated fats containing trans fatty acids, which was great, because they contained no cholesterol. Using margarine instead of butter was considered the healthy thing to do.

But we now know better. Clinical studies show that trans fatty acids tend to raise LDL (bad) cholesterol and lower HDL (good) cholesterol.

Recent studies have suggested that trans fatty acids may also increase your chances of infertility, developing some kinds of cancer, including breast cancer and colon cancer. It greatly increases a pregnant woman's risk of preeclampsia and may harm her foetus. For people with diabetes, trans fatty acids lower your body's response to insulin.

The NIN recommends restriction of trans fatty acids to less than 2 per cent of your total fat intake.

Sources of trans fatty acids are bakery products, margarine, Vanaspati /Dalda, ready to eat (processed) foods, deep fried foods like samosas, bhajias, french fries, chips etc and sweets like jalebis, gulab jamuns etc.

Opt for low fat milk & milk products. A recent study showed that roasting flaxseeds, which is considered to be good for reducing cholesterol and triglycerides

increased the amount of trans fatty acids. So, avoid eating roasted flaxseeds. It may not be as healthy as you think.

Also, ensure that you read food labels and look for trans fatty acids before buying any product.

Dietary Cholesterol

The body makes some of the cholesterol in the blood. The rest comes from the foods we eat. Dietary cholesterol is present only in animal foods. It is important to note that vegetable oils do not contain cholesterol and the companies promoting their oils as cholesterol free are only fooling you.

Sources of cholesterol are milk & milk products, butter, ghee, egg yolks, liver, brain and other organ meats, red meat and poultry.

Your cholesterol intake should be restricted to less than 200mg / day One can reduce both saturated fat and cholesterol intake by limiting the consumption of high – fat animal foods like butter ghee. Meat, egg, and organ meat and consuming low fat (skimmed) milk instead of whole milk. However, the NIN recommends consumption of eggs (3 eggs /week) in view of the several nutritional advantages of eggs.

Fats don't raise your cholesterol and are essential:

Unsaturated Fats -
Monounsaturated Fatty acids (MUFA)

Fats / Oils containing Monounsaturated fatty acids are liquid at room temperature but start to solidify when refrigerated. Monounsaturated fatty acids do not raise your cholesterol; hence it is recommended that you get 8-10 per cent of your fat calories from monounsaturated fatty acids. Sources of MUFA are avocado, olive oil, groundnut oil, canola oil, rice bran oil, peanut butter, nuts, olives and sesame seeds.

Polyunsaturated Fatty acids

Fats / Oils containing Polyunsaturated fatty acids are liquid at room temperature and remain liquid in the fridge. The intake of PUFA should be 8-10 per cent of your total energy intake. They are essential because they cannot be synthesized by the body and have to be obtained from dietary sources. There are two families of PUFA that are essential: Omega-6 and Omega-3.

Omega-6 fatty acids

Omega-6 fatty acids, also called linoleic acid, lower total LDL cholesterol concentrations when taken instead of saturated fatty acids. They also support the cardiovascular reproductive, immune, and nervous systems

Sources are Safflower, Sunflower, Cottonseed, Corn, Soybean oil, Groundnut, Rice bran, Sesame oil also provide moderate amounts of PUFA

Omega-3 fatty acids

You should ensure that you include more omega - 3 fatty acids in your diet. Omega - 3 fatty acids play a critical role promoting good health. Studies show that Omega- 3 fatty acids not only prevent clogging of the arteries but also protect against diseases like arthritis and colitis and your risk of cancer and Alzheimers.

Soybean, Canola/Rapeseed and mustard oils, pulses like Black gram (kala chana), kidney beans (rajmah) & cowpea (lobia), mustard and fenugreek seeds and green leafy vegetables are also good sources of omega - 3 fatty acids.

Nuts and oilseeds like walnuts, pumpkin seeds and flaxseeds are considered to be good sources of omega- 3 fatty acids but one is required to eat large amounts to meet the requirement of omega- 3. Remember they are also rich in calories so we have to keep a watch on the amount of nuts and oilseeds we eat.

Fish like mackerel, sardines, tuna and salmon are also rich sources of omega- 3 fatty acids. Eating fish, prepared the low- fat way, 2 to 3 times a week gives protection to the heart.

Choose a combination of oils which maintain a balance so as to give a ratio of polyunsaturated/ saturated (PUFA/SFA) of 0.8-1.0, and linoleic/-linolenic (n-6/n-3) of 5-10 in the total diet. For ensuring this appropriate balance of fatty acids in cereal- based diets, it is necessary to increase the linolenic (n-3) acid intake and reduce the quantity of linoleic (n-6) acid obtained from the cooking oil. To get a good proportion of all the classes of fatty acids. It is advisable to consume more than one type of vegetable oils.

NIN RECOMMENDATIONS:

NIN recommends a blend of two or more vegetable oils to be used in daily cooking. The choice of cooking oil should be as follows:

1. Rice bran/Cotton seed + Safflower/Sunflower/ Soybean
2. Groundnut/Sesame /Rice bran + Mustard
3. sunflower /Safflower + Palmolein /Olive
4. Groundnut/Sesame/Rice bran +Canola
5. Safflower / Sunflower + Groundnut/Sesame/ Rice bran
6. Groundnut/Sesame/Rice bran +Soyabean
7. Palmolein + Soyabean
8. Safflower/Sunflower + Palmolein +Mustard

MICRO – NUTRIENTS:

The plant oils in addition contain certain useful substances such as lignans (sesame oil), Tocotrienols(palm oil), sterols, tocopherols (vitamin E), oryzanole and tocotrienols (rice bran oil), carotenoids - all of which reduce cholesterol and have antioxidants properties which repair oxidant damage due to ageing, inflammation which occur in chronic diseases. Some of the useful components are lost during refining of oils, hence use of filtered cold pressed oils is recommended.

Speak to your nutritionist and find out which is the best oil for you and your family.

For frying, use oils which have more stability and a high smoke point. People often choose olive oil because they think it's healthy but frying in olive oil is not recommended as it has a low smoke point. The common practice of repeatedly using the oil for frying is hazardous as they generate free radicals and form a carcinogenic compound called acryl amide and trans fatty acids that are harmful to our health. On reheating, the viscosity of oil increases, becomes darker in color, and turns rancid.

Best example is of potato chips, which have a high amount of trans fatty acids and acryl amide. Therefore, it is advisable not to reheat oils. The oil once used for frying can be used for cooking e.g to give tadka to the dal.

FSSAI CLARIFIES ON CLAIMS ON MULTI SOURCE EDIBLE OILS:

FSSAI publishes a directive changing the nomenclature " Blended Edible Vegetable Oil " now to simply " Multi Source Edible Oil ".

The following clarifications have been made :-

1. If a bend has 70% of Oil A and 30% of Oil B (but not less than 20%) , nutrition – function claims specified only for Oil A can be made;
2. If a blend has 51% of Oil A and 49% of Oil B, nutrition – function claim specified only for Oil A can be made ; and
3. If a blend has 70% of Oil A , 25% Oil B and 5% Oil C (being Linseed or Chia Seed Oil) , nutrition – function claim as allowed for Oil A and also claim regarding Omega – 3 to Omega-6 ratio can be made .
4. Further in case of MSEO whose component oils are of equal proportion (e.g. , 50% each) , only those specified nutrient - function claims that are common to both the oils can be made.
5. However, in case the component oils of MSEO have conflicting nutrient -function claims, no such claims can be made.

Courtesy: AOCS, ICMR and FSSAI

Approval for Genetically Modified Mustard

The Government has approved the environmental release of Genetically Modified (GM) Mustard hybrid DMH-11 and its parental lines during 147th meeting of Genetic Engineering Appraisal Committee (GEAC) on 18 October, 2022 for its seed production and testing as per existing ICAR guidelines, conditions imposed by the GEAC while recommending the environmental release of GM mustard hybrid DMH-11 and its parental lines; and other extant rules/regulations prior to commercial release.

The hybrid DMH-11 has been tested against the check varieties Varuna and RL-1359 during Biosafety Research Level Trials (BRL) I and II, where it gave 28.15% high over Varuna during 2010-11 to 2014-15. Field trials for three years were conducted to assess the impact on human health and environment as per the stipulated guidelines and applicable rules. Extensive studies carried out on toxicity, allergenicity, compositional analysis, field trials and environmental safety studies of GM mustard lines vs. their non-transgenic comparators have provided evidence that the GE mustard hybrid DMH-11 and its parental lines are safe for cultivation and for food and feed use. Visitation of bees to the transgenic lines is similar to the non-transgenic counterparts during the BRL-I and BRL-II trials conducted as per the protocols approved by Review Committee on Genetic Manipulation (RCGM) and GEAC.

Few representations have been received on the environmental release of GE mustard hybrid DMH-11, however, the issue of environmental release of GM Mustard is under adjudication before the Hon'ble Supreme Court of India.

This information was given by the Union Minister of Agriculture and Farmers Welfare Shri Narendra Singh Tomar in a written reply in Lok Sabha today.

Courtesy: Ministry of Agriculture & Farmers Welfare - (PIB}

New AOCS methods

1. Official Method Ce 12-16: Sterols and stanols in foods and dietary supplements containing added phytosterols

Plant sterols and stanols, collectively known as phytosterols, are cholesterol-like molecules in plants that have been shown to reduce serum total and low-density lipoprotein (LDL) cholesterol levels in humans who consume them. Because of their potential to reduce the risk of cardiovascular disease, phytosterols are added to many foods such as margarines and other spreads, salad dressings, and snack bars, as well as dietary supplements. The US Food and Drug Administration (FDA) allows food and supplement manufacturers to make health claims on the relationship between phytosterols and a reduced risk of coronary heart disease, provided that the products contain specified amounts of the five major phytosterols that have shown beneficial effects (campesterol, campestanol, stigmasterol, ß-sitosterol, and sitostanol; Fig. 1).

According to Cantrill, Official Method Ce 12-16 arose from a collaboration between Cargill and the FDA. "Sterols and stanols are commonly included in margarines and dietary supplements, so Official Method Ce 12-16 is a test to find out whether they have the correct amounts of sterols and stanols as claimed on the label," he says. Previous methods for phytosterol analysis were limited in various

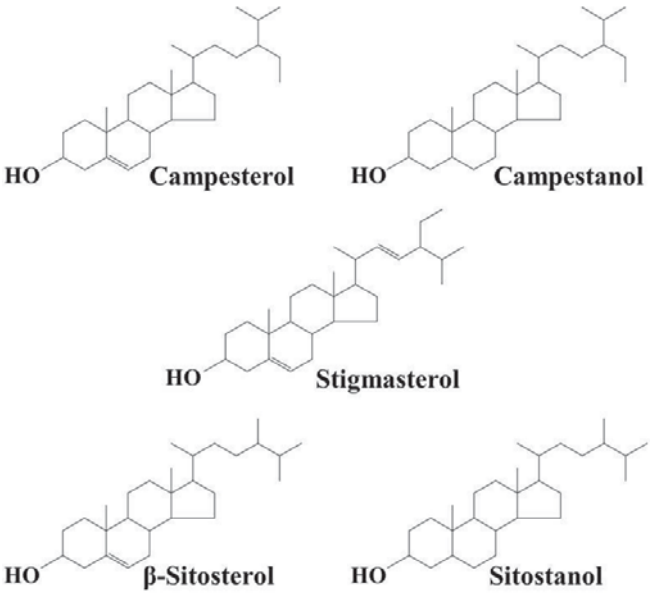

FIG. 1. Chemical structures of the five phytosterols for which beneficial health effects have been reported. Reprinted from Srigley, C. T., and Haile, E. A. (2015) "Quantification of plant sterols/stanols in foods and dietary supplements containing added phytosterols." *J. Food Comp. Anal. 40*, 163-176, with permission from Elsevier.

aspects, such as a lack of validation for stanol quantification, limited range or accuracy, or unsuitability for the analysis of dietary supplements (Srigley, C. T., and Haile, E. A.

A method Ce 12-16 can determine total free sterols/stanols and total steryl/stanol esters, as well as quantify each of the five major phytosterols that are the subject of the FDA's health claim. Ce 12-16 provides three protocols for extracting phytosterols from different matrices (sterol/stanol concentrates, steryl/stanol ester concentrates, foods, and dietary supplements). Each protocol derivatizes the phytosterols to trimethylsilyl (TMS) ethers so that they may be separated on a capillary GC column, detected by a flame ionization detector (FID), and identified by their retention times. The method uses eicoprostanol as an internal standard. Using the method, researchers determined that 25 analyzed samples, including spreads, beverages, baked goods, and dietary chews, had total phytosterol contents that varied from 0.2 to 55.2 g/100 g (Srigley, C. T., and Haile, E. A. Total phytosterol contents ranged from 83% to 137% of the amounts declared on labels. The limit of detection (LOD) and limit of quantitation (LOQ) for an individual phytosterol were 0.3 mg/100 g and 1 mg/ 100 g, respectively.

2. Recommended Practice Ce 13-16: Determination of cyclopropenoic and nutritional fatty acids in cottonseed and cottonseed oil by Gas Chromatography

Cotton plants of the genus Gossypium are cultivated primarily for their textile fibers. "However, cotton products are also consumed by humans and animals," says Barb Mitchell, staff scientist at Covance Labs, Inc. (Madison, Wisconsin, USA), who helped develop Recommended Practice Ce 13-16. Cottonseed oil has been used as a cooking oil and in foods such as mayonnaise and salad dressing, and cottonseed meal is included in animal feed. "As new cottonseed varieties are developed through biotechnology, it is necessary to assess their safety," says Mitchell.

According to Mitchell, the Organization for Economic Co-operation and Development (OECD) recommends the analysis of fatty acid profiles in cottonseed—both nutritional fatty acids and the anti-nutritive cyclopropenoid fatty acids. "Cyclopropenoid fatty acids in cottonseed include malvalic acid, sterculic acid, and dihydrosterculic acid, which have been shown to have unfavorable health effects in livestock," says Mitchell. Most cyclopropenoid fatty acids are removed during the deodorization step of oil refining, but the fatty acids can be a problem for producers of cold-pressed cottonseed oil.

Historically, the determination of nutritional fatty acids and of cyclopropenoid fatty acids required two separate analyses. Recommended Practice Ce 13-

16 combines the two analyses into a single GC procedure. First, the triacylglycerols from cottonseed or cottonseed oil are converted to fatty acid methyl esters by base transesterification using sodium methoxide. Then, the individual esters are analyzed by GC using a polyethylene glycol stationary phase with an FID.

"The biggest challenge was to adjust the GC conditions to get the best resolution between both malvalic and stearic acids and dihydrosterculic and á-linolenic acids," says Mitchell. "What worked better for one pair was worse for the other pair." However, the researchers eventually determined GC conditions that allowed an adequate separation of all compounds. The LOQ for various nutritional and cyclopropenoid fatty acids ranged from 0.001 to 0.012 mg/mL (Mitchell, B.

3. Standard Procedure Cd 12c-16: Accelerated oxidation test for the determination of the oxidation stability of foods, oils, and fats using the Oxi test Oxidation Test Reactor

Lipid oxidation is a major factor that limits the shelf life of foods containing fats and oils (Cassiday, L., I, 406–411, 2015). Various methods exist for assessing the rate of lipid oxidation in foods. However, these techniques require the fat to be extracted from food samples before oxidation tests can be performed. In contrast, the Oxitest instrument (VELP Scientifica; Usmate, Italy) can analyze fat oxidation in whole food samples, providing a simpler and more rapid method Standard Procedure Cd 12c-16 details how to use the Oxitest Oxidation Test Reactor to analyze the oxidative stability of whole food samples. Two samples can be analyzed simultaneously on the same instrument. A food sample, which can be liquid, solid, or doughy, is placed in one of two oxidation chambers, where it is subjected to accelerated oxidation conditions of high temperature (up to 110 ºC) and high oxygen pressure (up to 8 bar). In this way, lipid oxidation can be observed over a shortened time period (hours) compared with the days, weeks, or months required for the food to naturally become rancid. By monitoring changes in absolute pressure within the chamber, the Oxitest instrument measures the oxygen uptake of reactive components in the food. The instrument generates a value called the Induction Period (IP), which refers to the time required for a sample to show a sudden increase in the rate of oxidation. The longer the IP, the more resistant the sample is to oxidation. Cd 12c-16 can be used for a wide range of sample types with at least 2–4% fat content, including meat, oils, mayonnaise, and baked goods.

Researchers used the Oxitest method to analyze the oxidative stability of several extra virgin olive oils that came from two regions of Italy (Caruso, M. C., *et al*., I, 26–29, 2017). They found a strong correlation between the total content of polyphenols (which are natural antioxidants) in the olive oil and oxidation stability, as measured by IP. The IP values for all of the investigated oils ranged from 20 to 78 hours. The data did not indicate a direct correlation between geographical origin of the olive oil and IP value.

Although the five new AOCS methods may not have made the top news headlines of 2016, they will certainly be appreciated by members of the fats and oils community. The availability of reliable, accurate, validated methods will simplify and accelerate research on fats, oils, and the foods that contain them.

Refined oil duty cut won't bring down prices:

The government's move on Wednesday night to reduce the duty on refined soybean oil and refined sunflower oil to 12.5% from 17.5% will not have any impact on the prices of sunflower and soya oil,

said Emami Agrotech, Adani Wilmar and Gemini Edibles & Fats India.

The companies said the importing time for these oils is around 50 days, within which the oils lose their quality and original taste, and at present, India is not importing refined soybean or sunflower oil. The country imports non refined oils , which are refined in the country at the refineries,

"In originating countries of soya and sunflower oils there is not much of surplus refining capacities at present and they do not have preferential lower duty for refined oils," said Emami Agrotech CEO. "So, bulk imports of refined sunflower and soybean oils may not happen in the short term. However, it opens up the Indian market for imports of refined oils and refined palm imports will continue unless the duty differential is widened." At present, all crude edible oils - crude palm oil , crude sunflower oil and crude soybean oil – attract an import duty of 5%. The refined oil attract and import duty of 12.5% plus a cess of 10% on import duty.

Courtesy: ET Bureau

DIMINISHED ROLE FOR PALM OIL IN EUROPE

Palm oil is the single largest vegetable oil produced in the world accounting for about 80- mt of 250-mt of all vegetable oils produced. The only oil that comes close is soybean oil with an Annual output of about 59-mt., followed in the distance rapeseed oil (29-mt) and sunflower oil (21-mt). Significantly palm oil has highest productivity amongst all edible oils at 2.94-t/ha (tonnes per hectare as compared to coconut oil 0.23-t/ha and 0.46-t/ha for soybean oil.

Palm oil is tropical oil and Indonesia, Malaysia and Thailand account for nearly all of its production. The concern with the oil, driven largely by activists in Europe, is over the deforestation it causes as pristine tropical forests are cleared for all palm cultivation .Initiatives such as the Roundtable on sustainable Palm Oil (RSPO) which has amongst its members the large plantation companies. FMGS giants, oleo chemical companies as well as other stake holders, have had an impact on ground, and a significant portion of the palm oil produced companies with this or other sustainability guidelines.

According to Mr. UWE HAIDER, KLK OLEO EUROPE, while Europe consumes currently about 6mt. of palm oil for food energy and chemical needs legislations in Europe is becoming a real issue that could impact availability of the oil to the region. The deforestation free due products regulation will impact palm oil availability. It needs upfront deforestation – free due diligence statements and penalties are up to 4% of the Annual turnover.

Availability of Palm Kernal (PKO) , a major feedstock for making fatty alcohals (C12-14 range that serves as raw material for surfactants, will also be a constraint as there is simply not enough PKO available with traceability back to the plantation, as demanded by European legislation.

Europe needs palm oil and PKO for food and oleo chemicals. We need to strengthen sustainable palm oil availability and change public awareness to accept the use of such sustainable palm oils. This will need cooperatives and sustained action.

Given the head winds against palm oil political leaders in Indonesia and Malaysia in seemingly coordinated action have hinted that stopping supplies to Europe may be an option.

Source – hpi-india.

Marine ingredients expected to see ongoing price support into 2023

Rabobank's *Global Animal Protein Outlook 2023* gave readers a snapshot of the fish oil and fish meal markets for 2022 and their expectations for 2023, noting that the relatively bullish stance of marine ingredients stems from the high price of alternative feed commodities. The bank's analysis notes that despite fish meal and fish oil supplies remaining stable in 2022 and virtually unchanged compared to 2021, prices have been well supported. As prices for all terrestrial feed commodities and proteins – especially ingredient oils – remains high, marine ingredients will continues to see price support.

The Peruvian Ministry for Produce announced a 2.283 million metric tonne fishing quota for the winter season (December to March). This is 11.5 percent higher than last winter's quota, when vessels fished/utilised 100 percent of the allocated amount. Therefore, fishing landings will need to be good for fish meal and fish oil supplies to improve. In addition, improving fishing quotas in Europe will contribute to a positive supply outlook.

However, as soymeal and soy oil prices reached a peak in 1H 2022 and are starting to ease, Rabobank expects this to influence fish meal and especially fish oil prices. Analysts warn that this price correction shouldn't be overstated. The supply of terrestrial feed commodities remains tight and high prices are only marginally declining. Any unforeseen issues in the supply of either terrestrial or marine commodities would provide renewed price support.

Lastly, China's fish meal stocks in Q3 2022 seemed to be good, albeit slightly below last year's level. This suggests that Chinese buyers may not be willing to commit to much higher price levels once Peruvian supply for the 2022 winter quota comes to market in Q4 2022 and Q1 2023.

Courtesy: The fishmeal.com

Soybean oil for biofuels has limited food price impact

A recent study found that soybean oil for biofuels has a limited impact on overall food prices.

The United Soybean Board partnered with Purdue University on a food and fuel study to evaluate whether the increased use of soybean oil in biofuels has contributed to the rising retail prices of food products for consumers.

One key element missing from this equation is that only one-fifth of the soybean is oil. Most of the soybean is meal used as a high-quality protein in animal diets. This expanded crush for oil to meet biofuel demand creates increased availability for meal, driving down the price of animal protein products and partially offsetting the growth of oil and bakery prices, leaving the overall "food at home" portion of the Consumer Price Index (CPI) essentially unchanged. The static nature of the CPI can be attributed to meat prices representing a larger share of the CPI than fats and oils.

"The economic model we created links the farm supply of soybeans to retail demand for various food products," said Jayson Lusk, food and agricultural economist at Purdue University. "What we found, after assessing the impact of rising soybean oil demand on prices at the grocery store, was little change to the CPI. While the increased demand for biofuels pushed up retail prices for oil between 0.16% and 4.41% across different categories, retail animal product prices for dairy, beef, pork, chicken and eggs declined between -0.01% and -0.16%."

The study found that a 20% increase in the quantity of soybean oil demanded for use in biofuels generates the following price impact breakdown (all else equal):

- Soybean oil increase of 0.16% in retail price for frying and baking, 0.82% in retail margarine price, 4.41% in salad/cooking oil and 0.16% in other oil-containing food items.
- Animal protein decrease of 0.16% in retail egg prices, 0.13% in retail chicken prices, 0.06% in retail pork prices, 0.02% in retail dairy prices and 0.01% in retail beef prices.
- Farm level soybean prices increased 0.73%, farm revenue for soybean producers increased 0.92% and overall crude soybean oil prices increased 8.17%.ll crude soybean oil prices increased 8.17%.

Courtesy: World-Grain.com

IMPORTANT FIGURES

Table 1: World Oilseeds and Products Supply and Distribution
Million Metric Tons

	Area Harvested	Beginning Stocks	Production	Imports	Total Supply	Exports	Food Use Dom.	Domestic Consumpti	Ending Stocks
Major Oilseeds									
2010/11	246.00	77.55	460.78	105.01	643.34	108.20	35.89	446.18	88.96
2011/12	248.89	88.96	446.90	113.32	649.18	110.99	36.08	465.95	72.24
2012/13	257.16	72.24	474.36	114.83	661.43	118.25	36.45	470.92	72.26
2013/14	261.73	72.26	504.13	133.88	710.28	133.98	37.35	495.05	81.25
2014/15	267.69	81.25	539.42	143.73	764.40	147.53	38.83	520.79	96.08
2015/16	265.45	96.08	523.99	154.11	774.18	153.92	40.11	527.08	93.18
2016/17	270.31	93.26	577.02	167.84	838.13	171.53	41.56	556.25	110.35
2017/18	282.05	110.35	584.11	176.49	870.95	177.46	43.05	575.45	118.04
2018/19	282.82	118.04	602.25	168.15	888.45	172.03	43.67	582.57	133.85
2019/20	280.72	133.85	581.90	189.88	905.63	191.48	45.18	601.81	112.34
2020/21	287.02	112.34	608.45	190.27	911.05	192.05	46.80	603.20	115.81
2021/22	296.31	115.81	610.48	179.60	905.88	178.97	47.57	609.31	117.60
2022/23	301.64	117.60	627.40	195.05	940.04	200.29	49.00	621.35	118.40
2023/24	308.00	118.40	671.38	195.55	985.33	200.30	50.75	644.84	140.20
Major Protein Meals									
2010/11	nr	10.16	257.30	75.10	342.56	77.87	0.33	251.71	12.98
2011/12	nr	12.98	267.45	79.28	359.71	81.09	0.40	263.93	14.69
2012/13	nr	14.69	269.03	75.22	358.94	79.44	0.43	266.53	12.97
2013/14	nr	12.97	282.77	80.93	376.68	83.55	0.44	278.48	14.64
2014/15	nr	14.64	300.53	82.92	398.09	86.63	0.45	293.32	18.14
2015/16	nr	18.14	305.71	84.04	407.89	87.37	0.47	302.68	17.84
2016/17	nr	18.19	320.79	85.66	424.64	89.73	0.52	316.16	18.75
2017/18	nr	18.75	331.57	88.02	438.35	91.00	0.54	326.58	20.77
2018/19	nr	20.77	333.51	90.82	445.09	95.27	0.61	329.54	20.28
2019/20	nr	20.28	346.65	91.02	457.95	96.03	0.70	341.52	20.40
2020/21	nr	20.40	349.09	92.59	462.08	97.43	0.77	345.85	18.80
2021/22	nr	18.80	349.51	93.77	462.08	96.17	0.81	346.60	19.32
2022/23	nr	19.32	355.03	91.71	466.06	95.08	0.84	354.96	16.02
2023/24	nr	16.02	370.77	95.13	481.92	98.67	0.87	364.92	18.32
Major Vegetable Oils									
2010/11	17.49	16.81	149.12	56.63	222.56	60.58	109.66	142.23	19.75
2011/12	18.49	19.75	157.84	61.30	238.90	64.68	115.29	151.00	23.21
2012/13	19.20	23.21	161.05	64.76	249.02	68.27	120.08	157.48	23.27
2013/14	20.11	23.27	171.56	66.61	261.44	70.13	125.08	165.87	25.44
2014/15	20.94	25.44	177.32	70.15	272.91	76.57	130.14	169.59	26.75
2015/16	22.04	26.75	176.45	70.43	273.63	73.81	134.64	176.88	22.94
2016/17	23.16	22.93	188.75	76.19	287.87	82.02	138.37	182.33	23.52
2017/18	24.12	23.52	198.92	76.02	298.46	80.98	142.30	190.91	26.57
2018/19	24.59	26.57	204.13	82.10	312.80	86.87	145.33	197.64	28.29
2019/20	25.03	28.29	207.50	82.68	318.48	87.14	148.47	201.31	30.02
2020/21	25.36	30.02	206.92	81.26	318.20	85.30	151.09	204.21	28.70
2021/22	25.97	28.70	207.78	74.51	310.98	79.40	149.38	202.47	29.12
2022/23	27.11	29.12	216.67	82.44	328.22	87.11	153.67	210.91	30.21
2023/24	27.49	30.21	222.78	83.61	336.59	88.37	157.67	217.87	30.34

Based on the aggregate of different marketing years

Foreign Agricultural Service/USDA
Global Market Analysis

Table 2: United States Oilseeds and Products Supply and Distribution Local Marketing Year Thousand Metric Tons

	Area Harvested	Beginning Stocks	Production	Imports	Total Supply	Exports	Crush	Domestic Consumpti	Ending Stocks
Major Oilseeds									
2010/11	37,179	5,545	100,432	945	106,922	41,938	49,323	57,665	7,319
2011/12	35,131	7,319	92,442	1,285	101,046	37,813	50,316	57,621	5,612
2012/13	36,676	5,612	93,323	1,605	100,540	37,156	50,250	57,621	5,763
2013/14	35,428	5,763	98,986	3,067	107,816	45,569	51,455	58,294	3,953
2014/15	38,991	3,953	116,050	1,851	121,854	51,109	55,108	63,989	6,756
2015/16	38,403	6,756	115,891	1,130	123,777	53,968	55,055	62,940	6,869
2016/17	39,247	6,869	126,942	1,502	135,313	60,084	56,257	65,628	9,601
2017/18	42,801	9,601	131,483	1,419	142,503	59,315	60,168	69,361	13,827
2018/19	41,328	13,827	130,716	1,116	145,659	48,861	61,033	70,258	26,540
2019/20	36,826	26,540	106,980	1,216	134,736	47,067	63,037	71,711	15,958
2020/21	38,809	15,958	124,523	1,205	141,686	62,782	62,655	70,265	8,639
2021/22	41,063	8,639	131,350	1,172	141,161	59,705	63,868	72,315	9,141
2022/23	39,989	9,141	125,926	1,456	136,523	55,294	64,733	73,255	7,974
2023/24	40,914	7,974	133,203	1,239	142,416	54,824	67,212	76,262	11,330
Major Protein Meals									
2010/11	nr	341	38,032	2,241	40,614	8,488	49,323	31,748	378
2011/12	nr	378	39,450	3,032	42,860	9,170	50,316	33,354	336
2012/13	nr	336	38,593	3,393	42,322	10,460	50,250	31,548	314
2013/14	nr	314	39,291	3,798	43,403	10,803	51,455	32,308	292
2014/15	nr	292	43,210	3,873	47,375	12,144	55,108	34,941	290
2015/16	nr	290	42,773	4,070	47,133	11,178	55,055	35,680	275
2016/17	nr	275	43,117	3,920	47,312	10,826	56,257	36,078	408
2017/18	nr	408	47,063	3,736	51,207	13,005	60,168	37,639	563
2018/19	nr	563	46,530	3,935	51,028	12,447	61,033	38,160	421
2019/20	nr	421	48,773	4,121	53,315	12,826	63,037	40,103	386
2020/21	nr	386	48,257	4,385	53,028	12,623	62,655	40,014	391
2021/22	nr	391	49,269	3,565	53,225	12,441	63,868	40,431	353
2022/23	nr	353	50,160	4,181	54,694	12,931	64,733	41,358	405
2023/24	nr	405	51,805	4,179	56,389	13,674	67,212	42,265	450
Major Vegetable Oils									
2010/11	0	1,991	9,775	3,612	15,378	1,861	49,323	11,794	1,723
2011/12	0	1,723	10,032	3,831	15,586	1,146	50,316	12,873	1,567
2012/13	0	1,567	10,231	3,801	15,599	1,387	50,250	13,068	1,144
2013/14	0	1,144	10,425	4,016	15,585	1,116	51,455	13,498	971
2014/15	0	971	10,938	4,230	16,139	1,174	55,108	13,679	1,286
2015/16	0	1,286	11,210	4,527	17,023	1,248	55,055	14,573	1,202
2016/17	0	1,202	11,434	4,731	17,367	1,416	56,257	14,720	1,231
2017/18	0	1,231	12,109	4,783	18,123	1,342	60,168	15,541	1,240
2018/19	0	1,240	12,199	4,702	18,141	1,092	61,033	15,889	1,160
2019/20	0	1,160	12,636	4,901	18,697	1,504	63,037	15,986	1,207
2020/21	0	1,207	12,701	4,951	18,859	1,041	62,655	16,517	1,301
2021/22	0	1,301	13,060	5,249	19,610	1,048	63,868	17,289	1,273
2022/23	0	1,273	13,286	5,998	20,557	379	64,733	18,886	1,292
2023/24	0	1,292	13,711	6,280	21,283	449	67,212	19,579	1,255

Based on the aggregate of different marketing years

Foreign Agricultural Service/USDA
Global Market Analysis

Table 3: South East Asia Oilseeds and Products Supply and Distribution
Thousand Metric Tons

	2019/20	2020/21	2021/22	2022/23
Production				
Oilseed, Copra	4,590	4,455	4,689	4,691
Oilseed, Palm Kernel	16,776	16,624	16,508	17,340
Oilseed, Soybean	743	726	666	621
Other	3,396	3,533	3,563	3,558
Total	25,505	25,338	25,426	26,210
Domestic Consumption				
Meal, Fish	897	843	863	894
Meal, Rapeseed	489	473	418	745
Meal, Soybean	21,088	21,513	22,260	22,307
Other	3,658	3,643	3,399	3,544
Total	26,132	26,472	26,940	27,490
SME				
Meal, Fish	1,296	1,218	1,247	1,292
Meal, Rapeseed	348	337	297	530
Meal, Soybean	21,008	21,433	22,175	22,222
Other	1,779	1,764	1,676	1,712
Total	24,431	24,751	25,396	25,756
Imports				
Meal, Fish	410	329	347	385
Meal, Rapeseed	475	476	414	775
Meal, Soybean	18,222	18,057	19,010	18,353
Other	919	992	852	947
Total	20,026	19,854	20,623	20,460
Industrial Dom. Cons.				
Oil, Palm	12,670	13,212	14,291	15,710
Oil, Rapeseed	0	0	0	0
Oil, Soybean	56	54	54	54
Oil, Sunflowerseed	0	0	0	0
Other	4,853	4,972	5,108	5,449
Total	17,579	18,238	19,453	21,213
Food Use Dom. Cons.				
Oil, Palm	10,796	11,080	11,612	12,031
Oil, Rapeseed	15	13	13	13
Oil, Soybean	749	795	731	710
Oil, Sunflowerseed	171	158	141	146
Other	1,604	1,671	1,654	1,670
Total	13,335	13,717	14,151	14,570
Domestic Consumption				
Oil, Palm	23,856	24,677	26,295	28,153
Oil, Rapeseed	15	13	13	13
Oil, Soybean	805	849	785	764
Oil, Sunflowerseed	171	158	141	146
Other	6,467	6,653	6,762	7,129
Total	31,314	32,350	33,996	36,205
Imports				
Oil, Palm	4,045	4,437	4,221	4,202
Oil, Rapeseed	15	12	12	12
Oil, Soybean	308	295	236	260
Oil, Sunflowerseed	40	27	10	15
Other	701	708	819	610
Total	5,109	5,479	5,298	5,099

Southeast Asia includes Brunei, Burma, Cambonia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam.
SME - 44 Percent Protein Soybean Meal Equivalent
Foreign Agricultural Service/USDA Global Market Analysis

Table 4: Middle East Oilseeds and Products Supply and Distribution
Thousand Metric Tons

	2019/20	2020/21	2021/22	2022/23
Production				
Oilseed, Cottonseed	1,295	1,140	1,431	1,790
Oilseed, Rapeseed	458	415	382	495
Oilseed, Soybean	277	285	289	319
Oilseed, Sunflowerseed	1,798	1,608	1,796	1,949
Other	150	155	160	160
Total	3,978	3,603	4,058	4,713
Domestic Consumption				
Meal, Fish	150	147	200	185
Meal, Rapeseed	700	591	472	680
Meal, Soybean	8,845	9,044	9,647	9,260
Other	3,799	3,808	3,436	3,879
Total	13,494	13,590	13,755	14,004
SME				
Meal, Fish	217	212	289	267
Meal, Rapeseed	498	420	336	484
Meal, Soybean	8,843	9,042	9,645	9,258
Other	2,466	2,493	2,292	2,580
Total	12,024	12,168	12,562	12,589
Imports				
Meal, Fish	154	147	199	180
Meal, Rapeseed	275	268	250	266
Meal, Soybean	4,592	6,122	6,296	4,820
Other	1,933	1,520	1,421	1,495
Total	6,954	8,057	8,166	6,761
Imports				
Oil, Palm	2,647	2,912	3,332	3,240
Oil, Rapeseed	70	84	81	114
Oil, Soybean	174	710	537	303
Oil, Sunflowerseed	2,617	2,429	2,754	3,415
Other	251	226	223	254
Total	5,759	6,361	6,927	7,326
Industrial Dom. Cons.				
Oil, Palm	160	180	225	225
Oil, Rapeseed	10	10	10	25
Oil, Soybean	105	75	65	73
Oil, Sunflowerseed	20	20	20	25
Other	64	56	50	63
Total	359	341	370	411
Food Use Dom. Cons.				
Oil, Palm	2,131	2,175	2,421	2,450
Oil, Rapeseed	275	256	240	290
Oil, Soybean	870	943	1,065	1,063
Oil, Sunflowerseed	2,748	2,829	2,832	3,055
Other	634	648	687	729
Total	6,658	6,851	7,245	7,587
Domestic Consumption				
Oil, Palm	2,291	2,355	2,646	2,675
Oil, Rapeseed	285	266	250	315
Oil, Soybean	1,025	1,053	1,140	1,161
Oil, Sunflowerseed	2,778	2,859	2,862	3,095
Other	710	713	749	802
Total	7,089	7,246	7,647	8,048

Middle East includes Bahrain, Gaza Strip, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, West Banks, and Yemen.

SME - 44 Percent Protein Soybean Meal Equivalent

Foreign Agricultural Service/USDA Global Market Analysis

Table 5: European Union Oilseeds and Products Supply and Distribution
Thousand Metric Tons

	2019/20	2020/21	2021/22	2022/23
Production				
Oilseed, Rapeseed	15,252	16,732	17,389	19,536
Oilseed, Soybean	2,711	2,600	2,833	2,554
Oilseed, Sunflowerseed	9,474	8,898	10,285	9,287
Other	642	542	534	525
Total	28,079	28,772	31,041	31,902
Domestic Consumption				
Meal, Fish	450	440	486	455
Meal, Rapeseed	12,000	12,550	12,300	13,750
Meal, Soybean	28,267	28,392	28,042	27,042
Other	8,762	7,886	8,712	8,539
Total	49,479	49,268	49,540	49,786
SME				
Meal, Fish	650	636	702	657
Meal, Rapeseed	8,538	8,929	8,751	9,783
Meal, Soybean	28,225	28,350	28,000	27,000
Other	5,199	4,662	5,187	5,079
Total	42,612	42,577	42,641	42,520
Imports				
Meal, Fish	229	224	247	235
Meal, Rapeseed	469	467	576	760
Meal, Soybean	16,329	16,504	16,704	16,000
Other	4,490	4,030	4,097	4,055
Total	21,517	21,225	21,624	21,050
Industrial Dom. Cons.				
Oil, Palm	4,025	3,860	2,700	2,500
Oil, Rapeseed	6,600	6,675	6,600	6,950
Oil, Soybean	1,150	1,100	1,100	1,100
Oil, Sunflowerseed	510	500	500	500
Other	587	587	587	580
Total	12,872	12,722	11,487	11,630
Food Use Dom. Cons.				
Oil, Palm	2,350	2,300	1,950	2,000
Oil, Rapeseed	2,250	2,400	2,575	2,800
Oil, Soybean	1,175	1,275	1,150	1,170
Oil, Sunflowerseed	4,375	4,300	4,825	4,890
Other	2,246	2,272	2,254	2,074
Total	12,396	12,547	12,754	12,934
Domestic Consumption				
Oil, Palm	6,575	6,360	4,850	4,700
Oil, Rapeseed	8,900	9,125	9,225	9,800
Oil, Soybean	2,380	2,430	2,305	2,325
Oil, Sunflowerseed	4,898	4,813	5,338	5,403
Other	2,846	2,872	2,854	2,659
Total	25,599	25,600	24,572	24,887
Imports				
Oil, Palm	7,112	5,970	4,979	5,000
Oil, Rapeseed	467	314	593	400
Oil, Soybean	483	493	459	450
Oil, Sunflowerseed	2,369	1,599	2,181	1,900
Other	1,606	1,570	1,568	1,538
Total	12,037	9,946	9,780	9,288

European Union includes Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

Foreign Agricultural Service/USDA

Global Market Analysis

Table 6: China Oilseeds and Products Supply and Distribution
Thousand Metric Tons

	2019/20	2020/21	2021/22	2022/23
Production				
Oilseed, Peanut	17,520	17,993	18,308	18,300
Oilseed, Rapeseed	13,485	14,049	14,714	15,530
Oilseed, Soybean	18,092	19,602	16,395	20,280
Oilseed, Sunflowerseed	2,664	2,570	2,154	2,371
Other	10,758	11,600	10,503	12,031
Total	62,519	65,814	62,074	68,512
Domestic Consumption				
Meal, Fish	1,777	2,185	2,182	2,200
Meal, Rapeseed	11,034	11,404	11,951	12,802
Meal, Soybean	71,507	72,678	69,189	71,922
Other	11,647	12,130	11,830	13,403
Total	95,965	98,397	95,152	1,00,327
SME				
Meal, Fish	2,568	3,157	3,153	3,179
Meal, Rapeseed	7,514	7,776	8,165	8,771
Meal, Soybean	70,392	71,553	68,089	70,772
Other	9,828	10,120	9,901	10,924
Total	90,302	92,606	89,308	93,645
Imports				
Meal, Fish	1,427	1,836	1,819	1,800
Meal, Rapeseed	1,910	1,967	2,225	2,200
Meal, Soybean	51	74	56	50
Other	2,974	3,239	3,081	4,240
Total	6,362	7,116	7,181	8,290
Food Use Dom. Cons.				
Oil, Palm	3,800	4,200	3,300	4,300
Oil, Peanut	3,382	3,567	3,355	3,604
Oil, Rapeseed	8,100	8,100	8,300	8,300
Oil, Soybean	17,000	17,600	16,700	16,300
Oil, Sunflowerseed	2,176	2,067	955	1,536
Other	1,576	1,640	1,647	1,767
Total	36,034	37,174	34,257	35,807
Domestic Consumption				
Oil, Palm	6,200	6,550	5,100	6,650
Oil, Peanut	3,382	3,567	3,355	3,604
Oil, Rapeseed	8,100	8,100	8,300	8,300
Oil, Soybean	17,000	17,600	16,700	16,300
Oil, Sunflowerseed	2,176	2,067	955	1,536
Other	2,359	2,278	2,170	2,417
Total	39,217	40,162	36,580	38,807
Imports				
Oil, Palm	6,719	6,818	4,387	7,200
Oil, Peanut	226	346	166	350
Oil, Rapeseed	1,940	2,365	973	1,800
Oil, Soybean	1,000	1,231	291	450
Oil, Sunflowerseed	1,749	1,640	513	1,100
Other	986	862	798	935
Total	12,620	13,262	7,128	11,835

SME - 44 Percent Protein Soybean Meal Equivalent

Foreign Agricultural Service/USDA

Global Market Analysis

Table 7: India Oilseeds and Products Supply and Distribution
Thousand Metric Tons

	2019/20	2020/21	2021/22	2022/23
Production				
Oilseed, Cottonseed	12,100	11,718	10,359	10,614
Oilseed, Peanut	6,255	7,300	8,700	6,300
Oilseed, Rapeseed	7,400	8,600	11,100	11,500
Oilseed, Soybean	9,300	10,456	11,889	12,038
Oilseed, Sunflowerseed	140	150	140	215
Other	998	1,003	1,021	1,022
Total	36,193	39,227	43,209	41,689
Domestic Consumption				
Meal, Cottonseed	4,523	4,584	4,381	4,210
Meal, Peanut	1,525	1,597	1,604	1,515
Meal, Rapeseed	3,100	3,650	4,375	4,900
Meal, Soybean	5,780	5,850	6,273	6,580
Meal, Sunflowerseed	398	166	240	265
Other	618	682	504	577
Total	15,944	16,529	17,377	18,047
SME				
Meal, Cottonseed	3,665	3,714	3,550	3,411
Meal, Peanut	1,708	1,789	1,797	1,697
Meal, Rapeseed	2,206	2,597	3,113	3,486
Meal, Soybean	5,500	5,500	5,873	6,155
Meal, Sunflowerseed	265	111	160	177
Other	265	291	220	251
Total	13,610	14,003	14,713	15,178
Food Use Dom. Cons.				
Oil, Cottonseed	1,350	1,360	1,305	1,240
Oil, Palm	8,050	8,839	7,800	8,650
Oil, Peanut	1,150	1,160	1,185	1,110
Oil, Rapeseed	2,690	2,680	3,590	3,900
Oil, Soybean	5,125	4,950	5,825	4,940
Oil, Sunflowerseed	2,560	2,300	1,850	2,050
Other	380	400	375	444
Total	21,305	21,689	21,930	22,334
Domestic Consumption	none			
Oil, Cottonseed	1,395	1,408	1,350	1,286
Oil, Palm	8,459	9,214	8,146	9,050
Oil, Peanut	1,160	1,170	1,195	1,120
Oil, Rapeseed	2,770	2,750	3,660	3,970
Oil, Soybean	5,125	4,950	5,825	4,940
Oil, Sunflowerseed	2,560	2,300	1,850	2,050
Other	704	747	674	763
Total	22,173	22,539	22,700	23,179
Imports				
Oil, Cottonseed	3	8	4	1
Oil, Palm	7,398	8,411	8,004	9,450
Oil, Peanut	0	0	0	0
Oil, Rapeseed	78	25	34	25
Oil, Soybean	3,626	3,251	4,231	3,150
Oil, Sunflowerseed	2,514	1,958	1,956	2,300
Other	113	157	80	131
Total	13,732	13,810	14,309	15,057

SME - 44 Percent Protein Soybean Meal Equivalent

Foreign Agricultural Service/USDA

Global Market Analysis

Table 8: Major Protein Meals: World Supply and Distribution (Commodity View)
Million Metric Tons

	2019/20	2020/21	2021/22	2022/23
Production				
Meal, Copra	2	2	2	2
Meal, Cottonseed	15	15	15	15
Meal, Fish	5	5	5	5
Meal, Palm Kernel	10	10	10	10
Meal, Peanut	7.62	7.84	7.92	7.89
Meal, Rapeseed	39.77	41	42	47
Meal, Soybean	245	248	247	245
Meal, Sunflowerseed	21.75	20.25	21.24	22.5
Total	347	349	350	355
Imports				
Meal, Copra	0	1	1	1
Meal, Cottonseed	0	0	0	0
Meal, Fish	3.09	3.41	3.6	3.47
Meal, Palm Kernel	7.21	7.1	7.29	7.68
Meal, Peanut	0	0	0	0
Meal, Rapeseed	7.97	8.32	7.69	8.99
Meal, Soybean	63	65	67	62
Meal, Sunflowerseed	9	8	7	8
Total	91	93	94	92
Exports				
Meal, Copra	0.43	0.55	0.66	0.61
Meal, Cottonseed	0.42	0.41	0.45	0.32
Meal, Fish	3	3	3	3
Meal, Palm Kernel	7.83	7.58	7.87	8.2
Meal, Peanut	0	0	0	0
Meal, Rapeseed	8	8	8	9
Meal, Soybean	68	69	69	66
Meal, Sunflowerseed	9	8	8	9
Total	96	97	96	95
Domestic Consumption				
Meal, Copra	1.91	2	1.86	2.02
Meal, Cottonseed	15	15	15	15
Meal, Fish	5.06	5.42	5.69	5.55
Meal, Palm Kernel	9	9	9	10
Meal, Peanut	8	8	8	8
Meal, Rapeseed	40	42	42	47
Meal, Soybean	241	244	244	246
Meal, Sunflowerseed	21	21	21	22
Total	342	346	347	355
Ending Stocks				
Meal, Copra	0	0	0	0
Meal, Cottonseed	0.14	0.12	0.11	0.15
Meal, Fish	0.26	0.19	0.26	0.25
Meal, Palm Kernel	1	1	1	1
Meal, Peanut	0.04	0.03	0.04	0.03
Meal, Rapeseed	1.41	1.24	1.47	1.53
Meal, Soybean	16	15	16	12
Meal, Sunflowerseed	2	1	1	1
Total	20.4	18.8	19.32	16.02

Totals may not add due to rounding

Foreign Agricultural Service/USDA
Global Market Analysis

Table 9: Major Protein Meals: World Supply and Distribution (Country View)
Million Metric Tons

	2019/20	2020/21	2021/22	2022/23
Production				
China	91	92	88	92
United States	49	48	49	50
Brazil	38	38	41	44
European Union	30	30	31	31
Argentina	31.57	32.82	31.98	25.22
Other	107.6	108	108	112
Total	347	349	350	355
Imports				
European Union	22	21	22	21
China	6	7	7	8
Indonesia	5	6	6	6
Vietnam	6	6	6	6
United States	4.12	4.39	3.57	4.18
Thailand	3.57	3.36	3.55	3.51
Korea, South	3	3	3	3
Other	40.62	41.45	42.3	39.18
Total	91	93	94	92
Exports				
Argentina	28	29	28	22
Brazil	18	17	20	22
United States	12.83	12.62	12.44	12.93
Indonesia	5.2	5.33	5.85	5.82
Canada	5	6	5	6
Ukraine	6.1	5.02	3.92	4.38
Russia	3	3	3	4
Other	18	20	18	19
Total	96	97	96	95

	2019/20	2020/21	2021/22	2022/23
Domestic Consumption				
China	96	98	95	100
European Union	49	49	50	50
United States	40.1	40.01	40.43	41.36
Brazil	21	21	22	22
India	15.94	16.53	17.38	18.05
Russia	8	8	8	9
Mexico	8	8	8	8
Vietnam	7	8	8	8
Indonesia	6	6	7	7
Thailand	6	6	6	6
Other	84	85	86	86
Total	341.52	345.85	346.6	354.96
SME				
China	90.3	92.61	89.31	93.65
European Union	42.61	42.58	42.64	42.52
United States	39	39	39	40
Brazil	20.31	20.72	21.2	21.83
India	13.61	14	14.71	15.18
Mexico	7	7	7	8
Russia	7	7	7	7
Other	93.47	94.68	96.46	96.04
Total	312.88	317	318	324
Ending Stocks				
Brazil	3.78	4.07	3.63	3.46
Argentina	2.87	2.42	2.93	1.95
European Union	1.45	0.99	1.13	1.04
India	0.61	0.41	0.88	0.49
Indonesia	0.67	0.94	0.66	0.63
Other	11.02	9.97	10.09	8.46
Total	20.4	18.8	19.32	16.02

Major Protein Meals include Copra, Cottonseed, Fish, Palm Kernel, Peanut, Rapeseed, Soybean, and Sunflower Meal.

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Table 10: Protein Meal Prices
U.S. Dollars per Metric Ton

Year	Soybean				Cottonseed		Sunseed	Fish	Rapeseed
Beg Oct 1	U.S. 1/	Brz 2/	Arg 3/	Hamb 4/	U.S. 5/	U.S. 6/	Ukr 7/	Brem 8/	Hamb 9/
Oct - Sep Average									
11/12-20/21	409	393	398	413	316	221	255	1530	227
2011/12	434	442	442	461	303	272	263	1448	295
2012/13	516	489	506	538	366	266	318	1791	353
2013/14	540	500	509	533	416	263	315	1660	323
2014/15	406	376	386	403	335	231	269	1632	269
2015/16	358	335	349	351	288	169	233	1517	232
2016/17	349	322	326	336	230	160	178	1,377	225
2017/18	380	368	375	382	287	191	224	1,506	259
2018/19	340	325	321	329	252	181	219	1,477	247
2019/20	330	328	331	338	272	207	217	1,406	244
2020/21	432	447	439	463	413	272	312	1,486	319
2021/22									
Oct	359	392	387	448	329	245	284	1,461	340
Nov	395	386	393	447	336	283	280	1,437	365
Dec	440	415	423	478	343	319	278	1,428	388
Jan	464	470	465	505	351	332	294	1,431	405
Feb	508	534	505	552	374	353	300	1,435	428
Mar	545	566	548	590	381	367	N/A	1,525	551
Apr	524	524	516	553	391	354	352	1,645	540
May	486	475	473	504	429	315	348	1,629	450
Jun	492	483	476	529	423	311	304	1,606	361
Jul	516	493	486	548	407	296	228	1,578	334
Aug	563	488	489	560	446	281	215	1,629	361
Sep	522	487	480	529	496	248	210	1,623	344
Average	484	476	470	520	392	309	281	1,536	406
2022/23									
Oct	517	491	487	528	498	N/A	195	1,620	366
Nov	481	475	482	526	446	N/A	209	1,663	358
Dec	510	534	539	556	431	220	223	1,745	367
Jan	532	563	584	595	426	391	261	1,776	396
Feb	552	562	588	610	433	371	279	1,768	408
Mar	534	519	544	576	426	340	271	1,723	366
Apr	504	489	501	518	402	278	268	1,763	347
*May	467	466	478	480	409	262	265	1,791	299
Jun									
Jul									
Aug									
Sep									
Average	512	512	525	549	434	310	246	1,731	363

1/ Decatur, Average Wholsale 48% Protein; USDA. 2/ Brazil Paranagua, FOB; 48% Protein; IGC.
3/ Argentina Pellets, Up River, FOB; IGC; 4/ Hamburg FOB 44/45% Ex-Mill; Oil World.
5/ Memphis FOB; 41% Protein Solvent Extraction; USDA; 6/ Minneapolis FOB; 32% Protein; USDA.
7/ HiPro a.o. cif France or Ukraine DAF; Argentina Pellet 37-38% (Prior to Aug 2012); Oilworld.
8/ Bremen 64-65% Protein; Oil World. 9/ Hamburg FOB; Ex-Mill 34% Protein; Oil World.

* Preliminary

Foreign Agricultural Service/USDA Global Market Analysis

COCONUT OIL: – Nutritional facts & its non-food applications

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Introduction

Coconut (Cocos Lucifer L) grown in about 93 countries in an area of 11.8 million ha produces 10.9 million of copra equivalent. Coconut provides food, drink, medicine, health, shelter, aesthetics and wealth. Since every part of coconut is used for mankind, it is known as Tree of life & Tree of heaven. One of the primary natural product produced from the dry fruit (copra) of coconut is coconut oil which has been used from time immemorial as food, food ingredient and functional foods, besides used in pharmaceuticals, nutriceuticals, cosmetics and industrial uses including bio fuel. It is known as Miracle oil.

Coconut is consumed in many forms – raw (flesh), milk, water and oil. Coconut is a simple dry nut formed of a number of layers. The outermost is the brown husk, formed of fibers called coir, while the second one is endocarp i.e an inner stone. Upon removing the endocarp the white and fleshy edible part is obtained inside which is coconut water. Given below is the nutritional value of coconut.

Nutritional value of coconut

The amount of nutrients in 100 gm. Coconut meal (fleshy part) is given below:

Carbohydrates	5.23 gm.
Sugars	0..23 gm.
Dietary fiber	9.0 gm.
Saturated fatty Acids	29.70 gm.
Monounsaturated fatty acids	1.43 gm.
Polyunsaturated fatty acid	0.37 gm.
Protein	3.30 gm.
Thiamin (Vitamin B1)	0.066 mg.
Riboflavin (Vitamin B2)	0.02 mg.
Niacin (Vitamin B3)	0.54 mg.
Pantothenic acid (Vitamin B5)	0.300 mg.
Vitamin B6	0.054 mg
Folate (Vitamin B9)	0.26ug.
Vitamin C	3.30 mg.
Calcium	14.0 mg.
Iron	2.43 mg.
Magnesium	32 mg.
Phosphorous	113 mg.
Potassium	356 mg.
Zinc	1.1 mg.
Water	Rest
Energy	350 Kcal

Nature of coconut oil

Coconut oil is a colourless to pale brownish yellow oil with a melting point ranging from 23^0 to 26^0C. Almost 70% of saturated fatty acids present in coconut oil exhibit dietary properties which are specific to the group of short and medium chain fatty acids. Coconut oil rich in fatty acids of 12 carbon atoms or less is classified as medium Chain fatty Acids (MCFA). Coconut triglycerides are characterized by high laurate in the beta position. Coconut oil is more or less constant in composition irrespective of the country of origin.

Coconut oil is an important component in imitation dairy products like filled cheese, coffee whiteners, milk shake, ice cream, dessert topping, spray oil for crackers, cookies.

Historical Facts

Prior to World War II coconut oil was the most preferred vegetable oil for human consumption because it was considered as the healthy oil. During World war II, the Japanese military occupied the Phillippines and other South pacific islands which were the main source of Coconut oil. The supply of Coconut was effectively cut off from the United States. Although coconut oil had been popular both as a cooking oil and ingredient in numerous food products, the occupation continued to interrupt the supply for several long years as the war slowly dragged on.

Manufacturers began to develop alternative source of cooking oils, and the polyunsaturated oils phase was born. By the time the war was over, there was a lot of money at stake in the promotion of these polyunsaturated vegetable oils.

By the end of 1950,s public opinion had turned totally against saturated fats like butter and coconut oil. Saturated fats were blamed for raising cholesterol and cholesterol was now viewed as the evil enemy, the culprit responsible for the steep rise in heart disease. Butter, eggs and coconut oils were out. The new vegetable oils were in and viewed as heart healthy. Coconut oil continued to be demonized by the vegetable oil industry throught the ensuing decades. The soybean oil industry began to condemn the use of tropical oils particularly coconut oil. Unfortunately, the tropical oil industry centered in poorer nations like the Philippines & Indonesia could not afford to counter the negative propaganda of soya oil industry & science and good health took a back seat to profits.

The Hidden truth About Coconut oil

The truth about coconut oil is obvious to anyone who has studied the health of those who live in traditional tropical cultures where coconut has been a nutritious diet staple for thousands of years.

It is time to dispel such information and unfold the truth and play fair to coconut oil. Coconut oil provides more health benefits than anyone can imagine. Check out the people of traditional cultures , such as the South pacific islands, Asia, Africa and the central America where coconut and palm oils are plentiful. For many generations, they add significant amounts of coconut oil in their traditional coconut based diets but suffer very much lower rates of obesity and health problems than those in North America and Europe who don't eat coconut based food at all.

How Coconut Oil benefits Your health

The health benefits of coconut oil include hair care, skin care, stress relief, maintaining cholesterol levels, supporting the proper functioning of thyroid gland, weight loss, increased immunity, proper digestion and metabolism, relief from kidney problems, heart diseases, high blood pressure, diabetes, dental care and bone strength. These benefits of coconut oil can be attributed to the presence of lauric acid, capric and caprylic acid and its properties such as antimicrobial, antioxidant, antifungal, antibacterial, soothing etc.

For thousands of years both Ayurvedic and Indian folkloric medicine use coconut oil as a traditional remedy for almost all illnesses. Gradually, modern medical science discovers that coconut oil can actually has all the benefits mentioned above. Coconut oil continues to show off its awesome health benefits and astonish doctors by its powerful ability to kill viruses (e.g. influenza, hepatitis C, herpes, measles), bacteria (e.g. pneumonia, urinary tract infection), fungi and yeast which are otherwise resistant to drugs and antibiotics. Studies conducted in the Philippines recently showed that coconut oil does indeed reduce the viral load in AIDS patients.

Coconut Oil In Traditional medicine

People from many diverse cultures, languages, religions and races scattered around the globe have revered the coconut as a valuable source of both food and medicine. Wherever the coconut palm grows the people have learned of its importance as an effective medicine. For thousands of years coconut products have held a respected and valuable place in local folk medicine.

In traditional medicine around the world coconut is used to treat a wide variety of health problems including the following: abscesses, asthma, baldness, bronchitis, bruises, burns, colds, constipation, cough, dropsy, dysentery, earache, jaundice, kidney stones, nausea, malnutrition, rash, scabies, sore throat, skin infections, swelling, syphilis, toothache, tuberculosis, tumours, typhoid, ulcers, upset stomach, weakness and wounds.

Coconut In Modern Medicine

Modern medical science is now confirming the use of coconut in treating many of the above conditions. Published studies in medical journals show that coconut in one form or another may provide a wide range of health benefits.

Coconut Oil As excellent frying medium

Polyunsaturated fats which include common vegetable oils such as corn, Soya, Sunflower, safflower are not ideal for deep frying. These oils contain Omega-6 fatty acids which are highly susceptible to heat damage.

Frying destroys the antioxidants in oils and as such oxidizes the oils and causes cross-linking, cyclization, double-bond shifts, fragmentation and polymerization of oils that cause adverse health effects.

Coconut oil on the other hand is stable enough to resist heat-induced damage, while it also helps you promote heart health, maintain normal cholesterol levels and even helps you lose weight.

Coconut oil as richest source of medium chain fatty acids (MCFAs)

All fats and oils are composed of molecules called fatty acids. There are two methods of classifying fatty acids. The first is saturated, mono-unsaturated and poly-unsaturated fats. Another system of classification is based on molecular size or length of the carbon chain within each fatty acid. Fatty acids consist of long chain of carbon atoms with hydrogen atoms attached. In this system there are short chain fatty acids (SCFA), medium chain fatty acids (MCFA), and long chain fatty acids (LCFA). Coconut oil is composed predominately of medium chain fatty acids (MCFA), also known as medium chain triglycerides (MCT).

MCFA are very different from LCFA. They do not have a negative effect on cholesterol and help to protect against heart disease. It is primarily due to the MCFA in coconut oil that makes it so special and so beneficial. There are only a very few good dietary sources of MCFA. By far the best sources are from coconut and palm kernel oils.

MCFAs are easily digested, thus putting less strain on digestive system. This is especially important for those with digestive or metabolic concerns. MCFAs are sent directly to liver, where they are immediately converted into energy rather than being

stored as fat. MCFAs in coconut oil can actually help stimulate body's metabolism, leading to weight loss.

Coconut Oil's Natural "Miracle" Ingredient: Lauric acid

Lauric acid is a medium chain fatty acid which is abundant in coconut oil and considered responsible for many of its health benefits. Coconut oil is about 50% lauric acid. The only other abundant source in nature is palm kernel oil & breast milk. The medium chain fats found in coconut oil are similar to fats in mothers milk and have similar nutriceutical effects.

The breast milk is jam packed with nutrients and disease fighting ingredients that keep the babies healthy. Incredibly, coconut oil contains one of the same components-lauric acid – found in mothers milk. The lauric acid in both breast milk and coconut oil transforms when consumed into a substance called monolaurin, the actual compound responsible for helping to strengthen the immune system. A great volume of research has been done establishing the ability of lauric acid to enhance immunity. What researchers found was that this medium chain fatty acid derivative actually disrupts the lipid (or fatty) membranes of the offending organisms.

Non-Food Applications of Coconut oil

Coconut oil is gaining recognition as an excellent health food but its benefits don't stop there. Coconut oil finds many industrial applications which include:

Coconut oil in Cosmetic industry

Coconut oil has a creamy texture & is used in the cosmetic industry. Whether applied topically or internally, coconut oil helps to keep skin young, healthy and free of disease. Virgin coconut oil is used to make natural soaps and other health products and is said to promote luxurioud hair growth and protect the skin from bacterial and viral infection. In Ayurvedic medicine, coconut oil is said to nourish the body and increases strength while application of coconut oil to the skin is said to help fixation of Vitamin D in the body. The cosmetic applications of coconut oil include:

Hair & Skin oil: Coconut oil mixed with herbal oils and different scents is used as hair oil and is preferred because of its low viscosity. Without chemical modification, it promotes emolliency, gloss lubricity and adhesion and is said to prevent dandruff. Different preparations of coconut oil are also used to protect the skin from bacterial, protozoal and other infections in body and baby oils.

In Natural Shampoo: Coconut oil is used to prepare natural shampoos, in which the extra of amla fruit and soap nut powder are sometimes incorporated to add value.

Herbal / medicinal oils: Coconut oil with various herbs/medicinal plants is used for preparing medicated oils such as skin and massage oils. Some people use coconut oil with lime for healing wounds.

Beauty care products: Coconut oil has a high level of myristic acid which, in combination with isopropyl myristate is used in many beauty products as an additive.

Coconut For Clean Air

Coconut oil is gaining recognition as an excellent health food and medicine, but its benefits don't stop there. It can also be used to improve air quality by reducing air pollution caused by automobile exhaust by using it as diesel fuel. or as a fossil fuel alternative.

Not only does Coco bio diesel burn cleaner but it increases the efficiency of the fuel, increasing mileage, reducing wear on the engine and extending engine life. Coco bio diesel increases lubricity of the fuel by 36% thus reducing wear and tear on the engine. It increases solvency of the fuel which dissolves carbon deposits in the combustion chamber and declogs fuel nozzles, lines and ports allowing for greater engine efficiency. It also enhances cold starting efficiency of diesel fuel.

Lipid Health and Nutrition

Lipids play diverse roles in the normal functioning of the body:

- they serve as the structural building material of all membranes of cells and organelles
- they provide energy for living organisms - providing more than twice the energy content compared with carbohydrates and proteins on a weight basis
- they function as molecular messengers and signalling molecules in the body

Lipids are also biomarkers of disease and are involved in several pathological conditions. Lipids are also known to play a role in genetic modification and inûuence risk of chronic disease.

Dietary lipids

Some of the fatty acids need to be taken in diet. This includes essential fatty acids (EFAs), linoleic acid (LA, an omega-6 fatty acid, 18:2n-6), and a-linolenic acid (LNA, an omega-3 fatty acid, 18:3n-3). These help in formation of polyunsaturated fatty acids (PUFAs) used in cellular structures and as precursors for the biosynthesis of many of the body's regulatory molecules like long-chain PUFAs, arachidonic acid, eicosapentaenoic acid (EPA, 20:5n-3), and docosahexaenoic acid (DHA, 22:6n-3) and eicosanoids. DHA again is necessary for normal neural and retinal development in the infant and young child.

Effects of PUFA

Dietary lipids help in biochemical and physiological functions as modulators of cell actions and genes. For example, the n-6 and n-3 PUFAs bind to the peroxisome proliferator-activated receptors (PPARs) on genes. This PPAR gene is important for lipid and carbohydrate metabolism. These also play a role in chronic diseases like diabetes and inflammatory conditions.

PUFA in diet has been found to reduce risk of cardiovascular disease and cancers. In addition, n-3 fatty acids are known to lessen the severity and minimize symptoms of chronic inûammatory diseases, including rheumatoid arthritis and inûammatory bowel disease, and may even beneût in correcting psychological disorders.

PUFAs modulate eicosanoid biosynthesis in various tissues and cell types and this can inûuence gene expression.

Foods with PUFA

PUFA is present in three forms in food. These are LNA in vegetables, oilseeds, and nuts, and EPA and DHA in cold water ûshes and algae.

SDA is rich in plant oils (such as hempseed oil and black currant seed oil) but can be isolated and concentrated from marine ûsh. Since n-3 fatty acids cannot be synthesized in the body they must be either ingested directly or formed from LNA.

Food supplements and fortification

The diet needs to be low in saturated fats. Essential fatty acids and n-3 PUFA, however, are important in the diet.

Sources of n-3 PUFAs are also added directly to infant formula to provide sufûcient DHA for normal development of the nervous system during early infancy. These supplements are added to both dairy and non dairy products to reduce risk of heart disease, cancer risk and risk of obesity. The n-3 PUFA are contained and added in ûsh meal, ûsh oil, vegetable oils, linseed oil and canola oil etc.

Lipids and vitamins

A minimum amount of dietary fat is important because it helps in absorption of fat-soluble vitamins (A, D, E and K) and carotenoids.

Lipids and chronic diseases

Fats in diet play a role in chronic diseases. Up to 70% of all cancers in the United States are attributable to diet for example. Around half of the population according to the USDA develops a diet-related chronic disease responsible for the leading causes of death like heart disease, cancer, stroke, diabetes, and arteriosclerosis. This raises the annual health costs to $250 billion in the USA. High fat, especially trans fats and unsaturated fats lead to heart disease, degenerative and inûammatory arthritis, osteoporosis, obesity, cancer etc.

Courtsy : Medical and life sciences

SHIFTS TO MILLETS – CFTRI Develops Eight New Products

With focus on millets in view of International Year of Millets-2023, the CSIR-Central Food Technological Research Institute (CFTRI), Mysuru, on Thursday released eight new products based on millets at the ongoing 'One Week One Lab', a CSIR campaign, on the campus here

The products that were launched include instant finger millet upma mix, little millet puttu podi, ragi-based ready-to-eat malted weaning food, finger millet semolina, instant finger millet rava idli mix, instant finger millet khichdi dal, instant finger millet halva, and ragi-based malt hydrolysate.

As finger millet grains are an excellent source of various nutrients and many health-promoting components such as dietary fibre, minerals, vitamins, and phytochemicals that include phenolic compounds and have several potential health benefits, scientists at the CFTRI developed the products with the objective of maximising use of finger millets.

"The use of millets as food is limited mainly due to lack of innovative millet processing technologies at commercial scale that can be used to feed large populations in urban areas. In recent years, due to increased awareness, finger millet-based products are given more emphasis in diet," according to the scientists.

The CFTRI believes that the demand for healthy and nutritious foods is expected to increase due to increasing cases of lifestyle diseases. Therefore, it developed instant and ready-to-eat millet products, including finger millet upma mix that provides a healthier alternative to existing products and an opportunity to launch new products in the health and wellness segment, a note said here.

According to CFTRI, ready-to-eat segment share is expected to grow around 20-25% over the next five years. The millets are now being used for food due its nutritive value and health benefits. Thus, the finger millet instant rava idli mix will attract demand in the market besides finger millet instant Kesari halwa mix.

Other products are puttu, a dish native to South Indian States of Kerala, Tamil Nadu, and parts of Karnataka. Puttu is usually a breakfast dish served hot with either sweet side dishes such as palm sugar or banana, or savoury with chana masala, chutney or meat curries. The little millet puttu podi is one of the products developed by the institute, the note said.

According to CFTRI, weaning food is a semi-solid food given to an infant in an age group of 6 months to 2-3 years. Weaning foods are generally texture modifications of adult foods to make them easily digestible and promote healthy growth of a child. "Ragi is one of the important millets which gains prominence because of its nutritional significance. It is the richest source of calcium among the cereals and exhibits excellent malting characteristics. Malting generally improves the taste and the quality of the nutrients of a product. Supplementing malted ragi with malted legume generally increases both the quantity and quality of the proteins of the final product," the note explained.

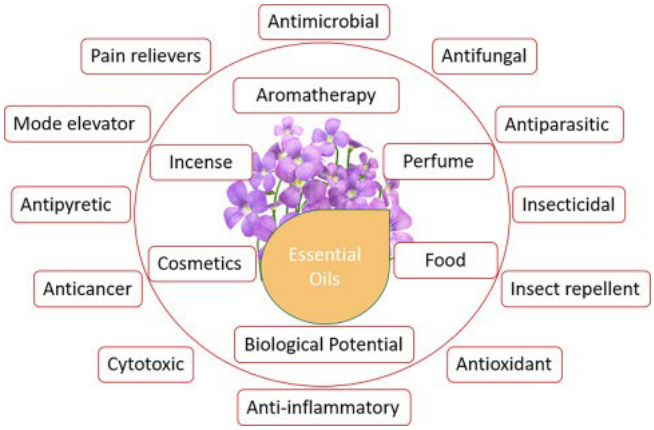
CFTRI has standardised the technology and general methods of preparation of ready-to-eat malted weaning food.

Importance of Essential Oils and current trends :

Essential oils (EOs) are the complex mixture of diverse array of volatile phytoconstituents. These EOs are isolated from every plant part (flowers, leaves, buds, bark, stem, rhizome, and roots) but mainly concentrated in leaves and flowers of the plants. They are primarily produced by specific secretory tissues known as glandular trichomes along with other secretory structures.

Different extraction techniques are used for the isolation of EOs, but hydrodistillation and steam distillation are the most employed techniques all around the world. Terpenoids, mainly monoterpenes and sesquiterpenes, low-molecular-weight hydrocarbons, and their oxygenated derivatives, are the key phytoconstituents present in the EOs. Pertaining to the presence of diverse array of bioactive phytoconstituents, EOs are used from the primeval time in different traditional medicinal and healing systems for the cure of variety of ailments.

Further, EOs are well known for their variety of biological potential such as antioxidant, cytotoxic, antimicrobial, anticancer, antifungal, antiparasitic, insecticidal, insect repellent, antiinflammatory, pain relievers, mode elevator, etc. Apart from these, now



Courtesy: Science Direct

a days, EOs are widely used in various fields and industries like aromatherapy, cosmetics, perfume and fragrance, incense, food preservative, biopesticides, and insecticides industries. Owing to the widespread applications of EOs in day-to-day life, presently the EOs market is growing rapidly. Therefore, the present chapter aimed to discuss the importance of EOs in different fields and current trends in the utilization of EOs particularly in the field of aromatherapy, medicines, and food and nonfood industries.

Biomimetic Ingredient for Restoring Skin Firmness

France based cosmetics ingredients supplier. Seppic has *launched Sagacious*, a new biomimetic anti sagging marine active ingredient.

The ingredient is inspired by the behaviour of plants in the international space station, which, to maintain their integrity in zero gravity synthesise specific molecules from the glycolipids family. Seppic has succeeded in extracting this family of molecules from *Himanthalia Elongata* seaweed using an eco-designed and patented process – " Coeur d' algue " (French for " Heart of Algae "). *Himanthalia elongata* is brown seaweed harvested with respect for biodiversity in France

According to Seppic, the active ingredient acts on all skin layers. The skin becomes significantly firmer and the signs of facial sagging less visible.

Clinical tests have shown that *Sagacious* improves skin firmness more than eight times than the placebo and decreases the visibility of *nasogenian* folds (efficacy clinically proven after, 28 days of application). Its mode of action has been evaluated also in vitro, demonstrating a restoration of Mechanical properties of fibroblasts close to the value of fibroblast 28 years younger, thanks to a stimulation of key molecules at the level of the different layers of skin.

Source : hpi-india

Fish oil may lower infection risk of coronavirus strain

SARS-CoV-2 is a strain of coronavirus, which causes COVID-19.

Manitoba researchers working at the Canadian Centre for Agri-Food Research in Health and Medicine and the St. Boniface Albrechtsen Research Centre discovered animals consuming fish oil have fewer anchor points required for entry of the virus into the heart, aorta, and kidneys.

Taking fish oil led to a 50 to 75 per cent reduction of a protein called ACE2, which is found on the surface of some cells.

"The virus comes and binds to it, attaches to it, and that allows it to penetrate into the cells and put its DNA in there, and there it replicates or makes more viruses to infect other cells," explained Peter Zahradka, a researcher and professor of physiology and pathophysiology at the University of Manitoba.

"So the more ACE2 on the cell surface, the greater number of virus particles that could infect the cells, and of course, the cells are fighting the virus. So the more it has, it overwhelms defences."

Since the protein acts as an anchor for the virus to attach cells, lowering levels means the cells can't become infected as easily.

This could make fish oil a possible new tool in the fight against COVID-19.

"It's very exciting because it can be used in conjunction with the vaccine. The vaccine is always the best solution, but the vaccines are targeted to specific variants," Zahradka explained.

"This would be very independent, and it would also help to reduce any chance that people towards the end of their vaccine cycle, they get infected or at least, that's our presumption based on the results."

He notes more research is needed to verify whether the initial observations also apply to humans, and the potential it has to help fight COVID-19.

The researchers also plan to explore fish oil's effects on long COVID.

"If the COVID virus is still having an effect months later by suppressing the ACE2 protein, it may be able to suppress the ability of long COVID to come back," he said.

The findings were published on Nov. 10, 2022, in the International Journal of Molecular Sciences.

Courtesy: CTV news

Enzyme crucial to fat production, leads to more effective treatments for childhood obesity and cancer.

While the research was in fruit fly larvae, being able to speed up or slow down lipid metabolism could have significant implications for human health, said Hua Bai, an associate professor of genetics, development and cell biology.

"We've identified what's basically a metabolic switch. It's like the accelerator on a car," he said.

The focus of Bai's research lab is the cellular and molecular mechanisms that cause animals to age. That was the initial intent of studying fatty acid synthase, an enzyme that plays a role in de novo lipogenesis, which is the process of turning excess

dietary carbohydrates into fat. Typically, levels of fatty acid synthase rise and fall based on an animal's cellular needs and diet.

Surprisingly, the researchers noticed that early in a fruit fly's development, de novo lipogenesis increases without an accompanying boost in the expression of fatty acid synthase. That suggested there must be some other factor at play, Bai said.

After proteins such as fatty acid synthase are created based on genetic code, their function can be altered by one of several different types of post-translational modification. Bai's team found one of those processes, acetylation, affected one of the 2,540 amino acids that combine to make fatty acid synthase, changing how effective it was at producing fat.

The research was published last month in the *Proceedings of the National Academy of Sciences*, a peer-reviewed journal.

In addition to its role in obesity, elevated levels of de novo lipogenesis are linked to cancer, so controlling it through a single amino acid could lead to highly targeted treatments, Bai said.

"Fine tuning the acetylation levels of fatty acid synthase would be a much more precise treatment than blocking the entire protein," he said.

It's not certain that the processes Bai's team studied will work the same in humans, but the two species' genomes are similar, which is part of the reason fruit flies are a common research subject. Still, capitalizing on the discovery to treat human disease is many years away, he said.

"The potential is high, but further testing is needed in other animals," he said.

Courtesy: Science News

WHO: 500K People Die Prematurely from Trans Fat Annually

The World Health Organization is calling for the total elimination of trans fat — an artificial toxic chemical commonly found in packaged foods, baked goods, cooking oils, and spreads which is responsible for half a million premature deaths each year.

WHO reports 5 billion people are being exposed to this toxic product, increasing their risk of heart disease and death.

Tom Frieden, the president and chief executive officer of the public health initiative Resolve to Save Lives, said that the global elimination of trans fat from food could prevent up to 17 million deaths from cardiovascular diseases by 2040.

Frieden also spoke of the importance of distinguishing artificial trans fat, "which is a toxic chemical, which has no valid use in the food supply and should be eliminated," from saturated fat, which he called "an inherent part of many food groups in which nobody is proposing to ban."

To put it simply, Frieden said, "Think of artificial trans fat as the tobacco of nutrition. It has no values."

Progress has been made since 2018 when the WHO set a goal for the global elimination of trans fat in 2023. It says 43 countries now have implemented best-practice policies for tackling trans fat in food,

thus protecting 2.8 billion people from heart disease and death.

To Frieden, however, that still leaves 5 billion people at risk from the devastating health impacts of trans fat. He said governments can stop these preventable deaths by enacting WHO's best-practice policies.

He noted several countries, especially Mexico, Nigeria and Sri Lanka, are very close to passing these lifesaving policies. According to him, all they need is a simple push to get them over the finish line.

"Policy wins in one country can help encourage other countries to take action," Frieden noted. "We hope that leaders such as India, Bangladesh, and the Philippines will be examples for all of the South and Southeast Asia region, and we hope that Nigeria, along with South Africa, which has already banned trans fat, will be a leader for Africa."

Friedan said experience shows the industry can adapt, innovate and replace trans fat with healthy alternatives. It is just a few large companies who continue to manufacture a toxic product.

Friedan added that these companies will come into line when they see the days of trans fat are numbered.

WHO reports most trans fat elimination policies have been implemented in high-income countries, mainly in the Americas and Europe, and that an increasing number of middle-income countries are following suit. As of now, however, no low-income countries have done so.

Courtesy: Science and Health

TEA TREE ESSENTIAL OIL

Tea tree oil, also known as **melaleuca oil**, is an essential oil with a fresh, camphoraceous odor and a colour that ranges from pale yellow to nearly colourless and clear. It is derived from the leaves of the tea tree, *Melaleuca alternifolia*, native to southeast Queensland and the northeast coast of New South Wales, Australia. Australia is a only place in the world where melaleuca alternifolia tea trees are mainly grown naturally The oil comprises many constituent chemicals, and its composition changes if it is exposed to air and oxidizes. As a traditional medicine, it is typically used as a topical medication in low concentrations for the treatment of skin conditions, Preliminary studies, the Mayo Clinic says that tea tree oil has been shown to be effective against dandruff, athlete's foot, and lice eggs.

The wide application of tea tree oil initially began from the discovery of Australian chemist, Arthur R. Penfold, in 1992 whereby he discovered that Melaleuca oil is an extremely powerful antiseptic, which is far more efficient than phenol, without causing any damage to the skin layer

Tea tree Harvesting

Harvesting is done on a regular rotation every second or third year during spring and late summer when the leaves are mature. In Australian plantations, harvesting is done with big machines which cut the growth right off at ground level but at True Blue Organics we cut about a metre above the ground and continue to cut all the regrowth at that level. The trees have very vigorous growth and regrowth and about 90% of our original plants are still producing fifteen years later.

The cut plant material is gathered, loaded on to the trailer and taken to the barn for further processing.

It is useful to allow the leaves to wilt for a few days as the initial drying means less moisture for the steam to remove and makes it easier for the steam to open the oil glands and extract the oil.

These branches are trimmed into short lengths using a sharp machete. Hand processing allows any insects to be removed and weeds which could cause

allergies, making the oil free of any possible contamination.

The trunks and thicker branches have no oil in them and when all the leaves and twigs have been trimmed off, the leafless branches are taken to a stock pile which builds up over the year. In early spring, we hire a big commercial mulcher to chip this woody material which is used to create a large compost heap. The composted material is then spread back around both the Tea Tree, the vegetable garden and around our Feijoa bushes.

Extraction of Tea Tree Oil

As for the extraction process of tea tree oil, the conventional technology being used till today in the industry is by the steam distillation method. Although it is the ancient form of extracting essential oils from leafy plants and requires simple utilities for the extraction process, the high temperature steam used as the extraction medium may cause slight changes in the extracted tea tree oil composition, therefore, probably may affect the overall chemistry of the essential oil which influences the oil's efficiency . Besides that, the essential oil components which requires higher boiling point ranges involves large amount of steam which prolongs the distillation period upon completion. Another major drawback upon the application of this method is that it contributes to the low yield of tea tree oil, as a small fraction of the essential oils, consisting of the polar hydrophilic constituents dissolves in the water collected in the receiver, thus contributing to the hydrosol formation, which is the mixture of recovered water and some dissolved hydrophilic portion of essential oils In common practice, the recovery of oxygenated compounds from hydrosols collected are usually disregarded and consequently resulting in the degradation of the market value of the co-product distilled from aromatic plants.

To eliminate the chances of incomplete recovery of essential oils, alternatively, solvent extraction method is possibly deemed as a substitute approach in which it may complement the potential drawbacks set by the conventional method. In the case of tea tree oil extraction, as most of the constituents are comprised of lipophilic compounds such as terpenes hydrocarbons, organic solvents such as nhexane and petroleum ether are highly preferred instead of introducing high temperature steam, to solubilize the essential oil compounds as most of the non-polar constituents dissolves in non-polar solvents (likedissolve-like). Aromatic plants containing limited amount of oil content in their leaves, for instance the Melaleuca alternifolia sp., with an estimation oil content of 1-2% on a basis of fresh plant weight, may not be entirely feasible for steam distillation approach, as they are very delicate and mostly consist of highly volatile monoterpenes compounds, in which it is recommended for them to be extracted via the dissolution of these volatile components in organic solvents to form "absolutes", instead of causing losses of these valuable compounds through the high temperature steam

The invention discloses a method of extracting tea tree essential oil from tea trees.

The method includes:

1. washing tea leaves, crushing them to 20 meshes to 80 meshes in particle size, adding organic solvent, performing percolation extracting, and filtering extract;

2. concentrating filtrate under normal pressure, recycling solvent, and performing vacuum concentration to obtain tea tree concrete;

3. subjecting the tea tree concrete to molecular distillation, and removing the solvent and polymer materials successively to obtain the tea tree essential oil. The tea tree essential oil is purified and extracted by means of molecular distillation, organic solvent percolation and molecular distillation are made full use, and the tea tree essential oil is extracted quickly and efficiently.

Yield of absolutes from Melaleuca alternifolia sp. based on different types of solvents.

Extraction solvents	Mass of extracted tea tree absolutes (g/g)	Yield of absolutes
n-hexane	0.48	0.96
Petroleum ether	0.53	1.06
Ethanol	0.39	0.78

Composition of Tea Tree oil

Chromatographic profile of selected components in tea tree oil according to ISO 4730 standard.

Component	Minimum (%)	Maximum (%)
α-pinene	**1**	**6**
α-terpinene	**5**	**13**
Limonene	**0.5**	**1.5**
p-cymene	**0.5**	**8**
1,8-cineole (eucalyptol)	**trace**	**15**
γ-terpinene	**10**	**28**
Terpinolene	**1.5**	**5**
terpinen-4-ol	**30**	**48**
α-terpineol	**1.5**	**8**

Uses for tea Tree Oil

Tea tree oil is an essential oil that has several uses, including keeping your skin, hair, and nails healthy.

Although Melaleuca alternifolia is known as the tea tree, it should not be confused with the plant whose leaves are used to make black, green, and oolong tea**.**

1. Using tree oil as a natural hand sanitizer may help kill a number of germs responsible for colds, the flu, and other illness.
2. Tea tree oil has been shown to kill or repel insects. In some cases, it is as effective or more effective than standard insecticides or repellents.
3. Tea tree oil contains compounds that fight bacteria responsible for body odor. It can be used to make a safe and effective deodorant.
4. Applying a mixture of tea tree oil and coconut oil can help prevent minor cuts and abrasions from becoming infected.
5. Tea tree oil may help speed wound healing by reducing inflammation and increasing white blood cell activity.
6. Gels containing tea tree oil have been shown to reduce the number of lesions and severity of acne in a number of studies.
7. Tea tree oil appears to be as effective against fungal nail infections as antifungal medications applied to the area.
8. Tea tree oil can be diluted with water to create a mouthwash that helps fight bad breath and dental plaque.
9. Tea tree oil can be mixed with water and vinegar to create a chemical-free, all-purpose cleaner for your home.
10. Applying a tea tree oil mixture may help combat skin inflammation related to contact dermatitis or insect bites.
11. More studies are needed, but the antifungal properties of tea tree oil have been found to reduce the severity of dandruff and improve other symptoms.
12. Tea tree oil's antifungal properties may help alleviate symptoms of athlete's foot.
13. Tea tree oil contains compounds that help fight the growth of mold on fruits and vegetables. Adding tea tree oil to water when rinsing produce may help your produce remain mold-free.
14. Applying a mixture of tea tree oil and coconut oil may help relieve the symptoms of psoriasis.

Precautions

Although tea tree oil is generally safe when used on adults' skin, allergic reactions may occur in some people. Tea tree oil may be unsafe for young children and pets.

Compiled by: C.S. Joshi, Director, FARELABS Pvt. Ltd. Gurugram

LAUGH AND LOUD

Q. What did the biologist wear to impress his date?

A. Designer genes.

****

Q. What did the stamen say to the pistil?

A. I like your style!

****

Q. What do rich clouds do?

A. They make it rain!

****

Q. What did the volcano say to his beautiful wife?

A. I lava you

****

Q. What does Earth say to make fun of the other planets?

A. "You guys have no life."

****

Q. What did the tree wear to his friend's pool party?

A. Swimming trunks

****

Q. How much room does fungi need in order to grow?

A. As mushroom as possible.

****

Q. Why did the man get hit by a bike every day?

A. He was stuck in a vicious cycle.

****

Q. What did the bartender say to the turkey sandwich when it tried to order a beer?

A. "Sorry, we don't serve food here."

****

Q. What's the difference between the bird flu and the swine flu?

A. One requires tweetment and the other an oinkment.

****

Q. What do you call a factory that sells good products?

A. A-satis-factory.

****

MEMBER PAGE

NOURISH YOUR BODY

by R. C. ARORA

An important part of looking young is having a glowing, smooth skin and good hair. Vital nourishment for hair and skin includes a few basics:

Vitamin A: This is the vitamin which helps in giving good vision. It is also needed for 'dandruff-free hair'. Vitamin A is important for hair growth. A deficiency leads to dry skin, wrinkles (most treatments for wrinkles involve vitamin A. Similarly, most treatments for pimples also use vitamin A). This vitamin is found in carrots (you can eat chopped carrots with a hung curd dip or make carrot juice for the kids), green leafy vegetables, tomato and papaya

Vitamin B complex is very important as it is a destress and counteracts free radical damage. Absence or deficiency of this vitamin leads to dry, wrinkled skin and cuts at the corners office the mouth. Many kinds of dermatitis are linked to the deficiency of this vitamin.

Unfortunately, our diet has very low level of this vitamin because we consume foods which are mostly flour - based, and while converting natural whole grains to flour, most of the B complex is lost. Stress also burns out a lot of B complex.

Good sources of B complex are whole grains like boiled corn, boiled black chana / rajmah and brown rice.

Vitamin C : It is very important to keep the skin tight, it works on the skin by binding the collagen together for that firm look. Vitamin C is also good for healing and having a blemish- free skin. It ensures proper functioning of the oil and sweat glands. Absence of this vitamin leads to a disease called scurvy.

Good sources of vitamin C are amla, citrus fruits like oranges, sweet lime (mausumbi) and sprouts.

Vitamin D: Since this vitamin gets manufactured in our skin whenever it is exposed to the sun's rays, therefore it is not common to find a deficiency of the vitamin in tropical countries. However, a related deficiency of calcium is very common.

Another vital part of the beauty menu are minerals. Minerals like calcium, magnesium, phosphorus, zinc, iron, potassium, selenium are an important part of the menu.

That is why it is important to eat foods which contain a lot of minerals, like nuts and seeds and green leafy vegetables. While grains, sprouted legumes and pulses (sprouted moong, moth, black chana) are also recommend Along with the above foods, one must consume enough water (10 glasses a day) and get enough sleep.

Vitamin E: is found in all nuts and nut oils. In fact, this vitamin couple with zinc is like a quick fix solution for many skin problems. Vitamin E is required for lubrication of the skin and for keeping it supple. Vitamin E application, along with zinc, improves scars and heals the skin. In winters, one can eat almonds, walnuts, sunflower seeds and sesame seeds.

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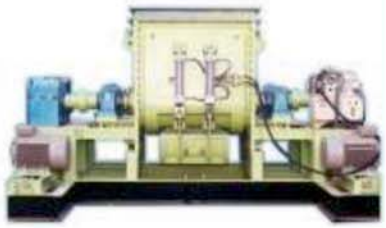

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