LIPID UNIVERSE

Volume-2, Issue-4 October - December, 2014

Authentication of milk fat by affirmative chromatographic techniques

Health Tips

Pumpkin Seed Oil

Trade News

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

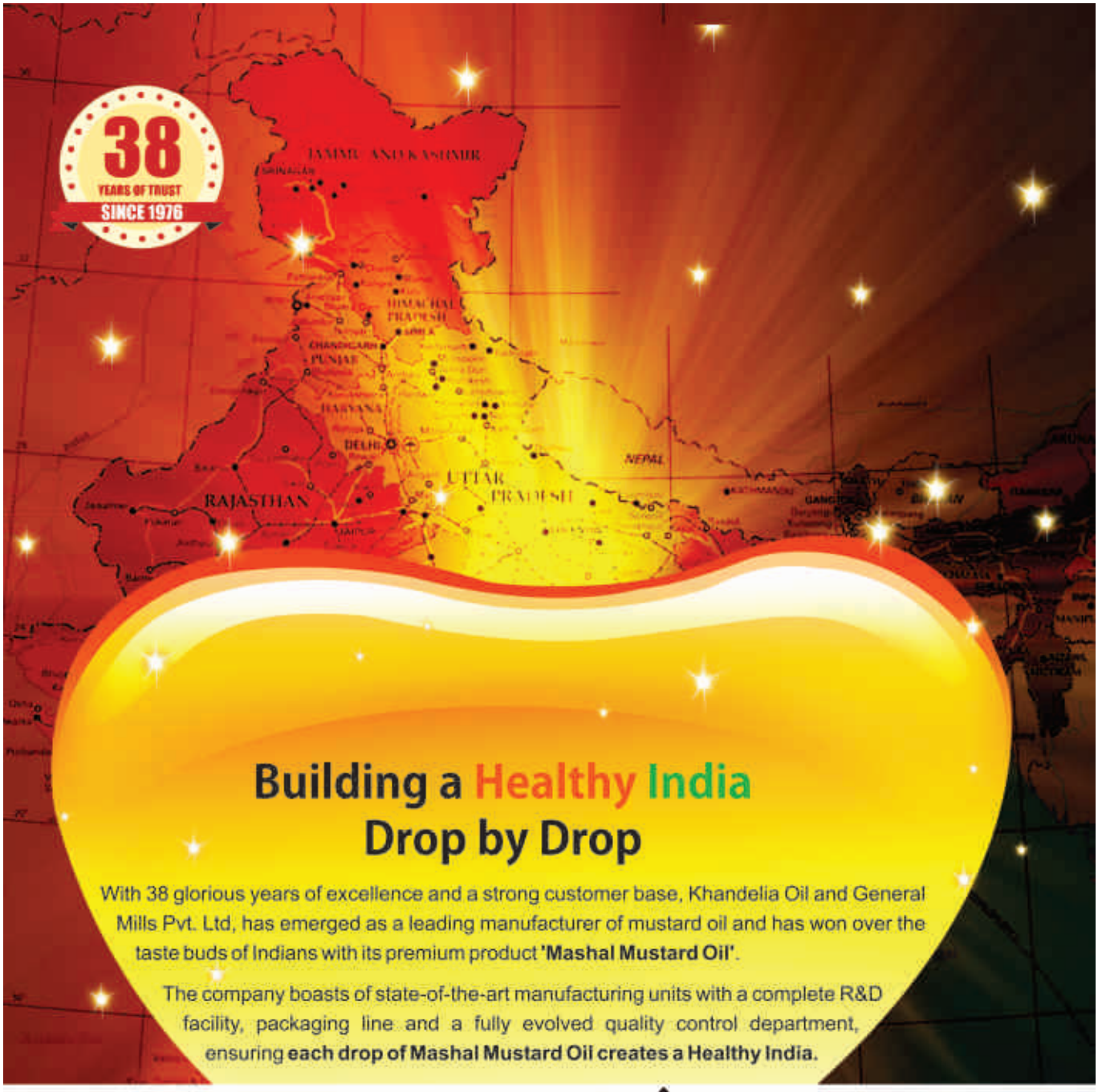
Office Interiors, Hospital Interiors, Laboratory Interiors
Kitchen Cabinets, Home Furniture, Wadrobes

Aluminium Partitions, Glass Work, Special Purpose Counters
Doors, Windows, Frames

INTERIOR & DECOR

Anu

ANU INTERIOR & DECOR
Village Jharsa, Kanhai More, Sector-39,
Gurgaon-122001, Haryana, INDIA
Cell : +919716749887
E-mail : shazad.aid@gmail.com



Building a Healthy India Drop by Drop

With 38 glorious years of excellence and a strong customer base, Khandelia Oil and General Mills Pvt. Ltd, has emerged as a leading manufacturer of mustard oil and has won over the taste buds of Indians with its premium product **'Mashal Mustard Oil'**.

The company boasts of state-of-the-art manufacturing units with a complete R&D facility, packaging line and a fully evolved quality control department, ensuring **each drop of Mashal Mustard Oil creates a Healthy India.**

BHARTI WALMART
PREFERRED SUPPLIER PARTNER 2011

Khandelia Business Group
23, Industrial Area, Phase II, Chandigarh 160002. Tel : +91-172-2652027/28,
Fax : +91-172-2652029. Email : chandigarh@khandelia.com, www.khandelia.com
Toll Free No.: 1800 10 22 311

A
world class
product from
Ruchi

अच्छा खाओ खुश रहो

MAHAKOSH®

कच्ची घानी
Mustard Oil

"QUALITY PRODUCT FROM INDIA'S ONE OF THE LARGEST EDIBLE OIL PRODUCER"
Ruchi Soya Industries Limited Tulsiani Chambers, Nariman Point Mumbai - 400 021

Shiv Shakti Chemicals

Satisfaction is Our Motto

We value our partnership with our customers.

SSC strives to build lasting relationships that invariably prove beneficial to its customers, by dealing in the chemicals for the manufacture of products ranging from industrial rare chemicals to advanced laboratory equipments.

We believe in building long term relations with consumers and for this purpose we continuously strive to put in our best efforts to deliver flawless results in order to achieve your full satisfaction. SSC stocks the entire inventory in a network of warehouses.

There are undeniable advantages of maintaining a more scaled-down size. We have a carefully trained staff that can focus on giving our clients one-on-one attention. Our company is known not only for advanced and accurate solutions, but also for the caliber of personal service we deliver. Running a lean, aggressive operation does not mean sacrificing courtesy. SSC's commitment to you includes live people at the other end of the phone whenever you need them. We are endowed with great flexibility to ensure timely delivery and thus will serve you best in the industry.

- FISHER SCIENTIFIC
- QUALIGENS
- MERCK
- RANKEM
- WHATMAN
- HIMEDIA
- BOROSIL
- LOBA
- FINAR
- POLYLAB
- CDH
- SPECTROCHEM
- S.D FINE
- SURGICAL GOODS
- LABORATORY INSTRUMENTS
- LABORATORY GENERAL ITEMS

Shiv Shakti Chemicals

Office : 275, Jagriti Enclave, Delhi - 110092
Email id: Shivshakti.chem@yahoo.com
9810141312 , 9711123404

FARELABS

FOOD ANALYSIS & RESEARCH LABORATORY

A commitment for a better tomorrow

Research and Development

Excellence

Creative industry oriented solutions

Analytical Testing

Accuracy

Attention to detail

Credentials

Trustworthiness

Successful business relationships

Consultancy and Training

Reliability

Abundant & diverse experience

Founded in 1999, FARE Labs Private Limited is a leading NABL accredited, FSSAI authorised & MOEF recognised laboratory institution of India. It is based in Gurgaon, and is promoted by Dwijendra Mathur and Chandra Shekar Joshi, a team of chemical engineers with a combined industry work experience of over 51 years.

FARE Labs possesses world-class competencies in Analytical Testing and Research & Development. In addition, it also has a strong Consultancy and Training division to provide holistic solutions to its clients.

Water, Fuels & bio-fuels
Food & Agriculture
Fats, Oils & Allied products
Pollution & Environment
Essential Oils, Herbs & Cosmetics
Soaps, Detergents & Toiletries
Packing material, Petrolium & Lubricants
Industrial & Fine Chemicals
Wood Testing & Soil Strength

FARE LABS Private Limited
L-17/3, DLF Phase-II, IFFCO Chowk, M. G. Road, Gurgaon-122002, Haryana, INDIA.
Phone : +91-124-4223207-08, 4034205, Fax : +91-124-4036038, Cell : +91-93126 64533
Email : farelabs@farelabs.com, Website : www.farelabs.com

Editor's desk

Recently taking into consideration the long pending demand of the industry, government has hiked duty on both crude and refined edible oil. Duty raised from 5% to 7.5% in crude oil and from 10% to 15% in case of refined vegetable oil. This step was taken to protect oil seed producers and processors both. Indian import to edible oil rose @ 12% to record high of 11.82 million tonnes in the marketing year 2013-14, ended in October.

The good global oil seed crop will keep pressure on the price in the coming year also. The palm oil prices, which roughly constitute 35% of vegetable oil consumption globally, declined 47% from a high of US$ 1,249/MT in February 2011 to US$ 657/MT in September 2014. In MY 2014 the total global production of vegetable oils was as high as 169.6 million tons against demand of 165.4 million tons. As per USDA estimate vegetable oil production increased at the rate 5.6% in year to year in MY 2014 and expected to increase 4.1% in year to year in MY 2015. Apart from above factors, the brunt crude price also slipped to below US$50 a barrel in January 2015. Due to decline in petroleum price demand of biofuel is also on decline. These factors will keep vegetable oil price suppressed in 2015.

The lower price of vegetable oil in market may increase Indian vegetable oil consumption forecast, and that will result in to further increase in import. It will be interesting to see that how Indian oil industry, market and seed producers react and solve this situation.

Yours truly

C S Joshi

Editor

Oil Technologists' Association of India
(North Zone)

Zonal Executive Committee (ZEC) for the period 2013-2015 (For 2 years)

Sl. No.	Discription	No of Positions	Name
1.	**President**	1	D. Mathur
2.	**Vice Presidents** (Elected)	2	Prabhat Kumar
			Dr. R. K. Singh
2A.	**Vice Presidents** (Nominated)	2	Ashok Jain
			Dr. J. Adhikari
3.	**Secretary**	1	S. K. Solanki
4.	**Jt. Secretary**	1	Ravi Gupta
5.	**Treasurer**	1	H. C. Goyal
6.	**Editor**	1	C. S. Joshi
7.	**Members**	10	Rajan Skhariya
			Rajeev Arora
			Ashwani K. Sharma
			Dr. M. K. Kundu
			Ashok Mahindru
			T. N. Agarwal
			Dr. S. N. Naik
			A. K. Jain
			Dr. S. K. Handoo
			S.K. Luthra

Co-opted members	Special Invitees	CEC Nominees
Ajay Tandon M. C. Pandey	Dr. Y. C. Nijhawan Dr. A. Madhavan Dr. H. B. Singh Dr. S. K. Saxena	J. B. Agarwal C. S. Joshi

Editorial Board		
	D. Mathur Ashok Mahindru M. C. Pandey Ashwani K Sharma	S. K. Solanki J. B. Agarwal Prabhat Kumar Arun Tyagi

Contents

Advertisers

Authentication of milk fat by affirmative chromatographic techniques

Anupama Rani, Vivek Sharma, Sumit Arora and Darshan Lal
Dairy Chemistry Division, NDRI, Karnal

ABATRACT

Food authentication has been evolving continually to situations that are basically governed by a global market trend. Clarified milk fat or ghee adulterated with vegetable oils/fats can be easily detected using chromatographic techniques like RP-TLC or RP-HPLC. Analytical techniques have been developed or modified to give plausible solutions to the devious adulterations at each moment. Classical tests have largely been replaced with newer technical procedures, most of which are based on thin-layer chromatography and high-performance liquid chromatography. A complete analysis of the adulterated sample is possible within 2 hours and detection of as low as 1% adulteration with vegetable oil by reverse phase - thin layer chromatography (RP-TLC). Similarly, the detection of adulteration by reverse phase- high performance liquid chromatography (RP- HPLC) was in agreement with the analysis of RP-TLC. The addition of vegetable oil could be easily detected by the presence of ß-sitosterol. Reverse phase- thin layer chromatography is most suitable for the detection of adulterants and was simpler and more efficient for quality analysis.

INTRODUCTION

Milk fat, which bears the highest price tag among all the edible fats, plays a significant role in the economics, nutrition, and physico - chemical properties of milk and milk products. Ghee is by far the most important product widely consumed in the Indian sub-continent since time immemorial. It is prepared from cow or buffalo milk or combination thereof. It is known in different countries with different names such as 'Maslee' or 'Samn' or 'Samna' in Egypt and Israel, 'Roghan' in Iran, and 'Dahin hurr' in Iraq. Butter oil, popular in western countries, is slightly different from ghee as the former has bland flavor. In India, a very complex situation arises especially during lean season in the summer months, when the supply of milk and ghee falls short of the demand. Fraudulent traders take undue advantage of such a situation and admix this novel food item with other cheaper fats/oils such as refined vegetable oils, hydrogenated fats, animal body fats and even with inedible mineral oils like liquid paraffin. The problem of detection of milk fat adulteration has assumed a very serious dimension in today's preview especially in the regime of global competitiveness where quality of milk and milk products is not an option but an obligation. However, establishing the purity of milk fat is a very complex phenomenon. Though, in the past, several techniques have been developed to detect milk fat adulteration, yet it is realized that they have their own limitations in detecting the type and level of all types of adulterants particularly in view of multiple component adulteration malpractices (Boghra et al., 1981; Arun Kumar et al., 2002). Keeping in view this fact, in this article an attempt has been made to suggest a schematic approach which when applied can help tackle this problem to an appreciable extent using different analytical techniques like RP-TLC and RP-HPLC. These chromatographic techniques offer good precision alongwith, reproducibility and repeatibilty.

MATERIAL AND METHODS

ß-sitosterol and Cholesterol, (Sigma Aldrich, USA),

RP-TLC (Reverse phase thin layer chromatography) plates: TLC silica gel 60 RP-18 F 254S (Merck Specialities Private Ltd., Mumbai, India)

HPLC system and accessories: Model: Dionex, Ultimate 3000 (Dionex softron gmbH, Germany)

METHODS

Sample preparation

Preparation of pure ghee (clarified butter fat) samples

Cow and buffalo milks used for the preparation of respective ghee samples were collected from the cattle yard of the National Dairy Research Institute, Karnal. Samples of cow/buffalo ghee were prepared by direct cream heating method (De 2011). Ghee was then filtered through 8 fold muslin cloth followed by Whatman No.4 filter paper and stored for further analysis.

Procurement of Vegetable oils/fats

Refined vegetable oils were collected from local market and added to the pure clarified milk fat /ghee samples for adulteration purpose.

Reversed - phase thin layer chromatography (RP- TLC) protocol

RP- TLC protocol as described by Anupama et al. (2013) for the detection of vegetable oils in ghee was adopted.

Extraction of unsaponifiable matter (USM) from ghee samples :-

Unsaponifiable matter from fat samples was isolated essentially as per the method standardized by Sharma et al. (2009) for cholesterol estimation in ghee. To extract the total sterols 0.2 g molten fat sample was taken in a 15 ml capacity screw capped tube followed by the addition of 5 ml of 5 % methanolic KOH . The tube was incubated in a water bath maintained at 90 °C with intermittent shaking after every 5 min., for about 20 min. After 20 min. of incubation, the tube was cooled to room temperature under tap water. One ml water and 5 ml hexane were added in the tube and tube was vortexed for 1–2 min. followed by centrifugation at 2,000 rpm for about 2 min. The upper hexane layer was pipetted out and in a small beaker of about 10 ml capacity and hexane was evaporated to get dried unsaponifiable matter. The dried unsaponifiable matter was redissolved in chloroform and volume was made to 500 µl in an eppendorf tube.

Conditions for reversed phase thin layer chromatography (RP-TLC) of unsaponifiable matter (USM)

Method of sterols separation on C18 stationary phase as described by Jarusiewicz et al. (2005) was adopted in the study. Developing solvent consisting of Petroleum ether: Acetonitrile: Methanol (20:40:40 v/v) was added to a TLC glass chamber lined with filter paper on the three sides for the saturation of the chamber for about 15 min. 6 µl of the unsaponifiable matter was spotted on TLC silica gel 60 RP-18 F 254S plate along with solutions of standard cholesterol, ß-sitosterol. TLC plate was then developed, removed, dried, and sprayed with phosphomolybdic acid solution (20 % solution in ethanol) and kept at 90–95 °C for 3 min and position of distinct blueish bands was compared with reference standards.

Extraction of unsaponifiable Matter (USM) from the ghee for RP-HPLC

Unsaponifiable matter from fat samples was extracted as per the method standardized by Samridhi (2012). One gram of fat sample was taken for the extraction of unsaponifiable matter in a screw capped test tube and 25 ml of 5% methanolic KOH was added to it. The tube was kept in a water bath at 90°C for about 50 min with vigorous shaking at regular intervals. After this, 5 ml water and 15 ml hexane were added and the contents were vortexed for 1 minute followed by centrifugation at 3000 rpm for about 5 minutes. The upper hexane layer was pipetted out and dried to get unsaponifiable matter. The dried unsaponifiable matter obtained was then dissolved in 300 µl of chloroform and the volume was made up to 500 µl with methanol. This sample was then filtered through 0.22 µm Millipore filter paper and subjected to RP-HPLC analysis. The reference standards of cholesterol, stigmasterol and ß-sitosterol of 1mg/ml concentration were also run on RP- HPLC and peak detection was made at 205 nm.

Analytical conditions for HPLC

The following analytical conditions as described by Oh HI et al. (2001), were used for the separation of the sterols.

Column stationary phase: Dionex C18, 5µm, 120Å, 250×4.6mm ID; Phase : Reversed- phase; UV detector wavelength : 205 nm; Column temperature : 300C; Mobile phase : Acetonitrile: Isopropanol (9:1, v/v); Flow rate : 1.5 ml/min; Run time: 30 min; Programming : Linear; Sample injection : 20 µL.

Results and discussion

Marker components for the detection of adulteration of vegetable oils in clarified milk fat or ghee

Sterols represent the major constituent of the unsaponifiable matter and range from 0.24 to 0.50 per cent in butter fat, 0.03 to 0.14 per cent in body fats and 0.03 to 0.50 per cent in vegetable oils (Bailey, 1951). Plants and animal fats have different types of sterols. Animal fats have cholesterol as the characteristic sterol while plant fats have phytosterols, which include ß-sitosterol, stigmasterol, campasterol, brassicasterol, etc. Using sterols as the basis, plant fats can be differentiated from milk fat while body fats cannot be distinguished from milk fat because both the fats have cholesterol as the common sterol. Phytosterols are structurally related to cholesterol, but differ from cholesterol in the side chain. They are different from one another in a number of properties like crystal shape, Resolution factor (Rf) value, melting point, etc. In the present study, RP-HPLC profile of sterols and reversed-phase thin layer chromatography (RP-TLC) behavior of sterols was used as the criteria for the detection of milk fat adulteration with vegetable oils and the results are described below:

RP- TLC of sterols in adulterated ghee samples: It can be seen from the chromatogram (Fig.4.1) that in case of pure ghee samples (cow and buffalo), only one prominent band appeared on the RP- TLC plate was corresponding to that of pure cholesterol but, in case of ghee sample adulterated with vegetable oils one more band below the cholesterol band appears corresponding to the Rf- value of ß- sitosterol was observed. The level of detection was varying depending upon the amount of ß-sitosterol present in the unsaponifiable matter of vegetable oil used as adulterant.

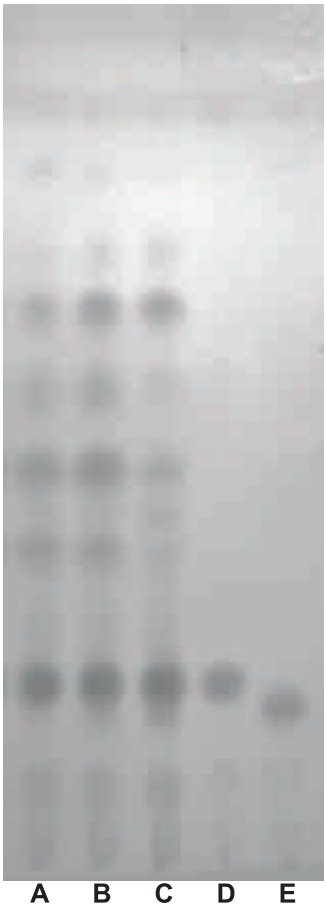


Fig.4.1 RP-TLC of (A) Pure ghee; (B) Vegetable oil adulterated sample I; (C) Vegetable oil adulterated sample II; (D) Cholesterol standard; (E) ß- sitosterol standard

RP- HPLC of sterols in adulterated ghee samples: The identification of the peaks in the samples was done by comparing the retention times with that of reference standards. The peak for ß-sitosterol (phytosterol) in the adulterated samples was used as an indicator for the presence of vegetable oils in ghee. It is evident from the chromatogram that cholesterol and ß-sitosterol had a wide gap in their retention time and resolved well under the standardized RP- HPLC conditions. In case of pure ghee samples (cow and buffalo), Fig. 4.2 has a cholesterol peak of retention time 17.623 min. Whereas, in case of ghee sample adulterated with vegetable oils (Fig. 4.3), the chromatogram has a peak of ß-sitosterol at retention time 22.720 min. alongwith, the cholesterol peak.

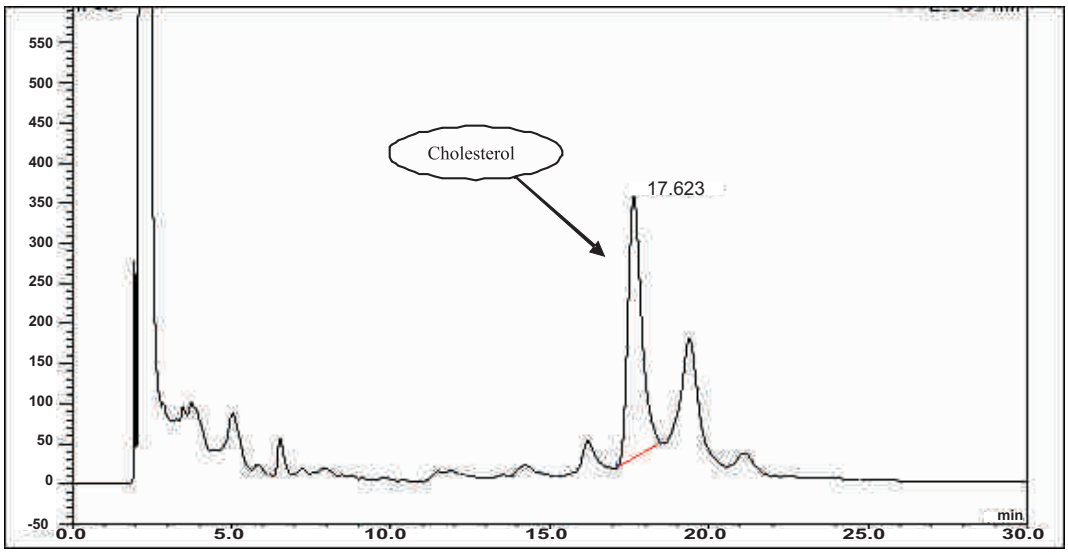


Fig 4.2 HPLC chromatogram of the pure ghee

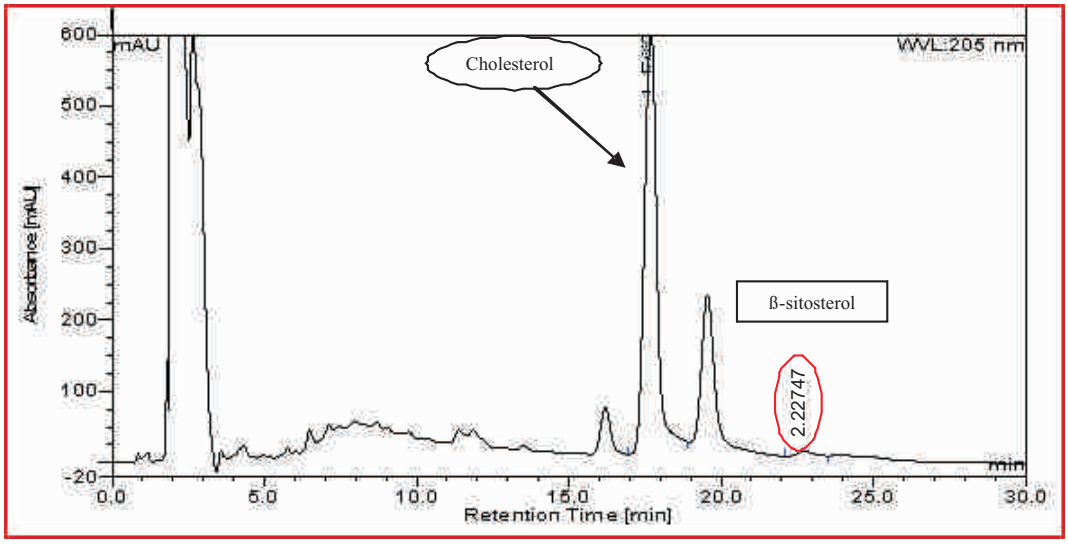


Fig 4.3 HPLC chromatogram of the vegetable oil adulterated ghee

Fig 4.3 HPLC chromatogram of the vegetable oil adulterated ghee

Conclusion

In the present study, a developed RP-TLC and RP-HPLC protocol were used for the detection of the vegetable oil adulteration in pure clarified milk fat or ghee to a minimum extent. Both of the chromatographic methods have comparable results and have reproducibility and repeatability.

Bibliography

Anupama Rani (2013) A rapid reversed-phase thin layer chromatographic protocol for detection of adulteration in ghee (clarified milk fat) with vegetable oils. Journal of Food Science and Technology 1-6.

Arun Kumar, Lal, D., Seth, R. and Sharma, R. 2002. Recent trends in detection of adulteration in milk fat- A Review. Indian Journal Dairy Science 55(6): 319-330.

Bailey AE (1951) Industrial oil and fat products. Interscience Publishers Inc., New York

De S (2011) Outlines of Dairy Technology. Oxford University Press, New Delhi.

Boghra, V.R., Singh, S. and Sharma, R.S. 1981. Present status of the tests used for the detection of adulterants in ghee. Dairy Guide, 81: 21-31.

Jarusiewics J, Sherm J, Fried B (2005) Separation of sterols by reverse phase and argentation thin layer chromatography. Their identification in shail bodies. Journal of Liquid Chromatography Related Technolgy 28:2607–2617

Oh H I, Shin T S, Chang E J (2001) Determination of cholesterol in milk and dairy products by high-performance liquid chromatography. Asian-Australian Journal Animal Sciences 14 1465-1469.

Samridhi (2012) Evaluation of chromatographic methods for the detection of milk fat adulteration with vegetable oils. M.Sc. Thesis submitted to National dairy Research Institue (Deemed University), Karnal, India.

Sharma, V., Sudharshana, R.M.J., Arora, S., Kumar, A., Lal, D., Seth, R., Wadhwa, B.K. and Sharma, G.S. 2009. Applicability of enzymatic diagnostic kit for cholesterol estimation in ghee. Journal of Food Science and Technology. 46(3): 244-246.

Trade News

Malaysia's Sime Darby offers $1.74 billion to buy New Britain Palm oil

Sime Darby Bhd (SIME.KL), the world's top oil palm planter by land size, has offered to buy New Britain Palm Oil Ltd NBPO.L for about $1.74 billion as the Malaysian firm looks to add high yielding plantations that can immediately boost its earnings.

The proposed acquisition, which was pitched at an 85 percent premium to New Britain Palm Oil Ltd's (NBPOL) last closing share price, comes after Sime Darby posted a 9 percent drop in net profit in the year to June as weak palm output hurt sales. "As a brown field asset, NBPOL will immediately contribute to earnings without the incumbent risks associated with green field expansion," Managing Director of Sime Darby Plantation Franki Anthony Dass said in a media release. The London-listed firm said in a statement that an independent board committee intended to recommend the bid to shareholders in the absence of a higher offer.

The acquisition, which will give Sime Darby significant land holdings in Papua New Guinea, comes at a time when top palm oil producer Indonesia is looking to cap foreign ownership of plantations to 30 percent from a current 95 percent limit. Malaysian-listed Sime Darby is one of a number of foreign firms operating in Indonesia, along with Singapore-listed Golden Agri-Resources (GAGR.SI) and Wilmar International (WLIL.SI) and Cargill [CARG.UL].

Sime Darby and NBPOL's combined land bank will reach almost a million hectares, up from Sime Darby's current holdings of 864,141 hectares spread across Malaysia, Indonesia and Liberia. "The premium paid for NBPOL's assets reflects competition for developed oil palm projects, as the hurdle rate for developing a new oil palm plantation is increasing due to issues like land acquisition," Barclays said in a report. Nearly two-thirds or 80,000 hectares of NBPOL's existing land bank of 135,000 hectares, most of which is in Papua New Guinea, is already planted with oil palm. NBPOL's average yields can reach 26 tonnes per hectare barring adverse weather, said Sime Darby, exceeding rates of 20 tonnes in the key palm growing state of Sabah.

The firm's two refineries in the United Kingdom and Papua New Guinea would boost Sime Darby Plantation's total refining capacity by 300,000 tonnes to 4.05 million tonnes.

Sime Darby said the offer valued NBPOL at 84,000 ringgit on an enterprise value per hectare, and was comparable to recent acquisitions within the industry. Am Research, however, said the valuation was at the upper range. "The value propositions ahead would depend largely on what synergies and additional benefits Sime Darby could derive from it," it said in a report.

DEAL DETAILS

NBPOL describes itself as the world's leading producer of sustainable palm oil. Sime Darby has been prudent in its search for new landbank and has rejected those that do not comply with standards set by the Roundtable on Sustainable Palm Oil, Bakke said. Both Indonesia and Malaysia, the world's top palm growers, have come under fire from international watchdogs for causing deforestation and destroying habitats for endangered animals such as the Orang utan and Sumatran rhino.

Sime Darby will use cash to fund 20 percent of the NBPOL deal, which is expected to be completed by end-December, with the remainder to be sourced externally. Citigroup Global Markets Ltd is the financial adviser. Sime Darby will seek to delist NBPOL from the London Stock Exchange. Group CEO Bakke said the firm was in early stages of exploring a secondary NBPOL listing in Malaysia or Singapore. NBPOL's primary listing in Papua New Guinea will be retained.

The purchase offer comes after Sime Darby said on Sept. 30 that it had opted not to buy a 49 percent stake in NBPOL from its major shareholder Malaysian investment firm Kulim Malaysia Bhd (KULM.KL) following the expiry of an exclusivity period. Kulim, which holds a 49 percent stake in NBPOL, said in a separate filing it intended to accept Sime Darby's offer, if a better offer was not made and if it met shareholders' approval. The government of Papua New Guinea's West New Britain province holds 8 percent in the London-listed company while Pacific Rim Plantation Services owns 4.49 percent. NBPOL shares opened up 79 pct in low volume trading in London, while Sime Darby shares rose only slightly.

"The offer will provide an opportunity for all shareholders to realize their investment in NBPOL at an attractive valuation and we also believe it represents a positive outcome for our employees, our customers and other stakeholders," said Antonio Monteiro de Castro, chairman of NBPOL.

Courtesy: Reuters

Indians get taste for branded edible oil as prices drop, incomes rise

Falling prices of imported oil and a marketing drive that often plays on health concerns over unbranded sales are prompting more Indians like Power to switch to products sold by big companies such as Ruchi Soya (RCSY.NS), Adani Wilmar, Cargill and Bunge (BG.N).

India's top edible oil importer Ruchi Soya sees the country's $8 billion branded oil market growing by up to 15 percent in 2015. That's good news for overseas suppliers to the world's biggest edible oil importer, with shipments of palm oil from Indonesia and Malaysia, as well as soy oil from Brazil and Argentina, making up over half of branded sales. "The quality of branded edible oil seems to be better. With international prices for palm oil, sunflower oil and soy oil dropping this year on bumper harvests, major edible oil companies have cut prices for their higher-margin branded products, hoping to tempt buyers at a time when incomes are rising.

The push on branded oil also comes as companies look to shake losses at their Indian refining units after Indonesia and Malaysia started offering refined palm products at discounts over crude palm oil.

A TOUCH OF BOLLYWOOD

Companies are spending big on marketing and setting up sales networks in rural areas, said a Mumbai-based analyst, who declined to be identified as he was not authorised to speak with media.

"We're investing only in branding and marketing. We don't want to build any more refining capacity," said Dinesh Shahra, managing director at Ruchi Soya. The company recently roped in Bollywood actress Madhuri Dixit to star in a TV advert featuring a mother happily preparing a family meal using the Mahakosh brand of soybean oil.

Such campaigns follow findings from food research companies that said some unpacked edible oil was tainted with substances like oil from argemone, a species of poppy that resembles rapeseed but can be harmful. That stoked more general concerns over the content of unlabelled oil products. "All this is helping the shift towards consumers picking more and more brands in the edible oil category," said Aseem Soni, a director in Cargill India's consumer packaging team.

India's edible oil consumption is expected to rise 5.6 percent to a record 19.3 million tonnes in the 2014/15 marketing year, estimates Govindbhai Patel, a widely respected trade expert and managing director of GG Patel & Nihil Research Co. In India, choice of edible oil often varies with region, with soy oil and sunflower oil typically favoured in the west, and rapeseed oil popular in the east.

And industry officials and analysts say India's countryside offers huge potential growth for branded goods. Only 9 percent of rural India consumes branded oils compared to 31 percent in urban areas, says Angshu Mallick, chief operating officer of Adani Wilmar, a venture between the Adani Group and Singapore's Wilmar International Ltd (WLIL.SI).

Courtesy: Business News

Olam to become top-tier cocoa processor with $1.3 billion ADM deal

Olam International Ltd will buy Archer Daniels Midland Co's cocoa business for $1.3 billion, catapulting the Singapore-based commodities firm into the top tier of global suppliers to the growing chocolate business.

The deal would be Olam's biggest ever and mark a dramatic turnaround after an attack two years ago on its acquisition and accounting practices by short-seller Muddy Waters, which forced it to change strategy while securing help from Singapore's sovereign wealth fund Temasek.

Earlier this month Olam also said it would pay $176 million for a U.S. peanut sheller, although the company said both deals were driven by one-off opportunities and it was unlikely to make another major acquisition before the end of the financial year to June 2015.

Olam is grabbing up one of the world's largest processors and suppliers of cocoa liquor, powder and butter, with eight factories from the Ivory Coast to Singapore. The combined entity will make up 16 percent of the world's total cocoa processing capacity and source over 20 percent of total bean output, Olam executives told a briefing, and will compete with industry leaders Barry Callebaut AG and Cargill Inc.

Olam, hoping to take advantage of a worldwide craving for chocolate, particularly in emerging markets, expects global processing capacity to increase by more than 15 percent by the end of the decade to keep up with demand growth.

Competition has nevertheless intensified over the past several years in cocoa grinding, which produces butter and powder to make chocolate bars and drinks, as major players expand capacity in Asia. Margins have also been squeezed by soaring, volatile bean prices.

For ADM, the deal comes just months after offloading its smaller, underperforming chocolate business to rival Cargill for $440 million. ADM will redeploy capital to investments with better potential returns and less volatility than the cocoa business, or distribute excess capital to shareholders, or a combination of both, said ADM Chairman and CEO Patricia Woertz.

Olam said the transaction is expected to add to earnings and be free cash flow positive in the first full year after closing, although it will see cash flow turn negative and gearing pick up in the short term.

Olam will finance the purchase, which it expects to close in the second quarter of next year, through a combination of cash and existing debt facilities, it said. JPMorgan is its financial adviser.

Courtesy: Reuters

A review of fatty acid profiles and antioxidant content in grass-fed and grain-fed beef

Cynthia A Daley1*, Amber Abbott1, Patrick S Doyle1, Glenn A Nader2 and Stephanie Larson2

Abstract

Growing consumer interest in grass-fed beef products has raised a number of questions with regard to the perceived differences in nutritional quality between grass-fed and grain-fed cattle. Research spanning three decades suggests that grass-based diets can significantly improve the fatty acid (FA) composition and antioxidant content of beef, albeit with variable impacts on overall palatability. Grass-based diets have been shown to enhance total conjugated linoleic acid (CLA) (C18:2) isomers, trans vaccenic acid (TVA) (C18:1 t11), a precursor to CLA, and omega-3 (n-3) FAs on a g/g fat basis. While the overall concentration of total SFAs is not different between feeding regimens, grass-finished beef tends toward a higher proportion of cholesterol neutral stearic FA (C18:0), and less cholesterol-elevating SFAs such as myristic (C14:0) and palmitic (C16:0) FAs. Several studies suggest that grass-based diets elevate precursors for Vitamin A and E, as well as cancer fighting antioxidants such as glutathione (GT) and superoxide dismutase (SOD) activity as compared to grain-fed contemporaries. Fat conscious consumers will also prefer the overall lower fat content of a grass-fed beef product. However, consumers should be aware that the differences in FA content will also give grass-fed beef a distinct grass flavor and unique cooking qualities that should be considered when making the transition from grain-fed beef. In addition, the fat from grass-finished beef may have a yellowish appearance from the elevated carotenoid content (precursor to Vitamin A). It is also noted that grain-fed beef consumers may achieve similar intakes of both n-3 and CLA through the consumption of higher fat grain-fed portions.

Introduction

There is considerable support among the nutritional communities for the diet-heart (lipid) hypothesis, the idea that an imbalance of dietary cholesterol and fats are the primary cause of atherosclerosis and cardiovascular disease (CVD) [1]. Health professionals world-wide recommend a reduction in the overall consumption of SFAs, trans-fatty acids (TAs) and cholesterol, while emphasizing the need to increase intake of n-3 polyunsaturated fats [1,2]. Such broad sweeping nutritional recommendations with regard to fat consumption are largely due to epidemiologic studies showing strong positive correlations between intake of SFA and the incidence of CVD, a condition believed to result from the concomitant rise in serum low-density-lipoprotein (LDL) cholesterol as SFA intake increases [3,4]. For example, it is generally accepted that for every 1% increase in energy from SFA, LDL cholesterol levels reportedly increase by 1.3 to 1.7 mg/dL (0.034 to 0.044 mmol/L) [5-7].

Wide promotion of this correlative data spurred an anti-SFA campaign that reduced consumption of dietary fats, including most animal proteins such as meat, dairy products and eggs over the last 3 decades [8], indicted on their relatively high SFA and cholesterol content. However, more recent lipid research would suggest that not all SFAs have the same impact on serum cholesterol. For instance, lauric acid (C12:0) and myristic acid (C14:0), have a greater total cholesterol raising effect than palmitic acid (C16:0), whereas stearic acid (C18:0) has a neutral effect on the concentration of total serum cholesterol, including no apparent impact on either LDL or HDL. Lauric acid increases total serum cholesterol, although it also decreases the ratio of total cholesterol:HDL because of a preferential increase in HDL cholesterol [5,7,9]. Thus, the individual fatty acid profiles tend to be more instructive than broad lipid classifications with respect to subsequent impacts on serum cholesterol, and should therefore be considered when making dietary recommendations for the prevention of CVD.

Clearly the lipid hypothesis has had broad sweeping impacts; not only on the way we eat, but also on the way food is produced on-farm. Indeed, changes in animal breeding and genetics have resulted in an overall leaner beef product[10]. Preliminary examination of diets containing today's leaner beef has shown a reduction in serum cholesterol, provided that beef consumption is limited to a three ounce portion devoid of all external fat [11]. O'Dea's work was the first of several studies to show today's leaner beef products can reduce plasma LDL concentrations in both normal and hyper-cholesterolemic subjects, theoretically reducing risk of CVD [12-15].

Beyond changes in genetics, some producers have also altered their feeding practices whereby reducing or eliminating grain from the ruminant diet, producing a product referred to as "grass-fed" or "grass-finished". Historically, most of the beef produced until the 1940's

was from cattle finished on grass. During the 1950's, considerable research was done to improve the efficiency of beef production, giving birth to the feedlot industry where high energy grains are fed to cattle as means to decrease days on feed and improve marbling (intramuscular fat: IMF). In addition, U.S. consumers have grown accustomed to the taste of grain-fed beef, generally preferring the flavor and overall palatability afforded by the higher energy grain ration[16]. However, changes in consumer demand, coupled with new research on the effect of feed on nutrient content, have a number of producers returning to the pastoral approach to beef production despite the inherent inefficiencies.

Research spanning three decades suggests that grass-only diets can significantly alter the fatty acid composition and improve the overall antioxidant content of beef. It is the intent of this review, to synthesize and summarize the information currently available to substantiate an enhanced nutrient claim for grass-fed beef products as well as to discuss the effects these specific nutrients have on human health.

Review of fatty acid profiles in grass-fed beef

Red meat, regardless of feeding regimen, is nutrient dense and regarded as an important source of essential amino acids, vitamins A, B6, B12, D, E, and minerals, including iron, zinc and selenium[17,18]. Along with these important nutrients, meat consumers also ingest a number of fats which are an important source of energy and facilitate the absorption of fat-soluble vitamins including A, D, E and K. According to the ADA, animal fats contribute approximately 60% of the SFA in the American diet, most of which are palmitic acid (C16:0) and stearic acid (C18:0). Stearic acid has been shown to have no net impact on serum cholesterol concentrations in humans[17,19]. In addition, 30% of the FA content in conventionally produced beef is composed of oleic acid (C18:1)[20], a monounsaturated FA (MUFA) that elicits a cholesterol-lowering effect among other healthful attributes including a reduced risk of stroke and a significant decrease in both systolic and diastolic blood pressure in susceptible populations [21].

Be that as it may, changes in finishing diets of conventional cattle can alter the lipid profile in such a way as to improve upon this nutritional package. Although there are genetic, age related and gender differences among the various meat producing species with respect to lipid profiles and ratios, the effect of animal nutrition is quite significant [22]. Regardless of the genetic makeup, gender, age, species or geographic location, direct contrasts between grass and grain rations consistently demonstrate significant differences in the overall fatty acid profile and antioxidant content found in the lipid depots and body tissues [22-24].

Table 1 summarizes the saturated fatty acid analysis for a number of studies whose objectives were to contrast the lipid profiles of cattle fed either a grain or grass diets [25-31]. This table is limited to those studies utilizing the longissimus dorsi (loin eye), thereby standardizing the contrasts to similar cuts within the carcass and limits the comparisons to cattle between 20 and 30 months of age. Unfortunately, not all studies report data in similar units of measure (i.e., g/g of fatty acid), so direct comparisons between studies are not possible.

Table 1. Comparison of mean saturated fatty acid composition (expressed as mg/g of fatty acid or as a % of total lipid) between grass-fed and grain-fed cattle. (Refer full text)

Table 1 reports that grass finished cattle are typically lower in total fat as compared to grain-fed contemporaries. Interestingly, there is no consistent difference in total SFA content between these two feeding regimens. Those SFA's considered to be more detrimental to serum cholesterol levels, i.e., myristic (C14:0) and palmitic (C16:0), were higher in grain-fed beef as compared to grass-fed contemporaries in 60% of the studies reviewed. Grass finished meat contains elevated concentrations of stearic acid (C18:0), the only saturated fatty acid with a net neutral impact on serum cholesterol. Thus, grass finished beef tends to produce a more favorable SFA composition although little is known of how grass-finished beef would ultimately impact serum cholesterol levels in hyper-cholesterolemic patients as compared to a grain-fed beef.

Like SFA intake, dietary cholesterol consumption has also become an important issue to consumers. Interestingly, beef's cholesterol content is similar to other meats (beef 73; pork 79; lamb 85; chicken 76; and turkey 83 mg/100 g) [32], and can therefore be used interchangeably with white meats to reduce serum cholesterol levels in hyper-cholesterolemic individuals[11,33]. Studies have shown that breed, nutrition and sex do not affect the cholesterol concentration of bovine skeletal muscle, rather cholesterol content is highly correlated to IMF concentrations[34]. As IMF levels rise, so goes cholesterol concentrations per gram of tissue [35]. Because pasture raised beef is lower in overall fat [24-

27,30], particularly with respect to marbling or IMF [26,36], it would seem to follow that grass-finished beef would be lower in overall cholesterol content although the data is very limited. Garcia et al (2008) report 40.3 and 45.8 grams of cholesterol/100 grams of tissue in pastured and grain-fed steers, respectively ($P < 0.001$) [24].

Interestingly, grain-fed beef consistently produces higher concentrations of MUFAs as compared to grass-fed beef, which include FAs such as oleic acid (C18:1 cis-9), the primary MUFA in beef. A number of epidemiological studies comparing disease rates in different countries have suggested an inverse association between MUFA intake and mortality rates to CVD [3,21]. Even so, grass-fed beef provides a higher concentration of TVA (C18:1 t11), an important MUFA for de novo synthesis of conjugated linoleic acid (CLA: C18:2 c-9, t-11), a potent anti-carcinogen that is synthesized within the body tissues [37]. Specific information relative to the health benefits of CLA and its biochemistry will be detailed later.

The important polyunsaturated fatty acids (PUFAs) in conventional beef are linoleic acid (C18:2), alpha-linolenic acid (C18:3), described as the essential FAs, and the long-chain fatty acids including arachidonic acid (C20:4), eicosapentaenoic acid (C20:5), docosanpetaenoic acid (C22:5) and docosahexaenoic acid (C22:6) [38]. The significance of nutrition on fatty acid composition is clearly demonstrated when profiles are examined by omega 6 (n-6) and omega 3 (n-3) families. Table 2 shows no significant change to the overall concentration of n-6 FAs between feeding regimens, although grass-fed beef consistently shows a higher concentrations of n-3 FAs as compared to grain-fed contemporaries, creating a more favorable n-6:n-3 ratio. There are a number of studies that report positive effects of improved n-3 intake on CVD and other health related issues discussed in more detail in the next section.

Table 2. Comparison of mean polyunsatured fatty acid composition (expressed as mg/g of fatty acid or as a % of total lipid) between grass-fed and grain-fed cattle. (Refer full text)

Review of Omega-3: Omega-6 fatty acid content in grass-fed beef

There are two essential fatty acids (EFAs) in human nutrition: a-linolenic acid (aLA), an omega-3 fatty acid; and linoleic acid (LA), an omega-6 fatty acid. The human body cannot synthesize essential fatty acids, yet they are critical to human health; for this reason, EFAs must be obtained from food. Both aLA and LA are polyunsaturated and serve as precursors of other important compounds. For instance, aLA is the precursor for the omega-3 pathway. Likewise, LA is the parent fatty acid in the omega-6 pathway. Omega-3 (n-3) and omega-6 (n-6) fatty acids are two separate distinct families, yet they are synthesized by some of the same enzymes; specifically, delta-5-desaturase and delta-6-desaturase. Excess of one family of FAs can interfere with the metabolism of the other, reducing its incorporation into tissue lipids and altering their overall biological effects[39]. Figure 1 depicts a schematic of n-6 and n-3 metabolism and elongation within the body [40].

Figure 1. Linoleic (C18:2n-6) and a-Linolenic (C18:3n-3) Acid metabolism and elongation. (Adapted from Simopoulos et al., 1991) (Refer full text)

A healthy diet should consist of roughly one to four times more omega-6 fatty acids than omega-3 fatty acids. The typical American diet tends to contain 11 to 30 times more omega -6 fatty acids than omega -3, a phenomenon that has been hypothesized as a significant factor in the rising rate of inflammatory disorders in the United States[40]. Table 2 shows significant differences in n-6:n-3 ratios between grass-fed and grain-fed beef, with and overall average of 1.53 and 7.65 for grass-fed and grain-fed, respectively, for all studies reported in this review.

The major types of omega-3 fatty acids used by the body include: a-linolenic acid (C18:3n-3, aLA), eicosapentaenoic acid (C20:5n-3, EPA), docosapentaenoic acid (C22:5n-3, DPA), and docosahexaenoic acid (C22:6n-3, DHA). Once eaten, the body converts aLA to EPA, DPA and DHA, albeit at low efficiency. Studies generally agree that whole body conversion of aLA to DHA is below 5% in humans, the majority of these long-chain FAs are consumed in the diet [41].

The omega-3 fatty acids were first discovered in the early 1970's when Danish physicians observed that Greenland Eskimos had an exceptionally low incidence of heart disease and arthritis despite the fact that they consumed a diet high in fat. These early studies established fish as a rich source of n-3 fatty acids. More recent research has established that EPA and DHA play a crucial role in the prevention of atherosclerosis, heart attack, depression and cancer [40,42]. In addition, omega-3 consumption reduced the inflammation caused

by rheumatoid arthritis [43,44].

The human brain has a high requirement for DHA; low DHA levels have been linked to low brain serotonin levels, which are connected to an increased tendency for depression and suicide. Several studies have established a correlation between low levels of omega -3 fatty acids and depression. High consumption of omega-3 FAs is typically associated with a lower incidence of depression, a decreased prevalence of age-related memory loss and a lower risk of developing Alzheimer's disease [45-51].

The National Institutes of Health has published recommended daily intakes of FAs; specific recommendations include 650 mg of EPA and DHA, 2.22 g/day of aLA and 4.44 g/day of LA. However, the Institute of Medicine has recommended DRI (dietary reference intake) for LA (omega-6) at 12 to 17 g and aLA (omega-3) at 1.1 to 1.6 g for adult women and men, respectively. Although seafood is the major dietary source of n-3 fatty acids, a recent fatty acid intake survey indicated that red meat also serves as a significant source of n-3 fatty acids for some populations [52].

Sinclair and co-workers were the first to show that beef consumption increased serum concentrations of a number of n-3 fatty acids including, EPA, DPA and DHA in humans [40]. Likewise, there are a number of studies that have been conducted with livestock which report similar findings, i.e., animals that consume rations high in precursor lipids produce a meat product higher in the essential fatty acids [53,54]. For instance, cattle fed primarily grass significantly increased the omega-3 content of the meat and also produced a more favorable omega-6 to omega-3 ratio than grain-fed beef [46,55-57].

Table 2 shows the effect of ration on polyunsaturated fatty acid composition from a number of recent studies that contrast grass-based rations to conventional grain feeding regimens [24-28,30,31]. Grass-based diets resulted in significantly higher levels of omega-3 within the lipid fraction of the meat, while omega-6 levels were left unchanged. In fact, as the concentration of grain is increased in the grass-based diet, the concentration of n-3 FAs decreases in a linear fashion. Grass-finished beef consistently produces a higher concentration of n-3 FAs (without effecting n-6 FA content), resulting in a more favorable n-6:n-3 ratio.

The amount of total lipid (fat) found in a serving of meat is highly dependent upon the feeding regimen as demonstrated in Tables 1 and 2. Fat will also vary by cut, as not all locations of the carcass will deposit fat to the same degree. Genetics also play a role in lipid metabolism creating significant breed effects. Even so, the effect of feeding regimen is a very powerful determinant of fatty acid composition.

Review of conjugated linoleic acid (CLA) and trans vaccenic acid (TVA) in grass-fed beef

Conjugated linoleic acids make up a group of polyunsaturated FAs found in meat and milk from ruminant animals and exist as a general mixture of conjugated isomers of LA. Of the many isomers identified, the cis-9, trans-11 CLA isomer (also referred to as rumenic acid or RA) accounts for up to 80-90% of the total CLA in ruminant products [58]. Naturally occurring CLAs originate from two sources: bacterial isomerization and/or biohydrogenation of polyunsaturated fatty acids (PUFA) in the rumen and the desaturation of trans-fatty acids in the adipose tissue and mammary gland [59,60].

Microbial biohydrogenation of LA and aLA by an anaerobic rumen bacterium Butyrivibrio fibrisolvens is highly dependent on rumen pH [61]. Grain consumption decreases rumen pH, reducing B. fibrisolven activity, conversely grass-based diets provide for a more favorable rumen environment for subsequent bacterial synthesis [62]. Rumen pH may help to explain the apparent differences in CLA content between grain and grass-finished meat products (see Table 2). De novo synthesis of CLA from 11t-C18:1 TVA has been documented in rodents, dairy cows and humans. Studies suggest a linear increase in CLA synthesis as the TVA content of the diet increased in human subjects [63]. The rate of conversion of TVA to CLA has been estimated to range from 5 to 12% in rodents to 19 to 30% in humans[64]. True dietary intake of CLA should therefore consider native 9c11t-C18:2 (actual CLA) as well as the 11t-C18:1 (potential CLA) content of foods [65,66]. Figure 2 portrays de novo synthesis pathways of CLA from TVA [37]

Figure 2. De novo synthesis of CLA from 11t-C18:1 vaccenic acid. (Adapted from Bauman et al., 1999) (Refer full text)

Natural augmentation of CLA c9t11 and TVA within the lipid fraction of beef products can be accomplished through diets rich in grass and lush green forages. While precursors can be found in both grains and lush green forages, grass-fed ruminant species have been shown to produce 2 to 3 times more CLA than ruminants fed in

confinement on high grain diets, largely due to a more favorable rumen pH [34,56,57,67] (see Table 2).

The impact of feeding practices becomes even more evident in light of recent reports from Canada which suggests a shift in the predominate trans C18:1 isomer in grain-fed beef. Dugan et al (2007) reported that the major trans isomer in beef produced from a 73% barley grain diet is 10t-18:1 (2.13% of total lipid) rather than 11t-18:1 (TVA) (0.77% of total lipid), a finding that is not particularly favorable considering the data that would support a negative impact of 10t-18:1 on LDL cholesterol and CVD [68,69].

Over the past two decades numerous studies have shown significant health benefits attributable to the actions of CLA, as demonstrated by experimental animal models, including actions to reduce carcinogenesis, atherosclerosis, and onset of diabetes [70-72]. Conjugated linoleic acid has also been reported to modulate body composition by reducing the accumulation of adipose tissue in a variety of species including mice, rats, pigs, and now humans [73-76]. These changes in body composition occur at ultra high doses of CLA, dosages that can only be attained through synthetic supplementation that may also produce ill side-effects, such as gastrointestinal upset, adverse changes to glucose/insulin metabolism and compromised liver function [77-81]. A number of excellent reviews on CLA and human health can be found in the literature [61,82-84].

Optimal dietary intake remains to be established for CLA. It has been hypothesized that 95 mg CLA/day is enough to show positive effects in the reduction of breast cancer in women utilizing epidemiological data linking increased milk consumption with reduced breast cancer[85]. Ha et al. (1989) published a much more conservative estimate stating that 3 g/day CLA is required to promote human health benefits[86]. Ritzenthaler et al. (2001) estimated CLA intakes of 620 mg/day for men and 441 mg/day for women are necessary for cancer prevention[87]. Obviously, all these values represent rough estimates and are mainly based on extrapolated animal data. What is clear is that we as a population do not consume enough CLA in our diets to have a significant impact on cancer prevention or suppression. Reports indicate that Americans consume between 150 to 200 mg/day, Germans consumer slightly more between 300 to 400 mg/day[87], and the Australians seem to be closer to the optimum concentration at 500 to 1000 mg/day according to Parodi (1994) [88].

Review of pro-Vitamin A/ß-carotene in grass-fed meat

Carotenoids are a family of compounds that are synthesized by higher plants as natural plant pigments. Xanthophylls, carotene and lycopene are responsible for yellow, orange and red coloring, respectively. Ruminants on high forage rations pass a portion of the ingested carotenoids into the milk and body fat in a manner that has yet to be fully elucidated. Cattle produced under extensive grass-based production systems generally have carcass fat which is more yellow than their concentrate-fed counterparts caused by carotenoids from the lush green forages. Although yellow carcass fat is negatively regarded in many countries around the world, it is also associated with a healthier fatty acid profile and a higher antioxidant content [89].

Plant species, harvest methods, and season, all have significant impacts on the carotenoid content of forage. In the process of making silage, haylage or hay, as much as 80% of the carotenoid content is destroyed [90]. Further, significant seasonal shifts occur in carotenoid content owing to the seasonal nature of plant growth.

Carotenes (mainly ß-carotene) are precursors of retinol (Vitamin A), a critical fat-soluble vitamin that is important for normal vision, bone growth, reproduction, cell division, and cell differentiation[91]. Specifically, it is responsible for maintaining the surface lining of the eyes and also the lining of the respiratory, urinary, and intestinal tracts. The overall integrity of skin and mucous membranes is maintained by vitamin A, creating a barrier to bacterial and viral infection [15,92]. In addition, vitamin A is involved in the regulation of immune function by supporting the production and function of white blood cells [12,13].

The current recommended intake of vitamin A is 3,000 to 5,000 IU for men and 2,300 to 4,000 IU for women [93], respectively, which is equivalent to 900 to 1500 µg (micrograms) (Note: DRI as reported by the Institute of Medicine for non-pregnant/non-lactating adult females is 700 µg/day and males is 900 µg/day or 2,300 - 3,000 I U (assuming conversion of 3.33 IU/µg). While there is no RDA (Required Daily Allowance) for ß-carotene or other pro-vitamin A carotenoids, the Institute of Medicine suggests consuming 3 mg of ß-carotene daily to maintain plasma ß-carotene in the range associated with normal function and a lowered risk of chronic diseases (NIH: Office of Dietary Supplements).

The effects of grass feeding on beta-carotene content of

beef was described by Descalzo et al. (2005) who found pasture-fed steers incorporated significantly higher amounts of beta-carotene into muscle tissues as compared to grain-fed animals [94]. Concentrations were 0.45 µg/g and 0.06 µg/g for beef from pasture and grain-fed cattle respectively, demonstrating a 7 fold increase in ß-carotene levels for grass-fed beef over the grain-fed contemporaries. Similar data has been reported previously, presumably due to the high ß-carotene content of fresh grasses as compared to cereal grains[38,55,95-97]. (see Table 3)

Table 3. Comparison of mean ß-carotene vitamin content in fresh beef from grass-fed and grain-fed cattle. (Refer full text)

Review of Vitamin E / a-tocopherol in grass-fed beef

Vitamin E is also a fat-soluble vitamin that exists in eight different isoforms with powerful antioxidant activity, the most active being a-tocopherol [98]. Numerous studies have shown that cattle finished on pasture produce higher levels of a-tocopherol in the final meat product than cattle fed high concentrate diets[23,28,94,97,99-101] (see Table 4).

Table 4. Comparison of mean a-tocopherol vitamin content in fresh beef from grass-fed and grain-fed cattle. (Refer full text)

Antioxidants such as vitamin E protect cells against the effects of free radicals. Free radicals are potentially damaging by-products of metabolism that may contribute to the development of chronic diseases such as cancer and cardiovascular disease.

Preliminary research shows vitamin E supplementation may help prevent or delay coronary heart disease [102-105]. Vitamin E may also block the formation of nitrosamines, which are carcinogens formed in the stomach from nitrates consumed in the diet. It may also protect against the development of cancers by enhancing immune function [106]. In addition to the cancer fighting effects, there are some observational studies that found lens clarity (a diagnostic tool for cataracts) was better in patients who regularly used vitamin E [107,108]. The current recommended intake of vitamin E is 22 IU (natural source) or 33 IU (synthetic source) for men and women [93,109], respectively, which is equivalent to 15 milligrams by weight.

The concentration of natural a-tocopherol (vitamin E) found in grain-fed beef ranged between 0.75 to 2.92 µg/g of muscle whereas pasture-fed beef ranges from 2.1 to 7.73 µg/g of tissue depending on the type of forage made available to the animals (Table 4). Grass finishing increases a-tocopherol levels three-fold over grain-fed beef and places grass-fed beef well within range of the muscle a-tocopherol levels needed to extend the shelf-life of retail beef (3 to 4 µg a-tocopherol/gram tissue) [110]. Vitamin E (a-tocopherol) acts post-mortem to delay oxidative deterioration of the meat; a process by which myoglobin is converted into brown metmyoglobin, producing a darkened, brown appearance to the meat. In a study where grass-fed and grain-fed beef were directly compared, the bright red color associated with oxymyoglobin was retained longer in the retail display in the grass-fed group, even thought the grass-fed meat contains a higher concentration of more oxidizable n-3 PUFA. The authors concluded that the antioxidants in grass probably caused higher tissue levels of vitamin E in grazed animals with benefits of lower lipid oxidation and better color retention despite the greater potential for lipid oxidation[111].

Review of antioxidant enzyme content in grass-fed beef

Glutathione (GT), is a relatively new protein identified in foods. It is a tripeptide composed of cysteine, glutamic acid and glycine and functions as an antioxidant primarily as a component of the enzyme system containing GT oxidase and reductase. Within the cell, GT has the capability of quenching free radicals (like hydrogen peroxide), thus protecting the cell from oxidized lipids or proteins and prevent damage to DNA. GT and its associated enzymes are found in virtually all plant and animal tissue and is readily absorbed in the small intestine[112].

Although our knowledge of GT content in foods is still somewhat limited, dairy products, eggs, apples, beans, and rice contain very little GT (< 3.3 mg/100 g). In contrast, fresh vegetables (e.g., asparagus 28.3 mg/100 g) and freshly cooked meats, such as ham and beef (23.3 mg/100 g and 17.5 mg/100 g, respectively), are high in GT [113].

Because GT compounds are elevated in lush green forages, grass-fed beef is particularly high in GT as compared to grain-fed contemporaries. Descalzo et al. (2007) reported a significant increase in GT molar concentrations in grass-fed beef [114]. In addition, grass-fed samples were also higher in superoxide dismutase (SOD) and catalase (CAT) activity than beef from grain-fed animals[115]. Superoxide dismutase and

catalase are coupled enzymes that work together as powerful antioxidants, SOD scavenges superoxide anions by forming hydrogen peroxide and CAT then decomposes the hydrogen peroxide to H2O and O2. Grass only diets improve the oxidative enzyme concentration in beef, protecting the muscle lipids against oxidation as well as providing the beef consumer with an additional source of antioxidant compounds.

Issues related to flavor and palatability of grass-fed beef

Maintaining the more favorable lipid profile in grass-fed beef requires a high percentage of lush fresh forage or grass in the ration. The higher the concentration of fresh green forages, the higher the aLA precursor that will be available for CLA and n-3 synthesis [53,54]. Fresh pasture forages have 10 to 12 times more C18:3 than cereal grains [116]. Dried or cured forages, such as hay, will have a slightly lower amount of precursor for CLA and n-3 synthesis. Shifting diets to cereal grains will cause a significant change in the FA profile and antioxidant content within 30 days of transition [57].

Because grass-finishing alters the biochemistry of the beef, aroma and flavor will also be affected. These attributes are directly linked to the chemical makeup of the final product. In a study comparing the flavor compounds between cooked grass-fed and grain-fed beef, the grass-fed beef contained higher concentrations of diterpenoids, derivatives of chlorophyll call phyt-1-ene and phyt-2-ene, that changed both the flavor and aroma of the cooked product [117]. Others have identified a "green" odor from cooked grass-fed meat associated with hexanals derived from oleic and aLA FAs. In contrast to the "green" aroma, grain-fed beef was described as possessing a "soapy" aroma, presumably from the octanals formed from LA that is found in high concentration in grains [118]. Grass-fed beef consumers can expect a different flavor and aroma to their steaks as they cook on the grill. Likewise, because of the lower lipid content and high concentration of PUFAs, cooking time will be reduced. For an exhaustive look at the effect of meat compounds on flavor, see Calkins and Hodgen (2007) [119].

With respect to palatability, grass-fed beef has historically been less well accepted in markets where grain-fed products predominant. For example, in a study where British lambs fed grass and Spanish lambs fed milk and concentrates were assessed by British and Spanish taste panels, both found the British lamb to have a higher odor and flavor intensity. However, the British panel preferred the flavor and overall eating quality of the grass-fed lamb, the Spanish panel much preferred the Spanish fed lamb [120]. Likewise, the U.S. is well known for producing corn-fed beef, taste panels and consumers who are more familiar with the taste of corn-fed beef seem to prefer it as well [16]. An individual usually comes to prefer the foods they grew up eating, making consumer sensory panels more of an art than science [36]. Trained taste panels, i.e., persons specifically trained to evaluate sensory characteristics in beef, found grass-fed beef less palatable than grain-fed beef in flavor and tenderness [119,121].

Conclusion

Research spanning three decades supports the argument that grass-fed beef (on a g/g fat basis), has a more desirable SFA lipid profile (more C18:0 cholesterol neutral SFA and less C14:0 & C16:0 cholesterol elevating SFAs) as compared to grain-fed beef. Grass-finished beef is also higher in total CLA (C18:2) isomers, TVA (C18:1 t11) and n-3 FAs on a g/g fat basis. This results in a better n-6:n-3 ratio that is preferred by the nutritional community. Grass-fed beef is also higher in precursors for Vitamin A and E and cancer fighting antioxidants such as GT and SOD activity as compared to grain-fed contemporaries.

Grass-fed beef tends to be lower in overall fat content, an important consideration for those consumers interested in decreasing overall fat consumption. Because of these differences in FA content, grass-fed beef also possesses a distinct grass flavor and unique cooking qualities that should be considered when making the transition from grain-fed beef. To maximize the favorable lipid profile and to guarantee the elevated antioxidant content, animals should be finished on 100% grass or pasture-based diets.

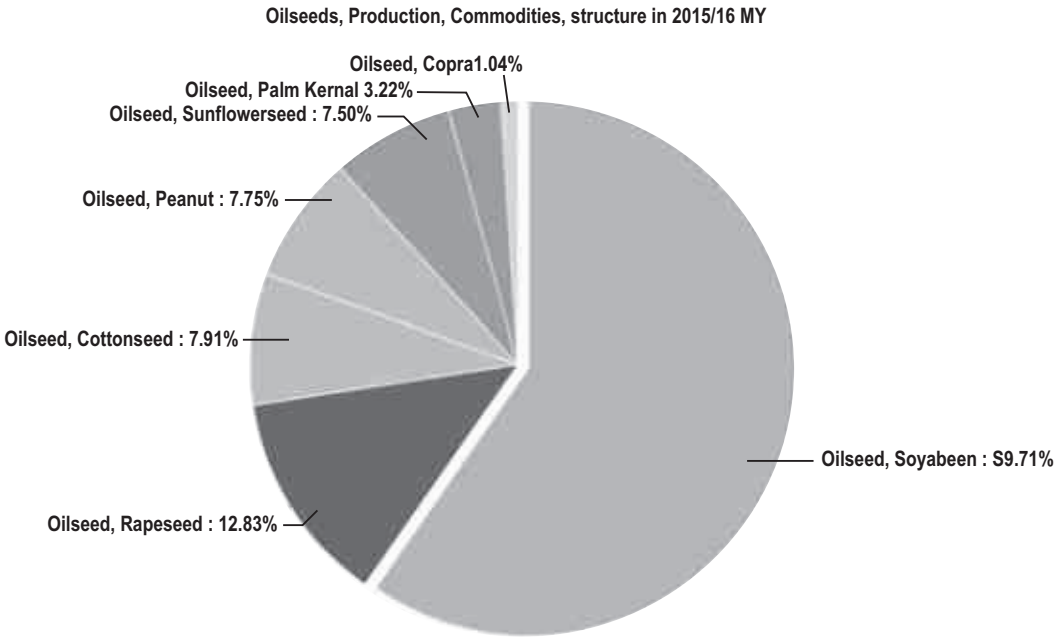
Grain-fed beef consumers may achieve similar intakes of both n-3 and CLA through consumption of higher fat portions with higher overall palatability scores. A number of clinical studies have shown that today's lean beef, regardless of feeding strategy, can be used interchangeably with fish or skinless chicken to reduce serum cholesterol levels in hypercholesterolemic patients.

(Refer full text)

Courtesy: Nutrition Journal

(The electronic version of this article is the complete one and can be found online at : http://www.nutritionj.com/content/9/1/10)

Important Figures



Oilseed, Peanut Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	41,209	+1,888 (+4.80%)	39,321	41,164
Beginning Stocks	2,015	-398 (-16.49%)	2,413	2,264
Imports	2,458	+40 (+1.65%)	2,418	2,376
Total Supply	45,682	+1,530 (+3.46%)	44,152	45,804
Exports	2,931	+227 (+8.39%)	2,704	2,886
Domestic Consumption	40,191	+758 (+1.92%)	39,433	40,505
Food Use Dom. Cons.	19,158	+155 (+0.81%)	19,003	18,919
Feed Waste Dom. Cons.	3,159	+371 (+13.30%)	2,788	3,829
Crush	17,874	+232 (+1.31%)	17,642	17,757
Total Distribution	45,682	+1,530 (+3.46%)	44,152	45,804
Ending Stocks	2,560	+545 (+27.04%)	2,015	2,413
Area Harvested	25,062	+1,361 (+5.74%)	23,701	25,289

World's Oilseed, Peanut Production is projected at 41,209 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

World's Oilseed, Peanut Production forecast rose by +1,888 (+4.80%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Changes for 2015/16MY in main Production countries:

- - China, Peoples Republic of's Production are up by +200 (+1.21%) thd. mt to 16,700 thd. mt
- - India's Production are up by +600 (+12.50%) thd. mt to 5,400 thd. mt
- - Nigeria Production are unchanged
- - United States's Production are up by +257 (+10.87%) thd. mt to 2,620 thd. mt
- - Sudan's Production are up by +908 (+94.28%) thd. mt to 1,871 thd. mt
- Oilseed, Peanut. Production. Countries+-101001k10kAgroChart.com

Oilseed, Peanut Production, in 1000 MT, of Top 10 countries

Country	2015/16	Change	2014/15	2013/14
China, Peoples Republic of	16,700	+200 (+1.21%)	16,500	16,972
India	5,400	+600 (+12.50%)	4,800	5,650
Nigeria	3,000	0 (0.0%)	3,000	3,000
United States	2,620	+257 (+10.87%)	2,363	1,893
Sudan	1,871	+908 (+94.28%)	963	1,767
Burma	1,375	0 (0.0%)	1,375	1,375
Indonesia	1,130	-20 (-1.73%)	1,150	1,160
Argentina	1,060	-40 (-3.63%)	1,100	997
Tanzania, United Republic of	800	0 (0.0%)	800	900
Senegal	725	0 (0.0%)	725	710

Oilseeds. China, Peoples Republic of. Peanut Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	16,700	+200 (+1.21%)	16,500	16,972
Imports	50	0 (0.0%)	50	50
Total Supply	16,750	+200 (+1.20%)	16,550	17,022
Exports	530	+80 (+17.77%)	450	565
Domestic Consumption	16,220	+120 (+0.74%)	16,100	16,457
Food Use Dom. Cons.	6,670	+50 (+0.75%)	6,620	6,585
Feed Waste Dom. Cons.	850	+70 (+8.97%)	780	1,162
Crush	8,700	0 (0.0%)	8,700	8,710
Total Distribution	16,750	+200 (+1.20%)	16,550	17,022
Area Harvested	4,600	-100 (-2.12%)	4,700	4,633

China, Peoples Republic of's Oilseed, Peanut Production is projected at 16,700 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

China, Peoples Republic of's Oilseed, Peanut Production forecast rose by +200 (+1,21%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. India, Peanut Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	5,400	+600 (+12.50%)	4,800	5,650
Beginning Stocks	17	-120 (-87.59%)	137	18
Imports	-	-	-	1
Total Supply	5,417	+480 (+9.72%)	4,937	5,669
Exports	650	+75 (+13.04%)	575	787
Domestic Consumption	4,675	+330 (+7.59%)	4,345	4,745
Food Use Dom. Cons.	625	+25 (+4.16%)	600	630
Feed Waste Dom. Cons.	350	+105 (+42.85%)	245	415
Crush	3,700	+200 (+5.71%)	3,500	3,700
Total Distribution	5,417	+480 (+9.72%)	4,937	5,669
Ending Stocks	92	+75 (+441.17%)	17	137
Area Harvested	5,200	+600 (+13.04%)	4,600	5,400

India's Oilseed, Peanut Production is projected at 5,400 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

India's Oilseed, Peanut Production forecast rose by +600 (+12.50%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. Nigeria, Peanut Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production				
3,000	0 (0.0%)	3,000	3,000	
Beginning Stocks	-	-	-	-
Imports	7	0 (0.0%)	7	7
Total Supply	3,007	0 (0.0%)	3,007	3,007
Exports	-	-	-	-
Domestic Consumption	3,007	0 (0.0%)	3,007	3,007
Food Use Dom. Cons.	1,900	0 (0.0%)	1,900	1,900
Feed Waste Dom. Cons.	357	0 (0.0%)	357	357
Crush	750	0 (0.0%)	750	750
Total Distribution	3,007	0 (0.0%)	3,007	3,007
Ending Stocks	-	-	-	-
Area Harvested	2,500	0 (0.0%)	2,500	2,500

Nigeria's Oilseed, Peanut Production is projected at 3,000 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

Nigeria's Oilseed, Peanut Production forecast unchanged in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. United States, Peanut Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	2,620	+257 (+10.87%)	2,363	1,893
Beginning Stocks	856	+13 (+1.54%)	843	1,257
Imports	39	+3 (+8.33%)	36	40
Total Supply	3,515	+273 (+8.42%)	3,242	3,190
Exports	515	+12 (+2.38%)	503	497
Domestic Consumption	1,968	+85 (+4.51%)	1,883	1,850
Food Use Dom. Cons.	1,385	+40 (+2.97%)	1,345	1,309
Feed Waste Dom. Cons.	256	+18 (+7.56%)	238	240
Crush	327	+27 (+9.00%)	300	301
Total Distribution	3,515	+273 (+8.42%)	3,242	3,190
Ending Stocks	1,032	+176 (+20.56%)	856	843
Area Harvested	587	+51 (+9.51%)	536	422

United States's Oilseed, Peanut Production is projected at 2,620 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

United States's Oilseed, Peanut Production forecast rose by +257 (+10.87%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. Sudan, Peanut Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	1,871	+908 (+94.28%)	963	1,767
Beginning Stocks	54	-290 (-84.30%)	344	-
Total Supply	1,925	+618 (+47.28%)	1,307	1,767
Exports	3	0 (0.0%)	3	3
Domestic Consumption	1,536	+286 (+22.88%)	1,250	1,420
Food Use Dom. Cons.	400	0 (0.0%)	400	400
Feed Waste Dom. Cons.	536	+286 (+114.40%)	250	420
Crush	600	0 (0.0%)	600	600
Total Distribution	1,925	+618 (+47.28%)	1,307	1,767
Ending Stocks	386	+332 (+614.81%)	54	344
Area Harvested	2,184	+930 (+74.16%)	1,254	2,162

Sudan's Oilseed, Peanut Production is projected at 1,871 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

Sudan's Oilseed, Peanut Production forecast rose by +908 (+94,28%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseed, Sunflower seed, Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	39,894	-139 (-0.34%)	40,033	42,870
Beginning Stocks	2,577	-306 (-10.61%)	2,883	2,657
Imports	1,372	0 (0.0%)	1,372	1,501
Total Supply	43,843	-445 (-1.00%)	44,288	47,028
Exports	1,682	-68 (-3.88%)	1,750	1,947
Domestic Consumption	40,284	+323 (+0.80%)	39,961	42,198
Food Use Dom. Cons.	1,827	+54 (+3.04%)	1,773	1,736
Feed Waste Dom. Cons.	1,804	-3 (-0.16%)	1,807	2,031
Crush	36,653	+272 (+0.74%)	36,381	38,431
Total Distribution	43,843	-445 (-1.00%)	44,288	47,028
Ending Stocks	1,877	-700 (-27.16%)	2,577	2,883
Area Harvested	23,565	+198 (+0.84%)	23,367	24,413

World's Oilseed, Sunflowerseed Production is projected at 39,894 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

World's Oilseed, Sunflowerseed Production forecast fell by -139 (-0.34%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Changes for 2015/16MY in main Production countries:

- - Ukraine's Production are down by -200 (-1.96%) thd. mt to 10,000 thd. mt
- - Russian Federation's Production are up by +471 (+5.27%) thd. mt to 9,400 thd. mt
- - European Union's Production are down by -435 (-4.86%) thd. mt to 8,500 thd. mt
- - Argentina's Production are down by -200 (-7.14%) thd. mt to 2,600 thd. mt
- - China, Peoples Republic of's Production are up by +50 (+2.12%) thd. mt to 2,400 thd. mt

Oilseed, Sunflower Seed, Production, in 1000 MT, of Top 10 countries

Country	2015/16	Change	2014/15	2013/14
Ukraine	10,000	-200 (-1.96%)	10,200	11,600
Russian Federation	9,400	+471 (+5.27%)	8,929	10,554
European Union	8,500	-435 (-4.86%)	8,935	9,008
Argentina	2,600	-200 (-7.14%)	2,800	2,100
China, Peoples Republic of	2,400	+50 (+2.12%)	2,350	2,423
Turkey	1,150	-50 (-4.16%)	1,200	1,400
United States	1,136	+131 (+13.03%)	1,005	917
South Africa, Republic of	775	+196 (+33.85%)	579	832
Pakistan	510	-30 (-5.55%)	540	600
India	500	0 (0.0%)	500	670

Oilseeds. Ukraine, Sunflower seed Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	10,000	-200 (-1.96%)	10,200	11,600
Beginning Stocks	197	-170 (-46.32%)	367	207
Imports	10	-5 (-33.33%)	15	15
Total Supply	10,207	-375 (-3.54%)	10,582	11,822
Exports	50	0 (0.0%)	50	70
Domestic Consumption	10,125	-210 (-2.03%)	10,335	11,385
Food Use Dom. Cons.	55	0 (0.0%)	55	55
Feed Waste Dom. Cons.	70	-10 (-12.50%)	80	80
Crush	10,000	-200 (-1.96%)	10,200	11,250
Total Distribution	10,207	-375 (-3.54%)	10,582	11,822
Ending Stocks	32	-165 (-83.75%)	197	367
Area Harvested	5,300	0 (0.0%)	5,300	5,300

Ukraine's Oilseed, Sunflowerseed Production is projected at 10,000 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

Ukraine's Oilseed, Sunflowerseed Production forecast fell by -200 (-1.96%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. Russian Federation, Sunflower seed Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	9,400	+471 (+5.27%)	8,929	10,554
Beginning Stocks	98	-271 (-73.44%)	369	-
Imports	30	+5 (+20.00%)	25	35
Total Supply	9,528	+205 (+2.19%)	9,323	10,589
Exports	50	-15 (-23.07%)	65	125
Domestic Consumption	9,420	+260 (+2.83%)	9,160	10,095
Food Use Dom. Cons.	220	0 (0.0%)	220	230
Feed Waste Dom. Cons.	250	-40 (-13.79%)	290	535
Crush	8,950	+300 (+3.46%)	8,650	9,330
Total Distribution	9,528	+205 (+2.19%)	9,323	10,589
Ending Stocks	58	-40 (-40.81%)	98	369
Area Harvested	6,500	+129 (+2.02%)	6,371	6,795

Russian Federation's Oilseed, Sunflowerseed Production is projected at 9,400 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

Russian Federation's Oilseed, Sunflowerseed Production forecast rose by +471 (+5.27%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. European Union, Sunflower seed Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	8,500	-435 (-4.86%)	8,935	9,008
Beginning Stocks	994	+115 (+13.08%)	879	780
Imports	250	0 (0.0%)	250	319
Total Supply	9,744	-320 (-3.17%)	10,064	10,107
Exports	600	0 (0.0%)	600	713
Domestic Consumption	8,400	-70 (-0.82%)	8,470	8,515
Food Use Dom. Cons.	450	+50 (+12.50%)	400	350
Feed Waste Dom. Cons.	550	-20 (-3.50%)	570	560
Crush	7,400	-100 (-1.33%)	7,500	7,605
Total Distribution	9,744	-320 (-3.17%)	10,064	10,107
Ending Stocks	744	-250 (-25.15%)	994	879
Area Harvested	4,250	-34 (-0.79%)	4,284	4,597

European Union's Oilseed, Sunflowerseed Production is projected at 8,500 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

European Union's Oilseed, Sunflowerseed Production forecast fell by -435 (-4,86%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. Argentina, Sunflower seed Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	2,600	-200 (-7.14%)	2,800	2,100
Beginning Stocks	821	+46 (+5.93%)	775	998
Imports	2	+1 (+100.00%)	1	1
Total Supply	3,423	-153 (-4.27%)	3,576	3,099
Exports	85	+5 (+6.25%)	80	73
Domestic Consumption	2,754	+79 (+2.95%)	2,675	2,251
Feed Waste Dom. Cons.	54	+4 (+8.00%)	50	40
Crush	2,700	+75 (+2.85%)	2,625	2,211
Total Distribution	3,423	-153 (-4.27%)	3,576	3,099
Ending Stocks	584	-237 (-28.86%)	821	775
Area Harvested	1,400	0 (0.0%)	1,400	1,300

Argentina's Oilseed, Sunflowerseed Production is projected at 2,600 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

Argentina's Oilseed, Sunflowerseed Production forecast fell by -200 (-7.14%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. China, Peoples Republic of, Sunflower seed Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	2,400	+50 (+2.12%)	2,350	2,423
Beginning Stocks	60	-39 (-39.39%)	99	156
Imports	50	+10 (+25.00%)	40	61
Total Supply	2,510	+21 (+0.84%)	2,489	2,640
Exports	160	-40 (-20.00%)	200	173
Domestic Consumption	2,290	+61 (+2.73%)	2,229	2,368
Food Use Dom. Cons.	900	0 (0.0%)	900	900
Feed Waste Dom. Cons.	110	+10 (+10.00%)	100	125
Crush	1,280	+51 (+4.14%)	1,229	1,343
Total Distribution	2,510	+21 (+0.84%)	2,489	2,640
Ending Stocks	60	0 (0.0%)	60	99
Area Harvested	920	0 (0.0%)	920	923

China, Peoples Republic of's Oilseed, Sunflowerseed Production is projected at 2,400 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

China, Peoples Republic of's Oilseed, Sunflowerseed Production forecast rose by +50 (+2.12%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseed, Palm Kernel, Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	17,137	+785 (+4.80%)	16,352	15,793
Beginning Stocks	240	-42 (-14.89%)	282	290
Imports	55	+5 (+10.00%)	50	59
Total Supply	17,432	+748 (+4.48%)	16,684	16,142
Exports	43	-4 (-8.51%)	47	53
Domestic Consumption	17,171	+774 (+4.72%)	16,397	15,807
Food Use Dom. Cons.	-	-	-	-
Feed Waste Dom. Cons.	113	-1 (-0.87%)	114	113
Crush	17,058	+775 (+4.75%)	16,283	15,694
Total Distribution	17,432	+748 (+4.48%)	16,684	16,142
Ending Stocks	218	-22 (-9.16%)	240	282

World's Oilseed, Palm Kernel Production is projected at 17,137 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

World's Oilseed, Palm Kernel Production forecast rose by +785 (+4.80%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Changes for 2015/16MY in main Production countries:

- - Indonesia's Production are up by +500 (+5.74%) thd. mt to 9,200 thd. mt
- - Malaysia's Production are up by +200 (+3.96%) thd. mt to 5,250 thd. mt
- - Nigeria Production are unchanged
- - Thailand's Production are up by +40 (+10.00%) thd. mt to 440 thd. mt
- - Colombia's Production are up by +20 (+8.00%) thd. mt to 270 thd. mt
- Oilseed, Palm Kernel. Production. Countries+-1101001kAgroChart.com

Oilseed, Palm Kernel Production, in 1000 MT, of Top 10 countries

Country	2015/16	Change	2014/15	2013/14
Indonesia	9,200	+500 (+5.74%)	8,700	8,100
Malaysia	5,250	+200 (+3.96%)	5,050	5,100
Nigeria	730	0 (0.0%)	730	725
Thailand	440	+40 (+10.00%)	400	435
Colombia	270	+20 (+8.00%)	250	235
Papua New Guinea	130	+5 (+4.00%)	125	125
Ecuador	120	+5 (+4.34%)	115	113
Honduras	115	+5 (+4.54%)	110	103
Cameroon	113	0 (0.0%)	113	113
Ghana	110	+2 (+1.85%)	108	105

Oilseeds. Indonesia, Palm Kernel Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	9,200	+500 (+5.74%)	8,700	8,100
Beginning Stocks	50	-20 (-28.57%)	70	90
Imports	-	-	-	-
Total Supply	9,250	+480 (+5.47%)	8,770	8,190
Exports	-	-	-	-
Domestic Consumption	9,220	+500 (+5.73%)	8,720	8,120
Feed Waste Dom. Cons.	70	0 (0.0%)	70	70
Crush	9,150	+500 (+5.78%)	8,650	8,050
Total Distribution	9,250	+480 (+5.47%)	8,770	8,190
Ending Stocks	30	-20 (-40.00%)	50	70

Indonesia's Oilseed, Palm Kernel Production is projected at 9,200 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

Indonesia's Oilseed, Palm Kernel Production forecast rose by +500 (+5,74%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. Malaysia, Palm Kernel Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	5,250	+200 (+3.96%)	5,050	5,100
Beginning Stocks	180	-18 (-9.09%)	198	187
Imports	20	0 (0.0%)	20	24
Total Supply	5,450	+182 (+3.45%)	5,268	5,311
Exports	5	0 (0.0%)	5	5
Domestic Consumption	5,265	+182 (+3.58%)	5,083	5,108
Feed Waste Dom. Cons.	-	-	-	-
Crush	5,265	+182 (+3.58%)	5,083	5,108
Total Distribution	5,450	+182 (+3.45%)	5,268	5,311
Ending Stocks	180	0 (0.0%)	180	198

Malaysia's Oilseed, Palm Kernel Production is projected at 5,250 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

Malaysia's Oilseed, Palm Kernel Production forecast rose by +200 (+3,96%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. Nigeria, Palm Kernel Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	730	0 (0.0%)	730	725
Beginning Stocks	5	0 (0.0%)	5	-
Imports	10	0 (0.0%)	10	18
Total Supply	745	0 (0.0%)	745	743
Exports	2	0 (0.0%)	2	2
Domestic Consumption	738	0 (0.0%)	738	736
Feed Waste Dom. Cons.	13	0 (0.0%)	13	11
Crush	725	0 (0.0%)	725	725
Total Distribution	745	0 (0.0%)	745	743
Ending Stocks	5	0 (0.0%)	5	5

Nigeria's Oilseed, Palm Kernel Production is projected at 730 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

Nigeria's Oilseed, Palm Kernel Production forecast unchanged in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. Thailand, Palm Kernel Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	440	+40 (+10.00%)	400	435
Total Supply	440	+40 (+10.00%)	400	435
Exports	10	0 (0.0%)	10	13
Domestic Consumption	430	+40 (+10.25%)	390	422
Crush	430	+40 (+10.25%)	390	422
Total Distribution	440	+40 (+10.00%)	400	435

Thailand's Oilseed, Palm Kernel Production is projected at 440 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

Thailand's Oilseed, Palm Kernel Production forecast rose by +40 (+10.00%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Oilseeds. Colombia, Palm Kernel Production, in 1000 MT

Attribute	2015/16	Change	2014/15	2013/14
Production	270	+20 (+8.00%)	250	235
Imports	-	-	-	-
Total Supply	270	+20 (+8.00%)	250	235
Domestic Consumption	270	+20 (+8.00%)	250	235
Food Use Dom. Cons.	-	-	-	-
Crush	270	+20 (+8.00%)	250	235
Total Distribution	270	+20 (+8.00%)	250	235

Colombia's Oilseed, Palm Kernel Production is projected at 270 thd. mt in 2015/16MY in the current USDA World Markets and Trade report.

Colombia's Oilseed, Palm Kernel Production forecast rose by +20 (+8.00%) thd. mt in the season of 2015/16 in comparison with the season of 2014/15.

Courtesy: Agrochart.com

Health Tips

Body's bacteria may keep our brains healthy

The microbes that live in your body outnumber your cells 10 to one. Recent studies suggest these tiny organisms help us digest food and maintain our immune system. Now, researchers have discovered yet another way microbes keep us healthy: They are needed for closing the blood-brain barrier, a molecular fence that shuts out pathogens and molecules that could harm the brain.

The findings suggest that a woman's diet or exposure to antibiotics during pregnancy may influence the development of this barrier. The work could also lead to a better understanding of multiple sclerosis, in which a leaky blood-brain barrier may set the stage for a decline in brain function.

The first evidence that bacteria may help fortify the body's biological barriers came in 2001. Researchers discovered that microbes in the gut activate genes that code for gap junction proteins, which are critical to building the gut wall. Without these proteins, gut pathogens can enter the bloodstream and cause disease.

In the new study, intestinal biologist Sven Pettersson and his postdoc Viorica Braniste of the Karolinska Institute in Stockholm decided to look at the blood-brain barrier, which also has gap junction proteins. They tested how leaky the blood-brain barrier was in developing and adult mice. Some of the rodents were brought up in a sterile environment and thus were germ-free, with no detectable microbes in their bodies. Braniste then injected antibodies—which are too big to get through the blood-brain barrier—into embryos developing within either germ-free moms or moms with the typical microbes, or microbiota.

The studies showed that the blood-brain barrier typically forms a tight seal a little more than 17 days into development. Antibodies infiltrated the brains of all the embryos younger than 17 days, but they continued to enter the brains of embryos of germ-free mothers well beyond day 17, the team reports online today in Science Translational Medicine. Embryos from germ-free mothers also had fewer intact gap junction proteins, and gap junction protein genes in their brains were less active, which may explain the persistent leakiness. (The researchers didn't look at the mice's guts.)

Germ-free mice even have leaky blood-brain barriers as adults. But those leaks closed after the researchers gave the animals the microbes from normal mice for 2 weeks, Pettersson says.

The microbes have "a striking effect," says Elaine Hsiao, a neurobiologist at the California Institute of Technology in Pasadena who was not involved in the study. The work suggests "a role for the [microbes] in regulating brain development and function."

But how? In the gut, bacteria may influence the gut wall's integrity through one of their byproducts, energy-laden molecules called short-chain fatty acids. So Pettersson and his colleagues infected germ-free mice with either bacteria that made these fatty acids or ones that did not. The blood-brain barrier improved only when the bacteria made these fatty acids, Pettersson says. He thinks that these molecules may get into the blood and stimulate gene activity that leads to the closure of the barrier.

The study is not perfect. "Germ-free mice are useful tools for studying the microbiota, but the germ-free condition is artificial and involves widespread disruptions" in how the body functions, such as impaired immunity and loss of gut integrity, Hsiao says. So these results in germ-free mice need to be confirmed in humans.

But at the very least, the findings point toward a new understanding of human health and disease, says Lora Hooper, an immunologist at the University of Texas Southwestern Medical Center in Dallas who was not involved in the work. With multiple sclerosis, neurobiologists are at a loss to explain why the disease progresses so erratically, so the idea that changes in the body's microbes may alter the blood-brain barrier to make the brain more vulnerable to damage is appealing, Pettersson notes.

Scientists, Hooper adds, should also investigate whether microbes help spur the development of the human fetus's blood-brain barrier. It could be that taking antibiotics at the wrong time during pregnancy is creating abnormalities in the blood-brain barrier of the child, she says.

Courtesy: Science

Saturated Fat Beats Out Carbs: Tripling Saturated Fat Intake Leaves No Effect in Blood

Nutrition experts advise against food high in saturated fat not only because of a high calorie content, but also because of an overall rise in the level of cholesterol in our blood. A recent study supported by the Dairy Research Institute, the National Cattlemen's Beef Association, and the Egg Nutrition Center has found that doubling or even tripling the amount of saturated fat in our diets will not lead to increases of total saturated fat in our blood.

"People believe 'you are what you eat,' but in reality, you

are what you save from what you eat," Jeff Volek, a professor of human sciences at The Ohio State University, said in a statement. "The point is you don't necessarily save the saturated fat that you eat. And the primary regulator of what you save in terms of fat is the carbohydrate in your diet. Since more than half of Americans show some signs of carb intolerance, it makes more sense to focus on carb restriction than fat restriction."

Volek and his colleagues provided 16 adults suffering from metabolic syndrome with the same diet consisting of 2,500 calories and 130 grams (g) of protein a day for a period of 18 weeks. People with metabolic syndrome are affected by at least three out of five risk factors for heart disease and diabetes, including excess belly fat, elevated blood pressure, low "good" cholesterol, insulin resistance or glucose intolerance, and high triglycerides. Diets started with 47g of carbs and 84g of saturated fat per day at the beginning of the study and ended with 346g of carbs and 32g of saturated fat per day.

By the end of the study, the average participant lost around 22 pounds and experienced significant improvements in blood glucose, insulin, and blood pressure. Total saturated fat in the blood did not increase in any of the participants and even went down for some. Researchers also tracked the levels of palmitoleic acid, a fatty acid linked to an unhealthy metabolism of carbs that can promote disease. Although palmitoleic acid levels decreased on high-fat/low-carb diets, concentrations of this fatty acid in the blood increased as carbs were added to the diet.

"There is widespread misunderstanding about saturated fat. In population studies, there's clearly no association of dietary saturated fat and heart disease, yet dietary guidelines continue to advocate restriction of saturated fat. That's not scientific and not smart," Volek added. "But studies measuring saturated fat in the blood and risk for heart disease show there is an association. Having a lot of saturated fat in your body is not a good thing. The question is, what causes people to store more saturated fat in their blood, or membranes, or tissues?

According to the American Heart Association, saturated fats occur naturally in meat and dairy products, such as fatty beef, lamb, pork, poultry with skin, beef fat, lard and cream, butter, cheese, and whole or reduced fat milk. The AHA recommends a diet that derives five to six percent of calories from saturated fat. On average, our diet should consist of 13g of saturated fat each day.

Source: Volk B, Kunces L, Volek J, et al. Effects of Step-Wise Increases in Dietary Carbohydrate on Circulating Saturated Fatty Acids and Palmitoleic Acid in Adults with Metabolic Syndrome.

Eating eggs reduces risk of type 2 diabetes

Egg consumption may reduce the risk of type 2 diabetes, according to new research from the University of Eastern Finland. The findings were published in American Journal of Clinical Nutrition.

Type 2 diabetes is becoming increasingly widespread throughout the world. Research has shown that lifestyle habits, such as exercise and nutrition, play a crucial role in the development of the disease. In some studies, high-cholesterol diets have been associated with disturbances in glucose metabolism and risk of type 2 diabetes. In contrast, in some experimental studies, the consumption of eggs has led to improved glucose balance, among other things. However, there is no experimental data available on the effects of egg consumption on the incidence of type 2 diabetes. In population-based studies, too, the association between egg consumption and type 2 diabetes has been investigated only scarcely, and the findings have been inconclusive. Egg consumption has either been associated with an elevated risk, or no association has been found.

The dietary habits of 2,332 men aged between 42 and 60 years were assessed at the baseline of the Kuopio Ischaemic Heart Disease Risk Factor Study, KIHD, at the University of Eastern Finland in 1984–1989. During a follow-up of 19.3 years, 432 men were diagnosed with type 2 diabetes.

The study found that egg consumption was associated with a lower risk of type 2 diabetes as well as with lower blood glucose levels. Men who ate approximately four eggs per week had a 37 per cent lower risk of type 2 diabetes than men who only ate approximately one egg per week. This association persisted even after possible confounding factors such as physical activity, body mass index, smoking and consumption of fruits and vegetables were taken into consideration. The consumption of more than four eggs did not bring any significant additional benefits.

A possible explanation is that unlike in many other populations, egg consumption in Finland is not strongly associated with unhealthy lifestyle habits such as smoking, low physical activity or consumption of processed meats. In addition to cholesterol, eggs contain many beneficial nutrients that can have an effect on, for example, glucose metabolism and low-grade inflammation, and thus lower the risk of type 2 diabetes. The study also suggests that the overall health effects of foods are difficult to anticipate based on an individual nutrient such as cholesterol alone. Indeed, instead of focusing on individual nutrients, nutrition research has increasingly focused on the health effects of whole foods and diets over the past few years.

Courtesy: American Journal of Clinical Nutrition.

Pumpkin seed oil

Introduction

Pumpkin seed oil is manufactured by pressing raw or roasted pumpkin seeds. It has a rich and nutty flavor and is a potent source of beneficial fatty acids, antioxidants and DHT blocking compounds such as beta-sitosterol and delta-7-sterine.

The viscous oil is light to very dark green to dark red in colour depending on the thickness of the observed sample. The oil appears green in thin layer and red in thick layer. Such optical phenomenon is called dichromatism. Pumpkin oil is one of the substances with strongest dichromatism. Its Kreft's dichromaticity index is -44. Used together with yoghurt, the colour turns to bright green and is sometimes referred to as "green-gold".

The four dominant fatty acids are Palmitic, Stearic, Oleic, and linoleic acid. HPLC analysis of the powerful pigments found in pumpkin seed oil reveal a number of CAROTENOIDS - the main components being BETA CAROTENE and LUTEIN. In addition other carotenoids present include - violaxanthin, luteoxanthin, auroxanthin, flavoxanthin, chrysanthemaxanthin, alpha-cryptoxanthin, beta-cryptoxanthin and alpha-carotene.

Oil content ranged from 10.9 to 30.9%. Total unsaturated fatty acid content ranged from 73.1 to 80.5%. The predominant fatty acids present were linoleic, oleic, palmitic, and stearic. Significant differences were observed among the cultivars for stearic, oleic, linoleic, and gadoleic acid content of oil. Low linolenic acid levels were observed (<1%). The tocopherol content of the oils ranged from 27.1 to 75.1 micro g/g of oil for alpha-tocopherol, from 74.9 to 492.8 micro g/g for gamma-tocopherol, and from 35.3 to 1109.7 micro g/g for delta-tocopherol. The study showed potential for pumpkin seed oil from all 12 cultivars to have high oxidative stability that would be suitable for food and industrial applications, as well as high unsaturation and tocopherol content that could potentially improve the nutrition of human diets.

The pumpkin seed oil nutrient mix focus is predominantly on the reproductive and urinary tract area of the body. Studies are constantly being done in relation to these nutrients having beneficial effects on BPH - Benign Prostatic Hypertrophy or enlarged prostate. The fatty acid and plant sterol content of pumpkin seed oil might account for the improved function of the bladder and urethra, which may account for BPH symptom relief.

The nutrients in pumpkin seed oil affect kidney stone formation by reducing levels of substances that promote stone formation and increasing levels of compounds that inhibit stone formation. Pumpkin seeds in history have commonly been used to treat a variety of kidney problems as well urinary problems, gastritis and the expelling of tapeworms and roundworms.

The lubricating effects of the essential fatty acids and antioxidant content are the likely reason relief is found by arthritis sufferers. These same nutrients are also lower the overall blood cholesterol content by lowering LDL (bad cholesterol) levels and increasing HDL (good cholesterol) levels. The antioxidants in the forms of Vitamin A and E are also useful in maintaining skin health.

The essential fatty acids, rich antioxidant content and synergistic effects of other minor components is the likely reason some people experience positive effects of eating pumpkin seed oil and pumpkin seeds. Australian Pumpkin Seed Company products are not designed or implied to cure any disease or illness but can act as an aid to dietary deficiency where one exists.

Native Americans used pumpkin flesh and seeds for food. Their use of the seeds for intestinal infections eventually led the United States Pharmacopoeia to list pumpkin seeds as an official medicine for parasite elimination from 1863 to 1936. Native Americans also commonly used pumpkin seeds to treat a variety of kidney problems. Eclectic physicians at the turn of the century used pumpkin seeds to treat urinary tract problems and gastritis, and to remove tapeworms and roundworms from the intestines.

Benefits of Pumpkin Seed Oil

Information can be found by searching the internet and on this website which relates to the positive effects of Pumpkin Seed Oil and or Seeds on:

- Prostate Function
- Cholesterol Lowering
- Cystitus Treatment
- Kidney Function
- Anti-Arthritic
- Diabetes
- Anti-Parasitic

- Increasing mothers milk production
- Skin Care

PROSTATE FUNCTION

Pumpkin seed oil has been used in combination with saw palmetto in two double blind human studies to effectively reduce symptoms of Benign Prostatic Hyperplasia (BPH). Researchers have suggested that the zinc, free fatty acid, or plant sterol content of pumpkin seeds might account for their benefit in men with BPH. Studies have shown that pumpkin seed extracts can improve the function of the bladder and urethra, this might partially account for BPH symptom relief.

ANTI-ARTHRITIC

Studies have shown that pumpkin seed oil is as potent as the drug indomethacin at relieving chronic rheumatoid arthritis. It is likely that this effect is due to the essential fatty acid profile, rich antioxidant content, and the synergistic effects of other minor components. Pumpkin seeds have been shown to have high levels of vitamin E, including all forms of the tocopherol family i.e. alpha, beta, delta, and gamma tocopherol, along with the tocotrienols.

ANTI-PARASITIC

Cucurbitin is an amino acid that has shown anti-parasitic activity in vitro. Human studies conducted in China have shown pumpkin seeds to be helpful for people with acute schistosomiasis, a severe parasitic disease occurring primarily in Asia and Africa that is transmitted through snails. Preliminary human research conducted in China and Russia has shown pumpkin seeds can assist with resolving tapeworm infestations.

CHOLESTEROL LOWERING

Pumpkin seed oil has been concurrently used with cholesterol lowering drugs and would appear to potentiate the overall lipid lowering effects. The positive effects on lowering LDL levels and increasing HDL levels are most likely due to the antioxidant and essential fatty acid content of pumpkin seed oil. Side effects of the cholesterol drug were also reduced when pumpkin seed oil was administered. Similar positive results have been found in concomitant use of pumpkin seed oil with anti-hypertensive medication. The hypotensive action is due to the EFAs (Essential fatty acid) and antioxidant capability of PSO (Pumpkin seed Oil) .

KIDNEY FUNCTION

Two studies in Thailand have demonstrated that eating pumpkin seeds as a snack can help prevent the most common type of kidney stone. Pumpkin seeds appear to both reduce levels of substances that promote stone formation in the urine and increase levels of compounds that inhibit stone formation. Some research has demonstrated that PSO could remarkably reduce bladder pressure, increase bladder compliance, and reduce urethral pressure. Dosage One to three teaspoons daily. Best taken with food. Potential applications Rheumatoid arthritis, elevated blood lipids and cholesterol, parasitic infestation, BPH, kidney/bladder disorders. Useful in maintaining skin health. The high tryptophan content of the seeds may make the oil useful in cases of insomnia. A nutritious culinary oil.

Antioxidant properties

It appears that the biggest skin benefits of pumpkin seed oil are that it possesses very high levels of the natural antioxidants and polyunsaturated fatty acids. Pumpkin seed oil is especially high in the gamma-tocopherol form of Vitamin E, which is a powerful antioxidant.

Antioxidants protect cell structure and health by neutralizing "free radicals", which are unstable molecules generated from sources like radiation, air pollution, and peroxides. Left unchecked, free radicals can attack the skin's structure, leaving it vulnerable to wrinkling, infection, and other damage.

Vitamin E works by stabilizing the free radical- Vitamin E gives up one of its electrons to complete the unstable molecule. This, in essence, renders the free radical harmless, and helps the skin retain its normal structure.

Vitamin E has been shown to have a wide range of skin benefits. Vitamin E has been shown to reduce the amount of scarring from wounds, and has been shown to diminish the appearance of stretch marks on the skin. Also, it has been shown to decrease the effects of psoriasis, and to diminish the redness associated with erythema, which is one symptom of rosacea.

Suggested Amount:

Unless otherwise prescribed: Pumpkin seed oil can be used as a healthy culinary oil or can be taken as a source of essential fatty acids with a dosage of 1-2 tablespoons per day. In the multicenter clinical trial noted above, patients received 1-2 capsules of a pumpkin seed extract per day for 12 weeks.

Laugh Out Loud

- A chemist goes into a drugstore. "I'd like a box of acetylsalicylic acid, please".
  The drugist surprisingly asked "Do you want Aspirin?"
  "Yes, of course, but I can never remember this strange word!"

- One day "METHYL " (-CH3) went out to play. His mom called him back but "DIMETHYL ETHER" returned instead.
  Why?
  Because mom called by saying, "methyl-o-methyl (CH3-O-CH3) come back!"

- Allegedly at the "Manhattan Project" where the first nuclear reactor was built, security was very tight and the workers were told not to tell their families what they were doing. During a security check the families were asked if they knew what their working parent did at work. One young lad replied that his father worked in a place that made light bulbs and toilet paper. When asked how he knew, he replied that his father brought a roll of toilet paper and a light bulb home every day in his lunch box.

- **Engineer in hell**

An engineer was mistakenly thrown to hell. On getting there, he notice that things wasn't comfortable for him. So he made some changes like installing air conditioning, and all that. Another day God call Devil on phone and said 'how is hell over there?' and he said 'hell is fine, in fact I have been enjoying this engineer you sent to me, he has make a lots of changes here.' God said 'no it was a mistake, send him here' but Devil refuse saying 'no, I won't, I love having engines on board'.

- **My Computer**

Help-desk guy speaking to a lady user ...
Help-desk: Double click on "My Computer".
Lady: I can't see your computer..
Help-desk: No.. Click on
"My Computer" on your computer.
Lady: How the hell can I click on your computer from my computer ??? !!
Help-desk: There is an icon labelled "My Computer" on your computer .. double click on it.
Lady: What the hell is your computer doing on my computer?

- **Deadly Instructions!**

A programmer had been missing from work for over a week when finally someone noticed and called the cops. They went round to his flat and broke the door open. They found him dead in the still running shower with an empty bottle of shampoo next to his body.
What had happened? Was foul play involved?
The mystery was finally solved, when one of his fellow programmers read the instructions on the shampoo bottle:
Wet hair
Apply shampoo
Lather
Rinse
Repeat...

- **Globalization**

Question: What is the truest definition of Globalization?
Answer: Princess Diana's death.
Question: How come?
Answer: An English princess with an Egyptian boyfriend crashes in a French tunnel, driving a German car with a Dutch engine, driven by a Belgian who was drunk on Scottish whisky, (check the bottle before you change the spelling) followed closely by Italian Paparazzi, on Japanese motorcycles; treated by an American doctor, using Brazilian medicines. This is sent to you by an American, using Bill Gates's technology, and you're probably reading this on your computer, that use Taiwanese chips, and a Korean monitor, assembled by Bangladeshi workers in a Singapore plant, transported by Indian lorry-drivers, hijacked by Indonesians,

unloaded by Sicilian longshoremen, and trucked to you by Mexican illegals.
That, my friends, is Globalization!!

- **Cannibals in an IT Company**

Five cannibals get appointed as programmers in an IT company. During the welcoming ceremony the boss says: "You`re all part of our team now. You can earn good money here, and you can go to the company canteen for something to eat. So don`t trouble the other employees.
The cannibals promise not to trouble the other employees.
A month later the boss returns and says: "You`re all working very hard, and I`m very satisfied with all of you. However, one of our cleaners has disappeared. Do any of you know what happened to her?"
The cannibals disavowed all knowledge of the missing cleaner.
After the boss left, the leader of the cannibals says to the others: "Which of you idiots ate the cleaner?"
A hand raises hesitantly, to which the leader of the cannibals says: "You fool! For four weeks we`ve been eating Team Leaders, Managers, and Project Managers so no one would notice anything, and you have to go and eat the cleaner!"

- **Even the Donkey cried.**

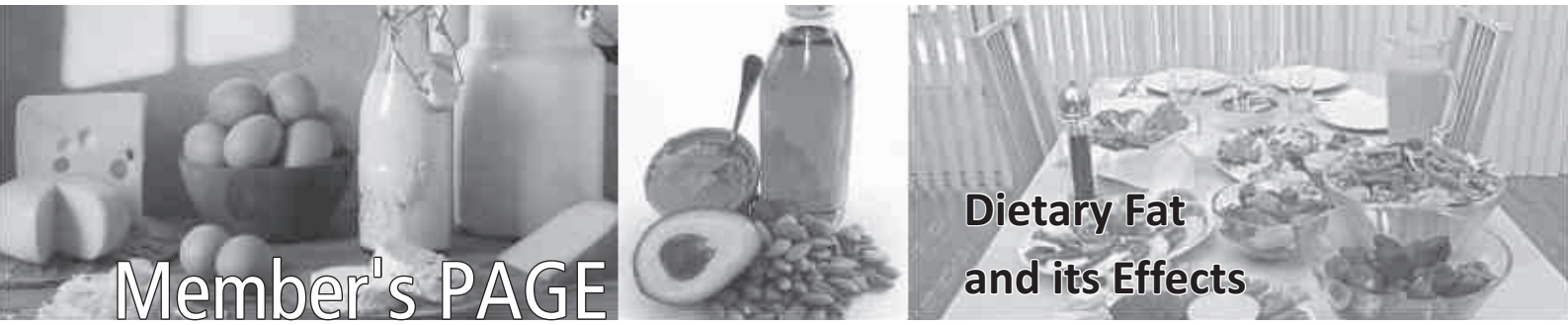
Once a King wanted to get his daughter married in the old swayamvara style. The princess posted a challenge that she would marry anyone who makes her donkey cry without hurting it. Many eligible princes from neighboring states came and tried their best (magic, poojas, sounds and tricks) to make the donkey cry. The donkey did not cry. Days passed, no result. Finally one young boy came from a faraway village. He also went to the donkey. Everyone laughed at him. But still, he went ahead and murmured something into the donkey's ears. Immediately the donkey started weeping. The princess was happy and she married the young boy. After the grand marriage, the King asked the boy what he did to make the donkey cry. He replied. Nothing. I only told the donkey that I am a maintenance engineer. The donkey cried because he understood my pathetic condition as a maintenance engineer which is a thankless job. Still worse than a donkeys life.

- **An Engineer and A Lawyer**

An engineer and a lawyer attended an interview separately. The Engineer was asked: If ten men cleared one hecter of land in ten hours how many hours would five men require to clear the same piece of land? The engineer answered: If ten men cleared one hecter for ten hours, then one man would require 10 X 10 hours. Therefore five men would require 10x10 divided by 5 i.e. 20hours. The lawyer was asked the same question and he answered: If ten men cleared one hecter of land for ten hours, then there would be no piece of land for any man to clear. Therefore five men would require zero hour.

- **Murphy's Ten Laws for Experimentalists:**

a. if something can go wrong, it will do so just before your grant is up for review;
b. if the reading on your detector is correct, then you have forgot to plug it in;
c. if several things can go wrong then they will do so all at the same time;
d. if nothing can go wrong with your experiment, something still will;
e. left unto itself, your experiment will go from bad to worse; on the other hand, if you pay attention to the experiment then it will take three times longer to complete than you thought it would;
f. Nature is both subtle and malicious (Murphy stole this one from Albert Einstein);
g. a straight line will never fit your data, and using a wiggly line will result in the rejection by referees of the publication of work;
h. if you make a great discovery today, you will find a major error in your methods tomorrow (experienced experimentalists call this effect "here today, gone tomorrow");
i. in contrast to a radio, banging your apparatus when you are at peak frustrate.



In our day to day working, we very often come across the terminology "cholesterol", "Heart disease" ,"Obesity" and "Cancer" etc. These are advertised as having connections with one way or the other with the intake of Oils and Fats (Dietary Fats) in our meals. Although, it is true to some extent but the fact is that we use oils and fats, as cooking material which gives us necessary calories/ energy and nourishment for our routine work. Also, it helps in transporting fat soluble vitamins A, D, K and maintain cholesterol levels. Moreover, synthesis of certain hormones and imparting satisfying texture and palatability to food are other functions done by oil/fats in our body.

The dietary requirement of oil/fat is roughly (3-3.5) kg per month for a family of 4 adult persons which amounts, 2 full table spoons of oil per day. However, Indian diet being normally cereals and pulses based which also provides almost half the fat needs of the person in the form of Invisible Fat.

Difference between Oils and Fats

Fats are generally classified as saturated and unsaturated. The ability of fat to solidify at body/room temperature is known as saturated fat. The oils are normally in liquid state and are known as less saturated or unsaturated. The unsaturation is further classified as mono-unsaturated (MUFA) and poly-unsaturated (PUFA) depending upon the fatty acid profile of the fat/oil. The saturation level of fat depends upon the presence of hydrogen atoms in fatty acids

Trans-Fatty Acids

The most common source of saturated dietary fat is pure Ghee/Vanaspati, while liquid Refined Veg. Oils are the source of providing unsaturated fat. Pure Ghee is produced from cow/buffalo milk while Vanaspati is manufactured by hydrogenation of vegetable oils. Trans Fatty acids which are very uncommon in nature, are formed by hydrogenation of vegetable oils and the quantity depends upon the hydrogenation conditions and mixture of vegetable oils used. During hydrogenation, unsaturated fat convert some of cis double bonds to trans double bonds by isomerization reaction.

Although small quantity of 1-2 % of trans fatty acids do exist in pure ghee which is much less as compared to the permissible limit of max.10% in vanaspati. Trans fatty acids are unhealthy substance and believe to raise blood cholesterol level if taken regularly in quantity. Also, it increases the level of LDL and lowers the HDL resulting in the increased risk of coronary Heart disease.

Cholesterol

Cholesterol is a fatty substance insoluble in blood. It becomes soluble when combines with proteins to form Lipoprotein and transported in the blood. High Density Lipoproteins (HDL), having more protein than fat and Low Density Lipoprotein (LDL), having more fat than protein, are two types of Lipoproteins performing different functions in the body. LDL carry fat and cholesterol to the peripheral tissues, where they are used, and HDL seems to collect cholesterol from the tissues and carry it to the liver for excretion. As HDL clears excess cholesterol form the blood, it is called "Good Cholesterol" while LDL may be responsible for depositing cholesterol in the artery walls and as such is known as "Bad Cholesterol".

Dietary Fat and Heart Disease

Diets high in Saturated Fats and cholesterol are believed to play a major role in increasing the levels of blood cholesterol while diet high in PUFA lowers both HDL and LDL level. Mono-unsaturates are believed to lower LDL only and for normal person it is preferred over poly-unsaturates. Certain saturated fatty acids are hyper cholesterolemic i.e. helps in increasing the cholesterol level. Elevated blood cholesterol is a major risk factor for coronary heart disease.

Obesity

This is a disease deeply rooted in the biological system and possibility of genetic and environmental factors govern the tendency to put on weight. It has been found that high fat and low carbohydrate diet will cause weight gain more than low fat and high carbohydrate diet although both provide the same number of calories. The Obese people have greater preference of fatty food than normal weight people. Obesity in its extensive form is a risk factor for diseases like hypertensions, diabetes and cancer.

Cancer

It has been experimented that high fat diet are tumour promoting and linoleic acid in particularly helps in its growth. Fish oil inhibits tumour growth because of Omega-3 fatty acid which is a form of linolenic acid.

From the above, we may say that all the three forms, saturates, mono-unsaturates and poly-unsaturates are essential parts of a dietary fat. As such either a balanced mixed or the intake of dietary fat should be by rotation so that none of each leaves the harmful effect on the body.

By : R.C. Arora
Administrative Officer
OTAI-Web.

LIPID UNIVERSE

Quarterly News Letter of Oil Technologists' Association of India, North Zone

Advertisement Tariff

Back Cover (Colour)	Rs. 40000.00 per 4 insertions
Front inside cover (Colour)	Rs. 29000.00 per 4 insertions
Back inside cover (Colour)	Rs. 29000.00 per 4 insertions
Full page (Colour)	Rs. 25000.00 per 4 insertions
	(Service tax extra as applicable)

Mechanical data

Frequency of publication	:	Quarterly
Finish size	:	21cm x 28cm
Print area	:	18cm x 25cm
No. of columns	:	Two
Paper	:	Art paper

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

Payment is to be made in advance by crossed cheque or demand draft in favour of "Oil Technologists'Association of India, North Zone" payable at New Delhi or
Transfer to A/c No. 10304097356
State Bank of India, Najafgarh Road, New Delhi-110015
IFSC No. : SBIN 0001181
All material to be send to the Editor, LIPID UNIVERSE.

Subscription Form

Yes, I/We want to avail the special offers and would like to receive "LIPID UNIVERSE" regularly from..... issue. Accept my/our subscription for one/two years and mail it to the address mentioned below :-

NAME : ..... DESIGNATION.....

ORGANIZATION..... .....

ADDRESS ....

....

DISTRICT..... CITY .....

STATE ..... PIN CODE .....

PHONE..... E-MAIL.....

I/We,am/are enclosing a Cheque / DD No ..... for Rs.....

drawn on ..... in favour of **"Oil Technologists' Association of India, North Zone".** Add Rs.25.00 for cheques not drawn at New Delhi. Add Rs.250.00 per year for Courier / Registered Post delivery (optional).

Mail the Subscription Form to :
LIPID UNIVERSE, C/o FARELABS Pvt. Ltd.
L-17/3, DLF Phase-II, IFFCO Chowk, M. G. Road,
Gurgaon - 122002, Haryana, INDIA
Phone : +91-124-4034205
Telefax : +91-124-4036038
E-mail : lipiduniverse@gmail.com
: csjoshi@farelabs.com

Subscription Tariff

1 year : Rs. 600.00
2 years : Rs. 1100.00

The quarterly periodical is published by D. Mathur, on behalf of Oil Technologists' Association of India, North Zone, CD-3/304, Sagar Complex, LSC, Pitampura, Delhi-110088. India. Phone : +91-11-27315848, and printed by him at
SANSOM GRAPHICS, 68-A, Sector-7, Gurgaon (9810262689) (sansom31@gmail.com)
Editor - C.S. Joshi.

AIRTECH SERVICES

An ISO 9001:2008 Certified Company

- Air Handling Units
- Fresh Air Unit
- Air Washer
- Clean Air Equipments
- Air Showers
- Dispensing Booths
- Laminar Air Flow
- Pass Boxes
- Clean Air Modules
- Air Curtains
- Dust Collectors
- Industrial Clean Air Filter
- Condensing Unit & Ductable Unit
- Clean Room Projects
- HEPA Filter
- Mini Pleat Hepa Filters
- Bag Filters
- Fancoil Filters

M/s. AIRTECH SERVICES

(An ISO 9001:2008 Certified Company)

Plot No. 712-H, Pace City -2, Sector-37, Gurgaon, Haryana, 122001

Email : admin@airtechservices.in, Sales@airtechservices.in

Mobile : +91-9810185577, +91-9310185577, Website : www.airtechservices.in

J.S. INTERNATIONAL

APEDA APPROVED INTEGRATED MEAT PLANT

Contact Person: Mr. Rizwan Farrukh
Email: sales@jsgroupindia.com - info@jsgroupindia.com - Website: www.jsgroupindia.com
Head Office: 16/80-1, Civil Lines, Kanpur - 208 001, India Tel: +91 512 23050 42/73/81, Fax: +91 9026 92 6660
Plant: B-15 to B-47, UPSIDC Industrial Area, Leather Technology Park, Banthar, Unnao - 209 801, India Tel: +91 515 28404 57/58/61

Vtech AUTOMATION

The People with Solutions

Electric Panels
Automation
Training

- AMF / Load management
- DG panels
- DG synchronization panels
- Control desks
- Feader pillars
- PLC Automation panels
- Automatic Power factor control panels
- MCC/PCC Panels

VTECH AUTOMATION

VTECH AUTOMATION

Corporate Office:
Plot No. 510, Pace City - II, Sector 37, Gurgaon - 122001
Phone: +(91)-(124)-4060883, Tele Fax: +(91)-(124)-4066884
Mobile: +(91)-9810590909, 9910590909
Email: ashok@varuntechnologies.com Website: www.vtechautomation.com

Industrial RO Plants & Water Softners
STP Water Treatment Plant

RO 250 LPH to 25000 LPH

Our Esteemed Clients & Installations :-

- Shapoorji Pallonji & Co. Ltd. • GMR • Jaypee Group
- Tata Housing Projects • Godrej Housing Projects
- Raheja Builders (P) Ltd. • IGI Airport Terminal-3
- Bhayana Builder • Rathi Super Steel • N.T.R.O.

We Provide R.O. on Rent

SPARK VIDYUT (P) LTD.

An ISO 9001:2008 Certified Co.

WZ-17A, New Sahib Pura, Opp. C.R.P.F. Camp, New Delhi-110018
E-mail : info@sparkvidyut.in, Web : www.sparkvidyut.in

Ph. : 9911234535, 9212601116, 28336751, 64599559

JVL

partnership for progress

जेवीएल रॉयल, झूला, शंकर,पायल, जूही ब्राण्ड तेल के उत्पादक

स्वादिष्ट एवं स्वास्थ्यवर्द्धक स्वास्थ्य, शक्ति,
स्वादिष्ट भोजन, आचार व मालिश के लिये

JVL Agro Foods
(A Unit of JVL Agro Industries Ltd.)

आपका स्वास्थ्य
हमारा लक्ष्य

Mfd. & Packed by

JVL Agro Foods

(A Unit of JVL Agro Industries Ltd.)

207, MIA, Alwar (Raj.)

Regd. Off.: Jhunjhunwala Bhawan,
Nati Imli, Varanasi (UP)

COOLING TOWERS FROM THE HOUSE OF

SUPERTECH

RCC Cooling Towers, Wooden Cooling Tower

FRP Square Cooling Towers

FRP Round Counter Flow cooling Tower

Drive Shaft

FRP Fan Cooling Tower

Gear Box of Cooling Tower

Cooling Tower Spare Parts

FRP Casing Panels I PVC Fills I Motor & Fan Assembly Arrangement I SS Wire Mesh I SS Nails
Drift Eliminator I Drive Shift I FRP Square Cooling Towers
FRP Cross Flow Cooling Towers I FRP Natural Draft Cooling Towers

Supertech Cooling Towers Pvt. Ltd. (An ISO 9001 : 2008 Company)
Regd. Office : 75, Ashoka Enclave Main, Sector 34, Faridabad (Haryana) I Phone : 91-129-2270375
Telefax : 91-129-4088904 I Mobile : 9810037905 I E-mail : supertechcoolingtowers@gmail.com; st_cooling@hotmail.com
H-50, Site-V, UPSIDC Surajpur Industrial Area (Kasna), Greater Noida, Distt. Gautambudh Nagar (U.P.)
www.supertechcoolingtowers.in I www.supertechcoolingtowers.com

MUEZ-HEST®

Your Dependable Partner In Progress Since 1995

Project And Product Engineering

Reactor

Custom Made Equipment

Dry Fractionation

Food Grade Liquid Storage

Refining Projects Of Oils & Fats

- Pre-treatment
- Neutralization/Bleaching/De-acidification
- Dewaxing/Winterisation/Fractionation

Custom Made Equipments/Reactors

Value Added Product Plant

- Lecithin
- Margarine
- Peanut Processing

Oleo-Chemicals

MUEZ-HEST INDIA PVT. LTD.

231, Blue Rose Industrial Estate,
W.E. Highway, Borivali (East),
Mumbai - 400 066, India.

Telefax:
+91-22-2854 1758 / 2870 1752

E-mail:
muezhest@vsnl.com
info@muezhest.com

www.muezhestindia.com

HOME CARE FABRIC CARE

PERSONAL CARE

We are proud to touch lives and make a difference by enhancing quality of life as you are the most precious.

Together with our partners, we bring exclusive range of products in Home, Fabric and Personal Care.

For Trade Enquiries :
Tel : +91 11 25060804
globalsales@advancegroup.biz
Address: 511/2/1, Rajokri, New Delhi-38