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Editor's desk

Research and Development is an area where Indian Industry and Indian agriculture are required to do a lot to match pace with the rest of world. R&D in pre harvest and post-harvest has increasingly becoming essential to meet the requirement of new products, consumer demand and to fulfil the need of industry as well as aspiration of Agriculture sector. By inventing new technologies and product in vegetable oil segment the present challenges can be addressed.

India is yet uncertain on the use of GMO crops while the world is marching from GMO to next generation gene edited products by altering the gene sequences of same species. This shows that a lot of work is required to meet the next generation demand and to make Indian edible oil and allied industry globally competitive.

A huge costal area can be tuned in to gold mine by implementing and encouraging the palm tree plantation. This will not only save precious foreign currency but generate a lot of employment and related industrial and commercial activities. Countries dependence on imported palm oil will reduce and edible oil and industrial oil user both will be benefited.

Keeping world market in mind, development of R&D and quality control laboratories can help in realising export potential of Indian minor oil seed, oils and oil products. The minor oil seed and allied product is an unexplored area where a lot of potential exists.

Government of India, by incorporating these areas under the ambitious make in India programme, can exploit the huge hidden potential of Indian vegetable oil and allied industries.

Yours truly
C S Joshi
Editor

Oil Technologists' Association of India
(North Zone)

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Codex Alimentarius Commission: Ensuring Food Safety and Nutrition Security for Over 50 Years

By Mina Kojima
D.V.M., and Angelika Tritscher, Ph.D.

The globalization of trade, which has contributed to food availability and diversification throughout the world, has increased the chances that the food produced in one place will affect the health and diet of people living in another. Changes in human behavior or practice in food production and consumption have led to changes in the occurrence of food pathogens as well as mycotoxins, and have also raised emerging problems of food safety and nutrition as well as food security. As a result, global actions across borders to ensure food safety as integral to food and nutrition security have become more important than ever before. Such actions include the establishment of evidence-based international standards on food safety and nutrition. Since its launch in 1963, the Codex Alimentarius Commission (CAC) has developed hundreds of such standards and provided guidance for improving food safety and nutrition in each of its Member States and globally.

Objectives and History

Codex Alimentarius, the name of the Commission's "bible" of standards, means, in Latin, "Food Law or Code." The Commission was established by a resolution of both the World Health Assembly and the Food and Agriculture Organization of the United Nations (FAO) Conference to protect the health of consumers and ensure fair practices in food trade through the development of international standards, recommendations and codes of practices. It is the principal body of the Joint FAO/World Health Organization (WHO) Food Standards Programme.[1]

Currently, the Commission has 186 members [185 member countries and 1 member organization (EU)], which covers 99 percent of the world's population, and over 200 observers (international governmental organizations, nongovernmental organizations and United Nations agencies).

The Commission develops not only international food safety and nutrition standards (e.g., maximum use levels for food additives, maximum limits for contaminants such as heavy metals) but also quality standards, guidelines and codes of practice. Its standards and related texts cover an impressively wide range of subjects of international relevance having to do with biotechnology, pesticides, pathogens, additives and contaminants, food labeling, reference values for nutrients (particularly those related to the risk of noncommunicable diseases) and many other horizontal areas, but also to specify and define particular foods to ensure their identity and quality. In 1995, the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures called on members of the WTO to harmonize their national regulations to Codex standards,[2] which have since become international benchmarks for food safety. Furthermore, Codex standards other than those addressing food safety are relevant under the WTO Agreement on Technical Barriers to Trade.

In 2002, WHO and FAO conducted a broad-ranging evaluation of the Codex Alimentarius and other FAO and WHO Food Standards work, including capacity building and expert scientific advice as a basis for Codex safety and nutrition standards. Based on the resulting recommendations, the Commission recognized the need to ensure: a) greater efficiency and effectiveness in the development of the standards, with transparency and inclusiveness and procedural consistency; b) increased participation of developing member countries in the Codex work; c) greater usefulness of the standards to the members in terms of relevance to their needs and timeliness; d) a stronger scientific base for risk analysis; and e) more effective capacity building for the development of national food control systems.[3]

Since the evaluation, the Commission has evolved in an open, transparent and inclusive way to meet emerging challenges on food safety and nutrition.

Although Codex standards are often viewed as "trade standards," their primary purpose is to protect consumers' health by ensuring the safety, nutritional and other qualities of food products traded worldwide. The importance of this work is evidenced by the large burden of food- and diet-related disorders and illness. Food- and waterborne diarrheal diseases kill an estimated 2.2 million people annually, most of them children,[4] and

food containing harmful levels of chemicals can cause serious long-term health problems, including cancer. Excessive intake of calories can lead to obesity and to conditions such as diabetes mellitus, coronary heart disease, cancer, hypertension and stroke.[5, 6] On the other hand, lack of sufficient food and micronutrient deficiencies also cause enormous numbers of deaths and disability. Stunting, a mark of chronic undernutrition, affects 165 million children younger than 5 years, and an estimated 35 percent of all deaths among children in this age group are associated with undernutrition.[7] Foodborne diseases and malnutrition undermine not only human health and productivity but also countries' potential for sustainable development.

The year 2013 marked the 50th anniversary of the CAC, and to commemorate this event, the Directors General of FAO and WHO attended its session in July.

Codex Trust Fund

In response to the 2002 evaluation, the Directors General of WHO and FAO launched the FAO/WHO Project and Fund for Enhanced Participation in Codex (Codex Trust Fund)[8] on February 14, 2003, with the objective of helping developing and transition-economy countries enhance their level of effective participation in the CAC. The Codex Trust Fund is achieving this goal primarily by providing resources for eligible countries to participate in Codex meetings, by facilitating training courses and also by enabling the preparation of scientific and technical data to feed into the Codex standard-setting process.

How It Works

The Commission's work is supported by some 20 subsidiary bodies, which are General Subject Committees (Codex Committees on Contaminants in Foods, on Food Additives, on Food Hygiene, etc.), Commodity Committees (Codex Committees on Fish and Fishery Products, on Fresh Fruits and Vegetables, etc.) and Regional Coordinating Committees.[1] Depending on the standard-setting need, the subsidiary bodies are kept active or made dormant, or new bodies are created in a time-bound manner to address an emerging issue. The international food safety and nutrition standards and recommendations, guidelines and codes of practice are usually drafted by a General Subject Committee and adopted by the Commission at its annual meeting held in July, alternately in Rome or Geneva. Each Codex Committee is hosted by a national government, which provides a Chair, and is serviced by a joint FAO/WHO Codex Secretariat based in Rome.[9]

Codex standards and guidelines have been developed in line with emerging food safety and nutrition issues as well as new scientific knowledge and food technologies. For example, the Codex Ad Hoc Intergovernmental Task Force on Food Derived from Biotechnology (1999–2003 and 2004–2008) has provided guidance to ensure the safety of foods derived from new biotechnologies such as recombinant DNA techniques, which were introduced in the market in the mid-1990s.[10]

Furthermore, the standards have taken account of updated risk management systems such as Hazard Analysis and Critical Control Points, test methods and risk-based sampling plans to target hazards in foods as they have evolved.

To underpin the science-based standard-setting process by the Commission, WHO and FAO have provided scientific advice for this work over the decades.

The Scientific Basis of Codex Standards

The Commission has benefited from the scientific and technical advice provided by WHO and FAO. Jointly, FAO and WHO convene international expert meetings to address emerging or emergency issues and provide independent risk assessments. The recommendations from these meetings feed directly into the Commission's standard-setting process. Four expert groups meet regularly: The Joint FAO/WHO Expert Committee on Food Additives[11] has carried out risk assessments related to food additives, contaminants, natural toxins and veterinary drug residues in food since 1956; the Joint FAO/WHO Meeting on Pesticide Residues[12] has assessed the potential health effects of pesticide residues since 1963 and recommends safe maximum residue levels for specific food commodities; the Joint FAO/WHO Expert Meeting on Microbiological Risk Assessment[13] has focused since 2000 on risk assessments for selected pathogen-commodity combinations; and the Joint FAO/WHO Expert Meeting on Nutrition[14] provides scientific advice on nutritional matters. Besides these long-standing programs, many ad hoc expert consultations have been convened to address emerging food safety issues such as the health concerns over exposure to acrylamide, melamine or bisphenol A.

Figure 1: Relationship between the Three Components of Risk Analysis

The relationship between Codex and the FAO/WHO scientific advice program is based on a risk analysis framework. It is made up of three components: risk assessment, risk management and risk communication. At an international level, FAO/WHO expert bodies take the role of risk assessor to provide the scientific bases of risk management and policymaking. The CAC takes the role of risk manager who decides on international food safety and nutrition policies and recommendations, also taking into consideration the circumstances of food production in the world and the socioeconomic impact of the proposed standards. Risk communication is an activity of interactive exchange of information and opinions concerning risks and involves all stakeholders in the whole risk analysis process (Figure 1).

WHO and FAO have provided a variety of scientific advice for Codex and other international/regional/national work relevant to ensuring food safety and nutrition. For example:

- Development and update of risk assessment methodologies: hazard identification, hazard characterization, exposure assessment and risk characterization for chemical and microbiological hazards in foods, risk ranking to prioritize hazards to be addressed by risk managers
- Applied risk assessment for specific food hazards: safe exposure limits for chemical hazards (e.g., acceptable daily intake, tolerable daily intake), risk of microbiological hazards in particular foods (e.g., Listeria monocytogenes in ready-to-eat foods), nutritional requirements and recommended nutrient intake
- Data collection and information sharing: Global Environment Monitoring System – Food Contamination Monitoring and Assessment Program (GEMS/food) compiling levels and trends of contaminants in food globally, their contribution to total human exposure and significance with regard to public health and trade

Besides feeding into the Codex standard-setting process, these tools are also utilized by national/regional authorities as a basis for standard setting in food safety and nutrition.

Future Challenges

As the CAC celebrates 50 years of successful work, it may be a good time to reflect on its trajectory and how it can serve the public interest even better. This includes consideration of how Codex work can support members in tackling important public health topics such as the fight against the increasing global burden of noncommunicable diseases. Over the years, the Commission has become more inclusive. Thanks to the Codex Trust Fund, more countries in development and with economies in transition are actively participating in the Commission's work. The openness, transparency and clarity of its reporting and prioritization procedures have been improved. Nonetheless, today's rapid changes in trade, travel and commerce call for an international standard-setting system that is able to respond more quickly to new situations. As a consequence, a review of current Codex work management is warranted, including the impact of so many Codex Committees, task forces and working groups on national Codex structures. Other aspects that need to be considered include the impact of the proliferation of bilateral and regional agreements on global standards, and the relevance and impact of private standards on the global process.

In addition, the evolution of food technologies and risk analysis methodologies increases the complexity of science advice requested from the Commission, which increases the workload of FAO/WHO expert bodies. Moreover, the need to address real-life scenarios in exposure to multiple compounds through multiple routes requires improved risk assessment approaches to better advise risk management decisions. An ongoing challenge is sufficient resourcing of the scientific advice programs in support of Codex work, and the Commission is actively seeking ways to improve the situation. The Commission and FAO/WHO continue their effort to manage the issue by prioritizing the work that needs FAO/WHO advice and by considering several options to secure more sustainable funding while ensuring independence, impartiality and integrity of the process.[15]

Furthermore, as scientific advice has become more complex, member countries, especially developing countries, have expressed their concern about the difficulty in understanding and interpreting it. Information about scientific advice needs to be more easily accessible, understandable and applicable. Some web-based materials such as FOSCOLLAB (a WHO platform for food safety professionals) and a microbiological risk management tool for the control of Campylobacter and Salmonella in chicken meat have been developed as interactive tools.

The current Codex Trust Fund will end in December 2015, and there is overwhelming support for a successor initiative. Preliminary discussions indicate the wish for more tailored support to countries. The development of a proposal is underway and will be discussed at regional and global levels.

Finally, stronger support of national Codex contact points and strengthening of national Codex structures are needed not only to enhance the work of the Commission and its subsidiary bodies, but also to strengthen implementation of Codex standards and

related texts at a national level. Achieving this will require heightened political will and an acknowledgement of the importance of food safety and nutrition in public health. Closer collaboration between the different sectors associated with food safety and nutrition at the national/regional level is required, and strengthened interactions between the Commission and other global players will be essential to transform the Commission into a modern organization adapted to current needs.

Mina Kojima, D.V.M., worked as a technical official for food safety at the Ministry of Health, Labor and Welfare of Japan. Significantly, she was in charge of the safety of imported food and foodborne disease investigation. She joined WHO in 2012 and is now responsible for the Secretariat of the Joint FAO/WHO Expert Meeting on Microbiological Risk Assessment and internal coordination on meetings of the CAC. Her main interests are in the area of food safety and foodborne diseases.

Angelika Tritscher, Ph.D., conducted research in carcinogenesis and human health risk assessment at the National Institute of Environmental Health Sciences in the U.S., followed by applied toxicology in food safety at the Nestlé Research Center in Switzerland. She joined WHO in 2003, and, in the Department of Food Safety and Zoonoses, she now heads the unit on Risk Assessment and Management, with responsibilities in risk assessment and evidence-based risk management measures along the food chain, in support of the CAC's work in developing international food safety standards. She is a board-certified toxicologist, a member of several national and international professional toxicology societies and has published over 50 peer-reviewed papers and several book chapters. Her main research interests are in the area of toxicology and risk assessment, food safety and environmental influence on human health.

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Courtesy: Food Safety magazine

These Foods Aren't Genetically Modified but They Are 'Edited'

In a few years, you could be eating the next generation of genetically altered foods — potatoes that do not turn brown or soybeans with a healthier mix of fatty acids. And you may have no idea that something is different, because there may be no mention on the labeling even after a law passed by Congress last year to disclose genetically modified ingredients takes effect. A new generation of crops known as gene-edited rather than genetically modified is coming to the market. Created through new tools that snip and tweak DNA at precise locations, they, at least for now, largely fall outside of current regulations.

Unlike older methods of engineering genes, these techniques, like Crispr, so far have The federal Agriculture Department has asked companies to advise it of their plans. But once the companies submit data to show the agency that the gene edits do not introduce foreign genes from plant pests into the crops, the agency is giving businesses the green light.

Hundreds of acres of gene-edited crops have already been grown in several states, unencumbered by oversight or regulations. And a few people have eaten them already. "This is not Frankenfood," said André Choulika, chief executive of Cellectis, one of the companies developing gene-edited crops. In October, Cellectis hosted a dinner at Benoit New York, the Alain Ducasse Manhattan restaurant, and served dishes made from its gene-edited soybeans and potatoes. Guests included professors, journalists and celebrities like Neil Patrick Harris, the actor. "I don't even know what gene editing is," Mr. Harris said. "I thought we were supposed to wear jeans." Calyxt, a subsidiary of Cellectis doing the gene-edited food, is also developing new versions of wheat including one with greater resistance to fungal diseases, another lower in carbohydrates and higher in dietary fibers.

Other companies also developing gene-edited crops including DuPont Pioneer, which has used the technology for a new variety of waxy corn, used most commonly not for food but for starch in adhesives. Scientists at Pennsylvania State University have used Crispr to create mushrooms that do not turn brown as quickly.

The current regulations were written for the earlier generation of genetically modified organisms, where scientists used bacteria and viruses — typically from plant pests — to drop a payload of new genes into the nuclei of the plant cells where they merge with the plant's DNA. That worked, but scientists could not control where the new genes would be inserted, and that led to worries of potentially dangerous genetic disruptions or crossbreeding with non-G.M.O. crops. Companies like Calyxt have portrayed gene editing more like moving the cursor in a word processor to a particular location and making a small change to the text.

Federal agencies have not yet said how they intend to regulate gene-edited foods, and the incoming Trump administration, while criticizing overregulation in general, has not weighed in. Other parts of the world are also considering whether to regulate gene-edited foods and how to do so. In Europe, where many countries have banned the cultivation of G.M.O.s, the European Commission has created a scientific panel to study the issue, with debate resuming this year.

Dr. Choulika said the inspiration for the October gathering was a dinner more than two centuries earlier, by Antoine-Augustin Parmentier, a French scientist who was enthralled with potatoes brought to Europe from South America. But many Europeans scorned the potato. France even outlawed the growing of potatoes in 1748. Largely because of Parmentier's work, potatoes were declared to be safely edible in 1772, and the ban was lifted. Still, few wanted to eat them.

In 1778, Parmentier organized the first in a series of lavish dinners for the high society of Paris, serving dishes all made with potatoes. Potatoes became a fixture in French cuisine. With farmers harvesting the first substantial plantings of the Cellectis gene-edited potatoes and soybeans last year, Dr. Choulika thought of throwing a modern version of Parmentier's gathering. "This is the first dinner on Earth with gene-edited foods," Dr. Choulika said to the diners. "Things that you eat today, millions of people are going to eat during the 21st century, and this will not stop." Food is a side business for Cellectis, which focuses on pharmaceuticals.

After some collaborations with big companies like Monsanto and DuPont Pioneer, Cellectis started Calyxt, to explore opportunities for using gene editing for foods.

Dr. Choulika said he considered G.M.O.s safe, but that the gene-editing techniques like those used by Calyxt would be more acceptable to consumers. Often in G.M.O.s, the inserted genes came from unrelated species, like the bacterial genes that were added to cotton so that it would exude a toxin to repel bollworms, a mixing of species known as transgenesis.

There's not this blockage of transgenesis that freaks out people for no reason," he said. "I think it is a question of perception." Instead of using bacteria and viruses to burrow into a cell, gene-editing techniques — Calyxt uses one called Talen — create molecules that act as a template to match a specific segment of DNA and then make a cut there. For the Calyxt soybeans, for example, the only change was to turn off two genes. "There is nothing taken out or added to the plant," Dr. Choulika said. "It's what nature would have produced." Those edits change the mix of fatty acids and perhaps make for a better cooking oil. "Better than olive oil," Dr. Choulika said.

At the dinner, the soybeans were transformed into a several dishes including soy blinis, mini tofu and soy burgers, and soybean hummus. Carole Pourchet, director of the Lab, the research and development arm of Mr. Ducasse's food enterprise, said the gene-edited soy cooked like normal soy, but that the potatoes were a little drier, leading to the idea to confit them to retain moisture. The potatoes showed up in mashed potatoes, potato pie and blinis.

"The dinner was maybe potatoes cooked 10 ways," said Richard C. Mulligan, a professor of genetics at Harvard Medical School who was one of the guests. Dr. Choulika worked as a postdoctoral researcher in Dr. Mulligan's laboratory two decades ago. Federico Tripodi, chief executive of the Calyxt subsidiary, said the company hoped the soybeans would be used in cooking oil for commercial and industrial use by 2018. The potatoes, edited to remain fresher longer and not produce carcinogens when fried, could be grown and sold in 2019. A second potato that is slower to turn brown just got word from the U.S.D.A. that it, too, is not subject to regulation.

Gene editing is not being used only with plants. A Minnesota company, Recombinetics, is editing the genes of farm animals — for example, creating cattle without horns. Critics warned that the industry was repeating the same mistakes of G.M.O.s. "We've never been against any of this technology," said Michael K. Hansen, a senior staff scientist at Consumers Union. "We don't say it's inherently bad or these crops are inherently dangers. It's just they raise safety issues, and there should be required safety assessments."

While the gene-editing templates match a specific sequence, it is possible that the same sequence occurs elsewhere in the genome or they will match similar sequences, and the DNA will be sliced in those places, too, with unknown consequences. "They make it sound very exact," Dr. Hansen said. "It will have off-target effects."

Dr. Hansen said unregulated gene-edited crops could also create trade havoc if traces of them accidentally mixed into exports to countries that prohibited them. Daniel Voytas, chief science officer of Calyxt who was one of the inventors of the Talen gene-editing technology, said the company had not checked the entire genomes of their plants, but did look for unintended changes within sections that were similar to the parts they were editing. "We didn't find any," he said. Dr. Voytas said it would not be "a huge amount of work" to sequence the entire genome and that all of the data they presented was available on the U.S.D.A.'s website. A U.S.D.A. advisory board in November unanimously recommended that standards for organic foods exclude gene-edited crops even if they were grown without chemical fertilizers and abided by the other strictures of organic farming.

Dr. Mulligan of Harvard said he was not sure that people would see much difference between gene-edited and genetically modified. "The objection that people have is a more visceral and vague objection to messing with DNA," he said. "It's hard to see that the public would see the difference." He admitted that he was more excited by the chef. "The good thing with this is Ducasse is such a culinary artist," Dr. Mulligan said. "He is really well known for being able to take anything and make it taste good."

For Mr. Harris, the dinner provided a whirlwind introduction to biotechnology — "realities that I thought were theoreticals," he said.

Courtesy: New York Times

European Member States Oppose GM Crop Cultivation

The European Commission's proposal to authorize the first new GM crops for cultivation since the late nineties have failed to achieve the majority vote, with member states showing strong opposition to the plan.

Late last week EU governments opposed the Commission's plan to allow GM maize types from Syngenta and Dow-Pioneer - with the technical names BT11 and 1507 - to be cultivated, as well as the renewal of the only GM maize currently allowed to be grown in Europe, Monsanto's Mon810.

These crops have been genetically modified to produce insecticide in their own cells and the two new crops can tolerate glufosinate, a herbicide produced by Bayer.

A majority of national governments rejected the proposal but failed to get the qualified majority necessary to ban the GM crops outright. It is now up to the Commission to decide whether to reject the three crops or table another vote with governments. A qualified majority requires 55% of member states representing 65% of the population. Under EU rules the Commission can now either reject the GM authorizations, change their details and ask governments again, or send them to an appeal committee.

"The European Commission has failed to get political support for GM crops since the biotech industry first tried to push them through in 1998. President Juncker promised to make decisions about GM crops more democratic, and so it is now time for the Commission to reject them once and for all. This saga is distracting us from the real debate we need on how we make farming resilient to climate change, save family farms and stop the destruction of nature. It's time to close our countryside to GM crops and move on," says Mute Schimpf, food campaigner for Friends of the Earth Europe.

A breakdown of the voting is as allows:

For the renewal of Mon810, 12 member states voted against the proposal: Bulgaria, Denmark, Ireland, Greece, France, Cyprus, Latvia, Luxembourg, Hungary, Austria, Poland and Slovenia. 10 member states voted in In favor: Czech Republic, Estonia, Spain, Italy, Lithuania, Netherlands, Romania, Finland, Sweden and the UK. Six member states abstained: Belgium, Germany, Croatia, Malta, Portugal, Slovakia. Authorization of 1507 and Bt 11 is as follows:

13 member states voted against: Bulgaria, Denmark, Ireland, Greece, France, Cyprus, Latvia, Luxembourg, Hungary, Austria, Poland, Slovenia, Sweden. Eight countries voted in favor: Estonia, Spain, Italy, Lithuania, Netherlands, Romania, Finland and the UK, while seven abstained: Belgium, Czech Republic, Germany, Croatia, Malta, Portugal, Slovakia.

Courtesy: Food Ingredients 1st

Europe Introduces Food Inspection Rules to Tackle Fraud

New rules on food safety and inspection have been adopted by the European Parliament to tackle fraudulent practices in the food industry. The European Parliament has adopted new rules on food safety and inspection which aim to tackle fraudulent practices in the food industry across the EU.

Adopted at the March 15 session, the new measures introduce tougher controls and food safety inspections, as well as improved methods for food traceability.

I trust that really deterrent penalties will be a key tool to combat fraud in every area.- Karin Kadenbach, Austrian MEP

Covering all stages of the agri-food chain, the rules will replace an earlier regulation on official controls that dates back to 2004. The new regulation has extended the scope to include controls on animal feed, plant health, pesticide use, geographical indication rules, animal welfare, and organic products. These rules are part of a framework to be adopted by all EU member countries and will enter into force by the end of this month, with member countries required to apply the new rules by 2020.

In a European Parliament press release, Karin Kadenbach, the Austrian MEP (Member of European Parliament) responsible for the drafting of the legislative proposal, revealed why the existing rules needed to be revised: "After the horse meat scandal, consumers had serious questions about the traceability of food, and the integrity of the meat supply chain," she explained. "The European Parliament strove to address these concerns and to end up with a text that allows competent authorities to effectively combat fraudulent practices."

The methods used for sampling, analysis, testing, and diagnosis are also clarified under the new regulation, as well common rules for import controls of animals, and animal and plant products at EU borders.

Courtesy Olive oil Times

Processing and Extraction of Seabuckthorn Fruits for Development of Nutraceuticals & Cosmoceutical Products

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Abstract : Sea buckthorn grows on a shrub-like tree originating in Asia, Eastern Europe, Canada and USA. In India, it is grown primarily at high altitude of the Himalayan Mountains. Sea buckthorn fruit contains 55% juice which is rich in vitamins B1, B2, K, C, A, E, C and folic acid. Sea buckthorn fruit pomace is rich in Omegas fatty acids like 3, 6, 7 and 9. It has multiple uses due to its protein building amino acids. It has over 60 antioxidants, at least 20 minerals, and healthy fatty acids to enhance both health and beauty of the body. It has been used to heal disease like psoriasis and make skin glow, boost immunity, slow aging process and lower cholesterol level; it also has numerous other qualities that make it a superior source of vitamins and minerals The seed oil contain Myristic , palmatic, palmitoleic,stearic, oleic, lenoleic, linolenic acids. The seed oil bioactive substance can be used to produce Nutraceutical cosmeceutical and health care products.

Key words: Sea buckthorn, Bio-actives, Antioxidants, Pomace, Cosmetic

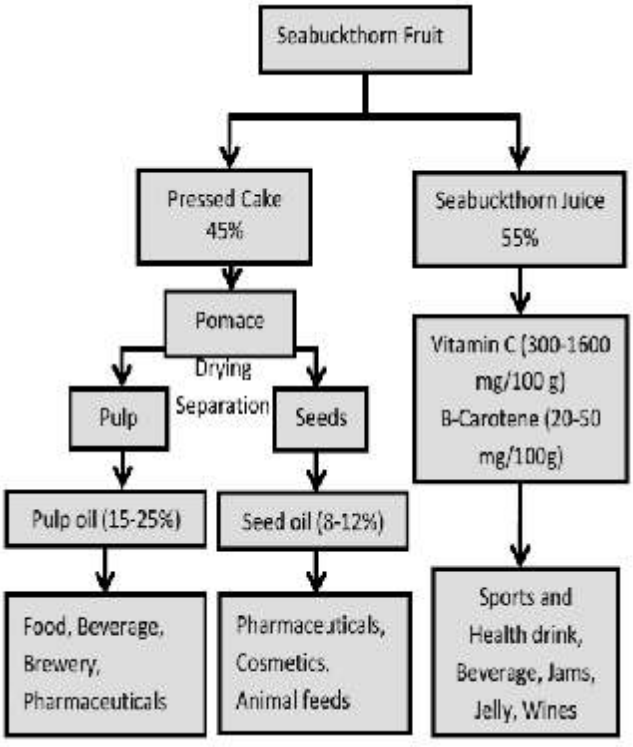

Fig 1: Graphical abstract

Introduction

Sea buckthorn is a general term given to shrub tree Hippophae Linn. This genus belongs to the family Elaeagnaceae and consists of six species and 10 sub species, among which most important is Hippophae rhamnoides Linn, commonly known as Sea buckthorn. Sea buckthorn plants are widely distributed throughout Europe Asia and is found in India, China, Nepal, Russia, Britain, Germany, Finland, Canada, France, Poland etc.

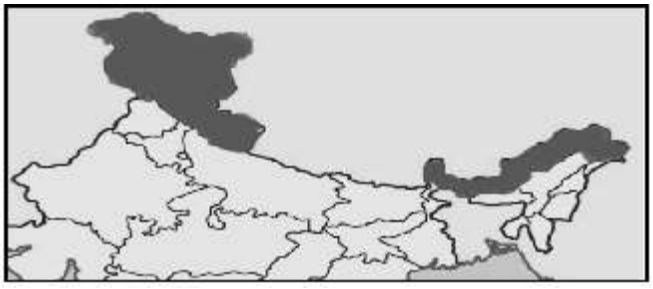

Fig 2 :Regions producing Seabuckthorn berries in India

Sea buckthorn is a thorny deciduous bush, and it is a popular medicinal plant that has traditionally been used in its raw form as a health food and nutritional supplement [1].Seabuckthorn berries contain 15-25 % of pulp oil and 8-12% of seed oil which have bioactive substance which can be used to produce medicines cosmoceutical product and health products [2].

Almost all parts of plant (berries, leaves and barks) have been used in foods, nutraceuticals, pharmaceuticals and cosmetic industry due to their content of essential bioactive. The oil is extracted from pulp Pomace and seed by cold press, solvent extraction or supercritical fluid extraction. These extracts are considered most valuable for high content of soluble vitamins, sterols and essential fatty acids.

The bark leaves, berries and seeds of Seabuckthorn are well known for their medicinal properties, and all parts of the plant contain high concentrations ofvarious bioactive substances. Seabuckthorn leaf extracts containplentiful flavonoids, which have been reported to have significant anti-oxidant, anti-inflammatory and hepatoprotective activities [3]. Yang and Kallio reported that Seabuckthorn berries are rich in antioxidant substances, such as tocopherols, flavonoids and carotenoids that can

improve the immune functionand can also suppress certain risk factors for cardiovascular disease [4].

Nutritional Value of Seabuckthorn fruit

Sea buckthorn berries contain more than 100 types of nutrients and bioactive substances. Sea buckthorn is rich in macronutrients and micronutrients. Seabuckthorn contains vitaminsB1, B2, folic acid, C, E, beta-carotene (Pro-vitamin A) and K. The fruit of Sea buckthorn is very rich in vitamin C (300-1600 mg/100 g), which is 4 –l00 times higher than any vegetable and fruit. It contains Carotenoids, Flavonoids, Polyphenols, Terpenes and at least 20 mineral co-factors. Sea buckthorn also naturally contains 5-HT (serotonin), a neurotransmitter that helps regulate emotions. Seabuckthorn numerous health benefits include cardiovascular, immunity, anticancer, memory, growth, anti-inflammatory, and skin health. Sea buckthorn contains more than 60 antioxidants.

Table 1 Nutritive value of Seabuckthorn fruit (Bal et. al.)

Seabuckthorn fruit	In mg/100 g
Vitamin A	11.0
Vitamin B1	0.04
Vitamin B2	0.56
Vitamin C	300-1600
Vitamin K	200-400
Vitamin E	Up-to 180
Carotenoids	30-50
Flavonoids	50-400
Tocopherols	30-1000

Sea buckthorn seed oil

Sea buckthorn seed oil is extracted from seed of seabuckthorn fruit, with organic solvents like hexane , ethanol and , supercritical CO2-extraction. Supercritical CO2- extraction yields totally solvent free oil, which is free of microbes or their spores. There is large scope for application of sea buckthorn seed oil in health care products. Sea buckthorn seed oil is well-known today for its healing and rejuvenating effects on the skin. When used topically, it's a great natural cleanser and exfoliator. It can also help to heal burns, cuts, wounds, sunburn, rashes, and other types of skin damage. Use of sea buckthorn seed oil daily helps in slow down of the ageing process by nourishing the tissue in the body. Some commercial cosmetics products such as facial mask, anti ageing cream, purifying mask, skin care oil, moisturizing face oil, etc. are available in market and they are highly recommended by cosmetologist for healthy skin.

Nowadays, the new trend in the application of sea buckthorn seed oil is to incorporate the oil into food stuffs, such as bread, juice, and yogurts. However, the high content of polyunsaturated fatty acids and other oxygen-sensitive lipid nutrients make the oil susceptible to oxidation, which limits the applications (Yang and Kallio).

The fatty acid compositions of Seabuckthorn seed oil and pulp of Seabuckthorn berries (Xing et. al., and Nuremberg et. al) is as given in Table 2.

Table 2- Fatty acid composition of Seabuckthorn seed and pulp oil

Fatty Acids	Seed oil	Pulp oil
Myristic acid C14	0.05-0.1	-
Palmatic acid C16	9-12	30-35
Palmitoleic acid C16:1	3-5	22-26
Stearic acid C18:0	1.5-3.5	1-1.5
Oleic acid C18:1	18-25	24-27
Linoleic acid C18:2	33-35	6-8
Linolenic acid C18:3	24-28	1-2
Sitosterol (g/kg oil)	5-7	14-15

Health Benefits of Sea Buckthorn seed oil

Sea buckthorn seed oil and pulp oil has multiple uses due to its protein building amino acids, vitamins B1, B2, K, C, A, E, and folic acid, over 60 antioxidants, at least 20 minerals, and healthy fatty acids. The fruit is full of carotenoids, xanthophylls, phenolics, and flavonoids. It's an absolute power house of nutrients.

Medicinal Properties	**Health Benefits**
Omega 3,6 &7	• Sustain proper brain and nervous system function • Healthy Skin and hair • Supports healthy digestive system function • Supports healthy cardio vascular function
Vitamins A, C & E – Antioxidant B Vitamins – General wellness D, K – Necessary vitamins	• Benefits prostrate and colon health • Contributes to proper brain & nervous system • functioning • Enhances eye health for better vision • Relieves sore joints
Antioxidants	• Fights cell-damaging free radicals • Provides anti-aging benefits • Supports healthy cell reproduction • Healthy immune system functioning & cellular rejuvenation • Healthy skin and hair
Flavonoids	• Helps fight cell-damaging free radicals • Assists in the process of healthy cellular rejuvenation • Promotes healthy immune system function
Carotenoids	• Beta carotene – assists in slowing the aging process • Lycopene – maintains prostate and colon cell health • Zeaxanthin – supports eye health
Minerals	• Helps the body produce energy • Helps the body support growth • Supports cell reproduction and rejuvenation
Energy	• Enhances mental clarity and promotes stamina • Sustained natural energy (no stimulants)
Anti-inflammatory	• Assists in healthy inflammatory response • Supports healthy cardio-vascular system • Relieves sore joints

Uses of Sea buckthorn leaves and fruits:

Sea buckthorn is an herb. The leaves, flowers, and fruits are used to make medicine. Sea buckthorn leaves and flowers are used for treating arthritis, gastrointestinal ulcers, gout, and skin rashes caused by infectious diseases such as measles. A tea containing sea buckthorn leaves is used as a source of vitamins, antioxidants, protein building blocks (amino acids), fatty acids and minerals; for improving blood pressure and lowering cholesterol levels in body ; preventing and controlling blood vessel diseases; and boosting immunity. Sea buckthorn berries are used for preventing infection, improving sight and slowing the ageing process.

The seed or berry oil is used as an expectorant for loosening phlegm; for treating asthma, heart disorders including chest pain (angina) and high cholesterol; for preventing blood vessel disease; and as an antioxidant. Sea buckthorn oil is also used for slowing the decline of thinking skills with age; reducing illness due to cancer, as well as limiting the toxicity of chemical cancer treatment (chemotherapy); balancing the immune system; treating stomach and intestinal diseases including ulcers and reflux esophagitis, treating night blindness and dry eye; and as a supplemental source of vitamins C, A, and E, beta-carotene, minerals, amino acid and fatty acid.

Some people apply sea buckthorn berries, berry concentrate, and berry or seed oil directly to the skin for preventing sunburn; for treating radiation damage from x-rays and sunburns; for healing wounds including bedsores, burns, and cuts; for acne, dermatitis, dry skin, eczema, skin ulcers, and skin color changes after giving birth; and for protecting mucus membranes. Swati Pal et. al. gives a guideline for application of Seabuckthorn pulp extracts can also used in the formulation of cosmetic products such as lipsticks, lip-bams, body massage oil.

In foods, sea buckthorn berries are used to make jellies, juices, purees, and sauces. In manufacturing, sea buckthorn is used in cosmetics and anti-aging products. [9]

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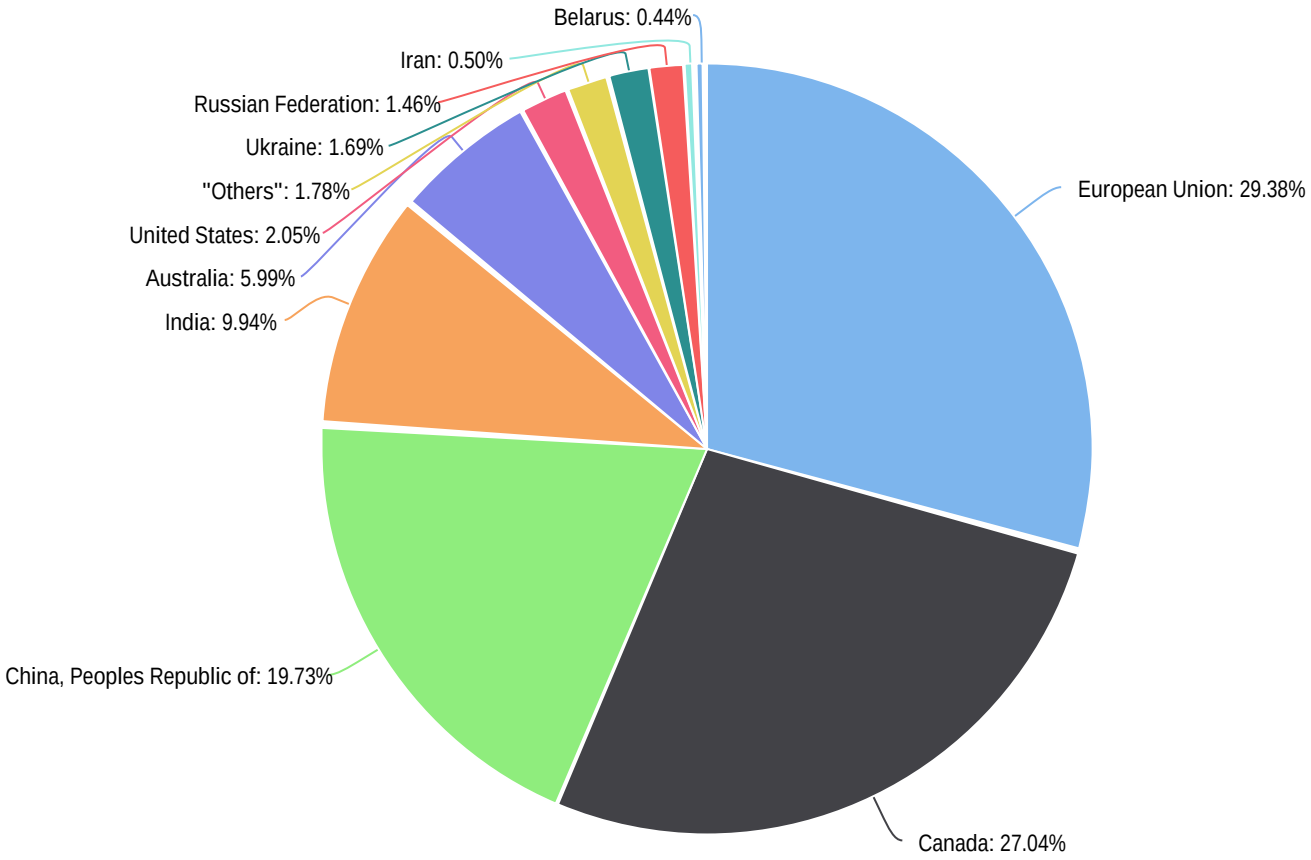
Important Figures

Oilseed, Rapeseed. World. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	68,414	+502 (+0.73%)	-1,772 (-2.52%)	67,912	70,186	71,442
Beginning Stocks	6,670	-51 (-0.75%)	-786 (-10.54%)	6,721	7,456	7,383
Imports	14,207	-25 (-0.17%)	-32 (-0.22%)	14,232	14,239	14,316
Total Supply	89,291	+426 (+0.47%)	-2,590 (-2.81%)	88,865	91,881	93,141
Exports	14,519	+271 (+1.90%)	-162 (-1.10%)	14,248	14,681	15,072
Domestic Consumption	69,679	+85 (+0.12%)	-851 (-1.20%)	69,594	70,530	70,613
Food Use Dom. Cons.	620	0.0 (0.0%)	+40 (+6.89%)	620	580	550
Feed Waste Dom. Cons.	2,496	+10 (+0.40%)	+208 (+9.09%)	2,486	2,288	2,463
Crush	66,563	+75 (+0.11%)	-1,099 (-1.62%)	66,488	67,662	67,600
Total Distribution	89,291	+426 (+0.47%)	-2,590 (-2.81%)	88,865	91,881	93,141
Ending Stocks	5,093	+70 (+1.39%)	-1,577 (-23.64%)	5,023	6,670	7,456
Area Harvested	33,601	-73 (-0.21%)	-493 (-1.44%)	33,674	34,094	35,515
Yield	45	0.0 (0.0%)	+1 (+2.27%)	45	44	45

Oilseed, Rapeseed. World. Production. Main countries in 16/17MY, `000 MT



Oilseed, Cotton Seed Country wise. `000 MT

S.N.	Country	16/17 Mar '17	16/17 Feb '17	15/16	14/15	13/14
1	European Union	20,100	20,100	22,195	24,575	21,306
2	Canada	18,500	18,500	18,377	16,410	18,551
3	China, Peoples Republic of	13,500	13,500	14,931	14,772	14,458
4	India	6,800	6,800	5,920	5,080	6,650
5	Australia	4,100	3,600	2,944	3,540	3,832
6	United States	1,404	1,404	1,306	1,141	1,004
7	Ukraine	1,154	1,154	1,744	2,200	2,352
8	Russian Federation	997	997	1,001	1,324	1,259
9	Iran	340	340	340	340	340
10	Belarus	300	300	300	730	676

Oilseed, Rapeseed. European Union. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	20,100	0.0 (0.0%)	-2,095 (-9.43%)	20,100	22,195	24,575
Beginning Stocks	2,004	-1 (-0.04%)	+125 (+6.65%)	2,005	1,879	1,890
Imports	3,700	0.0 (0.0%)	+206 (+5.89%)	3,700	3,494	2,317
Total Supply	25,804	-1 (-0.00%)	-1,764 (-6.39%)	25,805	27,568	28,782
Exports	400	0.0 (0.0%)	+56 (+16.27%)	400	344	588
Domestic Consumption	24,400	0.0 (0.0%)	-820 (-3.25%)	24,400	25,220	26,315
Feed Waste Dom. Cons.	900	0.0 (0.0%)	0.0 (0.0%)	900	900	950
Crush	23,500	0.0 (0.0%)	-820 (-3.37%)	23,500	24,320	25,365
Total Distribution	25,804	-1 (-0.00%)	-1,764 (-6.39%)	25,805	27,568	28,782
Ending Stocks	1,004	-1 (-0.09%)	-1,000 (-49.90%)	1,005	2,004	1,879
Area Harvested	6,450	+26 (+0.40%)	-63 (-0.96%)	6,424	6,513	6,745
Yield	3	0.0 (0.0%)	0.0 (0.0%)	3	3	4

Oilseed, Rapeseed. Canada. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	18,500	0.0 (0.0%)	+123 (+0.66%)	18,500	18,377	16,410
Beginning Stocks	2,016	0.0 (0.0%)	-526 (-20.69%)	2,016	2,542	3,008
Imports	100	0.0 (0.0%)	-4 (-3.84%)	100	104	77
Total Supply	20,616	0.0 (0.0%)	-407 (-1.93%)	20,616	21,023	19,495
Exports	9,800	0.0 (0.0%)	-478 (-4.65%)	9,800	10,278	9,216
Domestic Consumption	9,439	0.0 (0.0%)	+710 (+8.13%)	9,439	8,729	7,737
Feed Waste Dom. Cons.	439	0.0 (0.0%)	+25 (+6.03%)	439	414	377
Crush	9,000	0.0 (0.0%)	+685 (+8.23%)	9,000	8,315	7,360
Total Distribution	20,616	0.0 (0.0%)	-407 (-1.93%)	20,616	21,023	19,495
Ending Stocks	1,377	0.0 (0.0%)	-639 (-31.69%)	1,377	2,016	2,542
Area Harvested	8,050	0.0 (0.0%)	-272 (-3.26%)	8,050	8,322	8,344
Yield	2	0.0 (0.0%)	0.0 (0.0%)	2	2	2

Oilseed, Rapeseed. China, Peoples Republic of. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	13,500	0.0 (0.0%)	-1,431 (-9.58%)	13,500	14,931	14,772
Beginning Stocks	1,340	0.0 (0.0%)	-159 (-10.60%)	1,340	1,499	1,036
Imports	3,600	0.0 (0.0%)	-411 (-10.24%)	3,600	4,011	4,591
Total Supply	18,440	0.0 (0.0%)	-2,001 (-9.78%)	18,440	20,441	20,399
Exports	-	-	-	-	1	-
Domestic Consumption	17,200	0.0 (0.0%)	-1,900 (-9.94%)	17,200	19,100	18,900
Feed Waste Dom. Cons.	600	0.0 (0.0%)	0.0 (0.0%)	600	600	600
Crush	16,600	0.0 (0.0%)	-1,900 (-10.27%)	16,600	18,500	18,300
Total Distribution	18,440	0.0 (0.0%)	-2,001 (-9.78%)	18,440	20,441	20,399
Ending Stocks	1,240	0.0 (0.0%)	-100 (-7.46%)	1,240	1,340	1,499
Area Harvested	7,000	0.0 (0.0%)	-534 (-7.08%)	7,000	7,534	7,588
Yield	2	0.0 (0.0%)	0.0 (0.0%)	2	2	2

Oilseed, Rapeseed. India. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	6,800	0.0 (0.0%)	+880 (+14.86%)	6,800	5,920	5,080
Beginning Stocks	499	0.0 (0.0%)	+20 (+4.17%)	499	479	439
Imports	-	-	-	-	-	-
Total Supply	7,299	0.0 (0.0%)	+900 (+14.06%)	7,299	6,399	5,519
Exports	-	-	-	-	-	-
Domestic Consumption	6,650	0.0 (0.0%)	+750 (+12.71%)	6,650	5,900	5,040
Food Use Dom. Cons.	620	0.0 (0.0%)	+40 (+6.89%)	620	580	550
Feed Waste Dom. Cons.	330	0.0 (0.0%)	+10 (+3.12%)	330	320	290
Crush	5,700	0.0 (0.0%)	+700 (+14.00%)	5,700	5,000	4,200
Total Distribution	7,299	0.0 (0.0%)	+900 (+14.06%)	7,299	6,399	5,519
Ending Stocks	649	0.0 (0.0%)	+150 (+30.06%)	649	499	479
Area Harvested	6,500	0.0 (0.0%)	+686 (+11.79%)	6,500	5,814	5,799
Yield	1	0.0 (0.0%)	0.0 (0.0%)	1	1	1

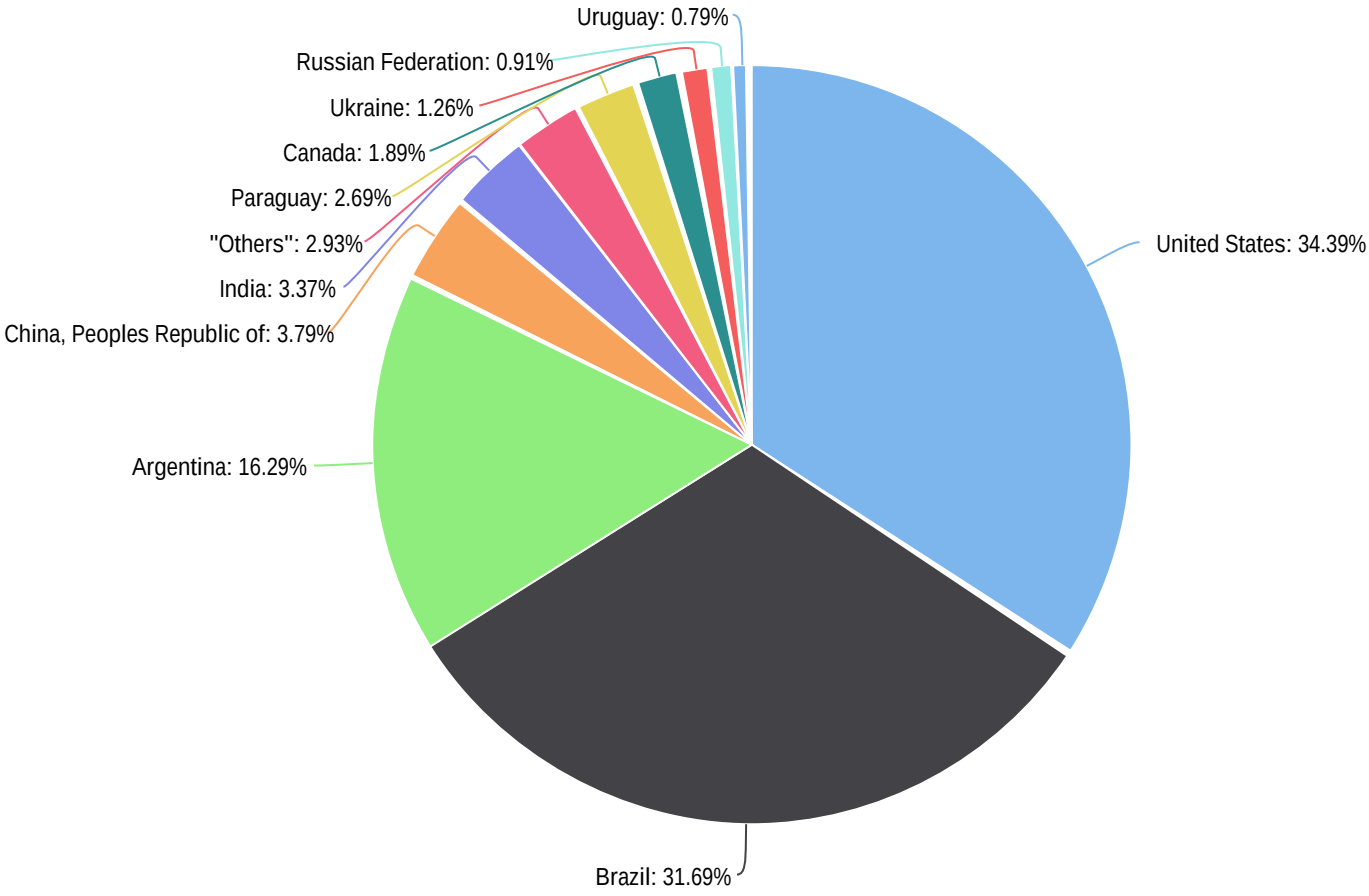
Oilseed, Rapeseed. Australia. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	4,100	+500 (+13.88%)	+1,156 (+39.26%)	3,600	2,944	3,540
Beginning Stocks	277	-50 (-15.29%)	-176 (-38.85%)	327	453	530
Imports	1	0.0 (0.0%)	0.0 (0.0%)	1	1	1
Total Supply	4,378	+450 (+11.45%)	+980 (+28.84%)	3,928	3,398	4,071
Exports	3,100	+300 (+10.71%)	+800 (+34.78%)	2,800	2,300	2,808
Domestic Consumption	871	+40 (+4.81%)	+50 (+6.09%)	831	821	810
Feed Waste Dom. Cons.	71	+10 (+16.39%)	+20 (+39.21%)	61	51	60
Crush	800	+30 (+3.89%)	+30 (+3.89%)	770	770	750
Total Distribution	4,378	+450 (+11.45%)	+980 (+28.84%)	3,928	3,398	4,071
Ending Stocks	407	+110 (+37.03%)	+130 (+46.93%)	297	277	453
Area Harvested	2,300	-100 (-4.16%)	-57 (-2.41%)	2,400	2,357	2,897
Yield	2	0.0 (0.0%)	+1 (+100.00%)	2	1	1

Oilseed, Soybean. World. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	340,788	+4,164 (+1.23%)	+27,975 (+8.94%)	336,624	312,813	319,595
Beginning Stocks	76,590	-596 (-0.77%)	-896 (-1.15%)	77,186	77,486	61,745
Imports	138,249	+822 (+0.59%)	+4,908 (+3.68%)	137,427	133,341	124,361
Total Supply	555,627	+4,390 (+0.79%)	+31,987 (+6.10%)	551,237	523,640	505,701
Exports	141,105	+993 (+0.70%)	+8,976 (+6.79%)	140,112	132,129	126,218
Domestic Consumption	331,701	+956 (+0.28%)	+16,780 (+5.32%)	330,745	314,921	301,997
Food Use Dom. Cons.	17,962	0.0 (0.0%)	+875 (+5.12%)	17,962	17,087	16,442
Feed Waste Dom. Cons.	22,191	+149 (+0.67%)	+619 (+2.86%)	22,042	21,572	21,141
Crush	291,548	+807 (+0.27%)	+15,286 (+5.53%)	290,741	276,262	264,414
Total Distribution	555,627	+4,390 (+0.79%)	+31,987 (+6.10%)	551,237	523,640	505,701
Ending Stocks	82,821	+2,441 (+3.03%)	+6,231 (+8.13%)	80,380	76,590	77,486
Area Harvested	121,196	+11 (+0.00%)	+1,153 (+0.96%)	121,185	120,043	118,262
Yield	83	-1 (-1.19%)	+3 (+3.75%)	84	80	80

Oilseed, Soybean. World. Production. Main countries in 16/17MY, `000 MT



Oilseed, Soya seed. Country wise. `000 MT

S.N.	Country	16/17 Mar '17	16/17 Feb '17	15/16	14/15	13/14
1	United States	117,208	117,208	106,857	106,878	91,389
2	Brazil	108,000	104,000	96,500	97,200	86,700
3	Argentina	55,500	55,500	56,800	61,400	53,400
4	China, Peoples Republic of	12,900	12,900	11,785	12,154	11,951
5	India	11,500	11,500	7,125	8,711	9,477
6	Paraguay	9,170	9,170	9,010	8,154	8,190
7	Canada	6,450	6,450	6,371	6,049	5,359
8	Ukraine	4,280	4,280	3,932	3,900	2,774
9	Russian Federation	3,099	3,099	2,707	2,362	1,517
10	Uruguay	2,700	2,700	2,208	3,109	3,300

Oilseed, Soybean. United States. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	117,208	0.0 (0.0%)	+10,351 (+9.68%)	117,208	106,857	106,878
Beginning Stocks	5,354	0.0 (0.0%)	+166 (+3.19%)	5,354	5,188	2,504
Imports	680	0.0 (0.0%)	+40 (+6.25%)	680	640	904
Total Supply	123,242	0.0 (0.0%)	+10,557 (+9.36%)	123,242	112,685	110,286
Exports	55,112	-680 (-1.21%)	+2,424 (+4.60%)	55,792	52,688	50,143
Domestic Consumption	56,287	+272 (+0.48%)	+1,644 (+3.00%)	56,015	54,643	54,955
Food Use Dom. Cons.	-	-	-	-	-	-
Feed Waste Dom. Cons.	3,489	0.0 (0.0%)	+181 (+5.47%)	3,489	3,308	3,980
Crush	52,798	+272 (+0.51%)	+1,463 (+2.84%)	52,526	51,335	50,975
Total Distribution	123,242	0.0 (0.0%)	+10,557 (+9.36%)	123,242	112,685	110,286
Ending Stocks	11,843	+408 (+3.56%)	+6,489 (+121.19%)	11,435	5,354	5,188
Area Harvested	33,482	0.0 (0.0%)	+406 (+1.22%)	33,482	33,076	33,423
Yield	4	0.0 (0.0%)	+1 (+33.33%)	4	3	3

Oilseed, Soybean. Brazil. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	108,000	+4,000 (+3.84%)	+11,500 (+11.91%)	104,000	96,500	97,200
Beginning Stocks	18,050	-579 (-3.10%)	-875 (-4.62%)	18,629	18,925	15,820
Imports	350	0.0 (0.0%)	-60 (-14.63%)	350	410	305
Total Supply	126,400	+3,421 (+2.78%)	+10,565 (+9.12%)	122,979	115,835	113,325
Exports	61,000	+1,500 (+2.52%)	+6,617 (+12.16%)	59,500	54,383	50,612
Domestic Consumption	44,600	+500 (+1.13%)	+1,198 (+2.76%)	44,100	43,402	43,788
Feed Waste Dom. Cons.	3,600	0.0 (0.0%)	+99 (+2.82%)	3,600	3,501	3,353
Crush	41,000	+500 (+1.23%)	+1,099 (+2.75%)	40,500	39,901	40,435
Total Distribution	126,400	+3,421 (+2.78%)	+10,565 (+9.12%)	122,979	115,835	113,325
Ending Stocks	20,800	+1,421 (+7.33%)	+2,750 (+15.23%)	19,379	18,050	18,925
Area Harvested	33,900	0.0 (0.0%)	+600 (+1.80%)	33,900	33,300	32,100
Yield	3	0.0 (0.0%)	0.0 (0.0%)	3	3	3

Oilseed, Soybean. Argentina. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	55,500	0.0 (0.0%)	-1,300 (-2.28%)	55,500	56,800	61,400
Beginning Stocks	31,950	0.0 (0.0%)	+34 (+0.10%)	31,950	31,916	25,271
Imports	1,000	0.0 (0.0%)	+325 (+48.14%)	1,000	675	2
Total Supply	88,450	0.0 (0.0%)	-941 (-1.05%)	88,450	89,391	86,673
Exports	9,000	0.0 (0.0%)	-920 (-9.27%)	9,000	9,920	10,573
Domestic Consumption	49,750	0.0 (0.0%)	+2,229 (+4.69%)	49,750	47,521	44,184
Feed Waste Dom. Cons.	4,450	0.0 (0.0%)	+159 (+3.70%)	4,450	4,291	4,167
Crush	45,300	0.0 (0.0%)	+2,070 (+4.78%)	45,300	43,230	40,017
Total Distribution	88,450	0.0 (0.0%)	-941 (-1.05%)	88,450	89,391	86,673
Ending Stocks	29,700	0.0 (0.0%)	-2,250 (-7.04%)	29,700	31,950	31,916
Area Harvested	19,000	0.0 (0.0%)	-530 (-2.71%)	19,000	19,530	19,340
Yield	3	0.0 (0.0%)	0.0 (0.0%)	3	3	3

Oilseed, Soybean. China, Peoples Republic of. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	12,900	0.0 (0.0%)	+1,115 (+9.46%)	12,900	11,785	12,154
Beginning Stocks	16,910	0.0 (0.0%)	-99 (-0.58%)	16,910	17,009	13,848
Imports	87,000	+1,000 (+1.16%)	+3,770 (+4.52%)	86,000	83,230	78,350
Total Supply	116,810	+1,000 (+0.86%)	+4,786 (+4.27%)	115,810	112,024	104,352
Exports	150	0.0 (0.0%)	+36 (+31.57%)	150	114	143
Domestic Consumption	101,100	+300 (+0.29%)	+6,100 (+6.42%)	100,800	95,000	87,200
Food Use Dom. Cons.	11,300	0.0 (0.0%)	+500 (+4.62%)	11,300	10,800	10,200
Feed Waste Dom. Cons.	3,300	+300 (+10.00%)	+400 (+13.79%)	3,000	2,900	2,500
Crush	86,500	0.0 (0.0%)	+5,200 (+6.39%)	86,500	81,300	74,500
Total Distribution	116,810	+1,000 (+0.86%)	+4,786 (+4.27%)	115,810	112,024	104,352
Ending Stocks	15,560	+700 (+4.71%)	-1,350 (-7.98%)	14,860	16,910	17,009
Area Harvested	7,200	0.0 (0.0%)	+694 (+10.66%)	7,200	6,506	6,800
Yield	2	0.0 (0.0%)	0.0 (0.0%)	2	2	2

Oilseed, Soybean. India. `000 MT

Attribute	16/17 Mar '17	Month Change	Year Change	16/17 Feb '17	15/16	14/15
Production	11,500	0.0 (0.0%)	+4,375 (+61.40%)	11,500	7,125	8,711
Beginning Stocks	234	0.0 (0.0%)	+34 (+17.00%)	234	200	600
Imports	20	0.0 (0.0%)	-33 (-62.26%)	20	53	11
Total Supply	11,754	0.0 (0.0%)	+4,376 (+59.31%)	11,754	7,378	9,322
Exports	150	0.0 (0.0%)	+16 (+11.94%)	150	134	234
Domestic Consumption	10,304	0.0 (0.0%)	+3,294 (+46.99%)	10,304	7,010	8,888
Food Use Dom. Cons.	400	0.0 (0.0%)	+40 (+11.11%)	400	360	340
Feed Waste Dom. Cons.	904	0.0 (0.0%)	+54 (+6.35%)	904	850	848
Crush	9,000	0.0 (0.0%)	+3,200 (+55.17%)	9,000	5,800	7,700
Total Distribution	11,754	0.0 (0.0%)	+4,376 (+59.31%)	11,754	7,378	9,322
Ending Stocks	1,300	0.0 (0.0%)	+1,066 (+455.55%)	1,300	234	200
Area Harvested	11,400	0.0 (0.0%)	-200 (-1.72%)	11,400	11,600	10,911
Yield	1	0.0 (0.0%)	0.0 (0.0%)	1	1	1

Flies Fed Sugar-Rich Diets Are Damaged for Life, and Die Faster

UCL scientists found that no matter the healthy interventions of the future, flies previously fed on a high-sugar diet died earlier, as the activity of a gene associated with longevity was repressed by sugar over the long term.

The recommended daily intake of sugar for an adult with a normal body mass index is about 25 grams per day, or about 5 percent of your daily calorie intake, according to the World Health Organization. A single can of Coke has 39 grams of sugar.

Sugar, often found in 'innocent' foods like fat-free salad dressings or multi-grain cereals, leads to higher cholesterol, heart disease, obesity, uncontrolled growth and multiplication of cells, diabetes, metabolic syndrome and more. A logical debate has ensued about whether it should be considered white gold or white poison.

Ironically, first-world countries, where information flows abundant, like the US, Germany or the Netherlands, still consume 126, 103 and 103 grams of sugar on a daily basis respectively, occupying the three first places on the list of the top 10 sugar-consuming countries in the world.

Timelier than ever, research from the University College London, which was published in the January issue of the journal Cell Reports, now rings the alarm bells for one more overlooked danger of eating sugar at face value: Sugar over-consumption may bear long-lasting effects even after a healthy diet has been adopted.

The research team, comprising scientists from UCL and Australia's Monash University, compared the lifespans of female flies fed on a diet containing 5 percent sugar (a healthy one) to flies given eight times this amount. Both groups of flies were fed for three weeks before going on a healthy diet.

The team found that no matter the healthy diet in the later stage, the flies previously fed a high-sugar diet started to die earlier, and on average had 7 percent shorter lifespans (flies live up to 90 days).

At a molecular level, this was attributed to a "gene reprogramming" caused by the sugar-rich diet consumed in early adulthood. In a nutshell, sugar repressed the activity of a type of gene associated with longevity, FOXO.

"FOXO is a type of gene called a transcription factor," Adam Dobson, a researcher at the UCL's Institute of Healthy Ageing explained to Olive Oil Times.

"Transcription factors are interesting because they regulate other genes. So, if you change the activity of a transcription factor, in this case, by eating a high-sugar diet, you can indirectly change the activity of many other genes and cause extensive secondary effects."

"We don't know yet precisely what happens downstream of FOXO," Dobson said, "but we think it is probably one of these secondary effects, with FOXO regulating genes which change the physical structure of DNA. This might explain the reprogramming of gene expression and lifespan, because the structure of DNA can affect which genes are turned on or off."

"Importantly, flies and worms that don't have FOXO don't appear to be reprogrammed by sugar," Dobson added.

With the FOXO gene contributing to longevity in a wide variety of species including humans, the UCL study's findings are salient for our understanding of how changes in diet and gene expression are related to the pace of ageing.

Would it be arbitrary or premature to claim the damage too much sugar does to our organisms is irreversible?

"We can't say anything about humans for certain because we have only looked in flies and worms," said Dobson. "But we have shown that those organisms do bear long-term molecular implications of their past diets, because of sugar suppressing FOXO.

"There is some evidence that FOXO is important for human longevity and we know that sugar consumption is rocketing in humans. So while we don't know if what we have shown in flies and worms is also true for humans, all the pieces are there."

Courtesy: Olive Oil Times

What's chocolate, and how does its chemistry inspire such cravings?

Hundreds of chemicals make chocolate so delicious, and it was once a currency you could eat.

Eating your body weight in chocolate in the course of a few years may sound borderline obsessive, but in Switzerland that's par for the course.

The Swiss eat an average of 9 kg of chocolate per person every year. Folks in Germany and the U.K. aren't far

behind; they annually consume about 8 kg and 7.5 kg of chocolate per person, respectively. Americans, by comparison, seem to be dieting. Each year, they eat only about 4.5 kg of the creamy treat.

Chocolate isn't just a delicious comfort food; it's also a complex mixture: Every scrumptious square contains some 800 compounds, explains retired Nestlé scientist Stephen T. Beckett in the book "The Science of Chocolate." The treat is also big business—about $100 billion in worldwide sales in 2016, according to industry analysts.

Cacao, the key component of chocolate, comes from beans that grow in pods on Theobroma cacao, better known as the cacao tree. The tree is a native of the tropical regions of South and Central America, but it is also cultivated in West Africa and Southeast Asia.

We can thank the Aztecs and their contemporaries in Mexico and Central America for discovering the cacao tree's delights, explains Cornell University anthropologist John S. Henderson. In the 16th century, Spanish explorers brought cacao pods back to Europe and beyond; the world has been devouring chocolate ever since.

Mesoamericans have been making beverages from components of the cacao tree since at least 1150–1200 B.C.E. Pottery from that era features traces of a stimulating cacao plant molecule similar to caffeine called theobromine, Henderson says. But because cacao beans aren't the only part of the tree that contains theobromine, the pottery vessels may have contained drinks made from other parts of the tree, such as its bark or leaves. Mesoamericans also used other parts of cacao trees to make chicha, a type of beer, and other nonchocolate cacao drinks.

By 600 C.E., Mesoamericans were refining cacao beans into unsweetened chocolate drinks and using the concoction in religious rituals and social ceremonies connected with births and deaths. Cacao beans were even used as a form of currency—money you could eat, Henderson adds.

Making ancient chocolate drinks required an elaborate preparation process. Not unlike modern cacao processors, Mesoamericans harvested cacao pods, fermented the beans, then dried and often roasted them. Then they ground the beans and mixed the resulting powder with water and flavor additives such as chili peppers.

Modern cacao processors also ferment, dry, and roast cacao beans. Then they grind the beans, forming cacao liquor, a thick, brown liquid that solidifies near room temperature. About 55% of the liquor is cacao butter, a fat consisting of various triglycerides with mainly oleic acid, stearic acid, and palmitic acid side chains.

What manufacturers do next depends on what they're making.

Fat levels in the liquor are too high for making cocoa powder and too low for making so-called eating chocolate. So manufacturers separate cacao butter from the liquor and use it to raise the fat content of eating chocolate. The separation process leaves behind solid cacao. That material is pulverized and used to manufacture drinking chocolate, cocoa powder, and chocolate flavoring used by bakers and candy makers.

Eating chocolate comes in a number of varieties. Manufacturers prepare dark chocolate by mixing the separated cacao butter with cacao liquor and sugar. They use the same ingredients plus dried milk and various flavorings such as vanilla extract or its factory mimic, vanillin, to make milk chocolate. White chocolate contains cacao butter, sugar, and milk, but no chocolate liquor. In all these chocolates, the fat content is typically between 25 and 35%.

Nearly all chocolate contains small quantities of vitamins such as riboflavin as well as trace levels of many metals needed for a healthy diet, including magnesium, potassium, calcium, iron, and copper. Chocoholics will also remind you that their vice is rich in healthy antioxidant compounds such as catechin and epicatechin.

But many of us eat chocolate just because we crave it: That's probably because the treat contains stimulants such as caffeine, theobromine, and the amphetamine-like substance phenylethylamine. Chocolate also contains the cannabinoid molecule anandamide, which likely helps induce cravings. (The active molecule in marijuana is also a cannabinoid.)

Pinpointing what makes chocolate taste like chocolate turns out to be tricky. In each type of chocolate, the aroma compounds affecting taste depend on many parameters, including the origin of the cacao, roasting conditions, and processing techniques, says Kirsteen Rodger, a manager at Nestlé Research in Lausanne, Switzerland.

Roasting converts organic compounds in the beans to a variety of flavorful products. For example, it turns amino acids, which tend to be tasteless and odorless, into 3-methylbutanal, phenylacetaldehyde, and other aldehydes that are key components of chocolate's familiar aroma. The relative concentrations of these and other compounds found in the cacao pod or formed

during roasting determine the overall perception of chocolate flavor, Rodger says.

So-called fat blooms also affect people's perceptions of chocolate flavor. That term refers to the unappealing white or grayish film that sometimes appears on chocolate and ruins its appearance, taste, and texture. Created by fat molecules that migrate from the chocolate's interior and recrystallize on the surface, the blooming process causes big headaches for confectionaries.

New clues for controlling the old problem came from a recent X-ray scattering study. It shows that as fats and oils migrate through pores in chocolate's interior, they ruin cacao butter's crystalline structure, which is key to chocolate's prized texture. The study suggests that reducing chocolate's porosity during processing could reduce blooming.

One sure way to alter chocolate's crystal structure is to pop a piece in your mouth and slowly let it melt. That experiment, best done while concentrating on the rich assortment of flavor compounds, is one you can safely try at home.

Courtesy: Chemical & Engineering News

This Kind of Fat Lowers Your Risk For Diabetes

Not all saturated fats are created equal, it appears. A pair of new studies suggests that certain sources of saturated fat may be worse than others—especially when it comes to raising risk for type 2 diabetes.

In one study, published in the American Journal of Clinical Nutrition, researchers from Harvard University and the Universitat Rovira i Virgili in Spain tracked 3,349 Spanish adults for about 4.5 years. Overall, they found that people who consumed higher amounts of saturated fats and animal fats were twice as likely to develop diabetes than those who consumed a lower amount.

When the researchers broke down the results by specific food type, the consumption of butter (at 12 grams a day) and cheese (at 30 grams a day) were both linked to an increased risk of diabetes. On the other hand, people who ate whole-fat yogurt actually had a lower risk than those who didn't.

The researchers have several explanations for these findings. Yogurt contains healthful ingredients, like probiotics and protein, that may have protective effects when it comes to diabetes risk, says lead author Marta Guasch-Ferre, a nutrition research fellow at the Harvard T.H. Chan School of Public Health. Even though the results were adjusted to account for other food intake, unhealthy eating patterns may have influenced them. "Butter and cheese often come with carbohydrates, like toast or crackers," Guasch-Ferre says. Plus, people who eat more yogurt tend to have better diets than those who don't, she adds.

The study did not find any significant links between diabetes risk and consumption of red meat, processed meat, eggs or whole-fat milk. That was a surprise to the researchers, who suspect that other factors may have diluted these results. They point out that dietary patterns in Spain are different than those in the United States, and that many of the study participants were following a Mediterranean diet, so these findings may not apply to someone following a typical American diet.

"It's safe to say, based on the findings of other studies, that processed meat and red meat are associated with cardiovascular disease and other chronic disease risks," says Guasch-Ferre. "We know it's beneficial to reduce the intake of these meats and to replace them with healthy fats from plant sources like nuts and olive oil."

However, just because a fat may come from a plant doesn't make it healthy. Palm oil, used in a lot of processed foods, is very high in saturated fat. In another recent study, scientists demonstrate how even one dose of palm oil can affect metabolism and reduce the body's sensitivity to insulin.

For this research, published in the Journal of Clinical Investigation, German scientists asked 14 healthy men to drink either a glass of plain water or a drink made with palm oil that contained as much saturated fat as a cheeseburger and French fries. When the participants drank one of these beverages, they experienced a reduction in insulin sensitivity, an increase in fat deposits in the liver and changes in their metabolism similar to those experienced by people with diabetes.

For healthy people, the authors say, the occasional fatty meal likely won't cause any permanent damage. But people who regularly eat foods high in palm oil or other saturated fats may face bigger long-term consequences, like chronic insulin resistance and fatty liver disease. Both are risk factors for diabetes.

The American Heart Association recommends that no more than 10% of total calories come from saturated fat and encourages consumption of unsaturated fats and carbohydrates from vegetables, fruits, whole grains, nuts and legumes. Based on recent research, says Guasch-Ferre, these recommendations seem to be just as important for diabetes risk as they are for heart health—and not just because fatty foods can cause

weight gain.

“I think it’s probably more that saturated fats have harmful effects on insulin resistance and other markers of inflammation, more than weight gain,” she says. More research is needed, she adds, to fully understand the connection or to make clear recommendations about specific foods.

Courtesy: Time Health

Nuts and olive oil.”

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Courtesy: Reuters

Loss of microbial gut diversity a threat to health?

Our health is closely linked to the diversity of microbes in our gut.

Our bodies are made up of nearly equal numbers of human and microbial cells. These tiny passengers are vital for our health but are dwindling in number. The human gut is home to bacteria, viruses, fungi, and small worms in some parts of the world. While the average person's body contains 30 to 40 trillion human cells, bacteria add another 38 million to this number.

Our microbiome - which is the total collection of all the genes that microbes contribute to our bodies - and our immune system are intricately linked.

Without our microbial passengers, our immune systems would not develop, which is what happens to mice that grow up in germ-free environments. Modern life affects the microbes that live in our gut. This poses a threat to our health. With the advent of modern molecular biology techniques, scientists have started to shed light on how our microbiome develops and which factors are detrimental to our health.

What is in the human gut?

The level of variation in the gut microbiome between different people and locations across the globe is astonishing.

While over 1,000 different bacterial species have been found to exist in the human gut, each individual is thought to harbor only around 160 of these.

For years, scientists tried to identify a list of bacterial species that were associated with health. More than 1,000 species of bacteria have been found to exist in the human gut. Today, some believe that a core set of metabolic and molecular processes are at the heart of a healthy gut. Which species support these processes is less relevant than how well they are working together.

The hallmark of this functional core of gut bacteria is a set of genes that promote long-term residence in the gut and active contribution to human metabolic function. Specifically, these microbes aid digestion, as well as the production of vitamins, hormones, and essential amino acids. Diet is a major player in determining which microbes take up residence in our guts long-term. A Western diet, high in fat and refined sugars but low in fiber, is thought to reduce microbial diversity. This can have detrimental effects on health.

A study published in the journal Nature investigated the mechanism. When mice were fed a low-fiber diet for 4 weeks, the levels of 60 percent of microbial species

decreased significantly. About half of these returned to normal levels when the mice were switched back to a high-fiber diet. But even a short burst of such an unhealthful diet left long-lasting effects, or "scars," on the microbial diversity, as the researchers pointed out.

More importantly, the loss of diversity became permanently established within four generations when the mice continued to consume a low- fiber diet.

What effect does a loss of microbial diversity have on our health? And how do we come by our tiny passengers in the first place?

The origins of the human microbiome

For many years, scientists assumed that gut of the developing fetus was sterile, meaning it does not contain any microbes. However, there is evidence from research using mouse models that the amniotic fluid that surrounds the growing fetus contains some microbial species. These can be detected in the new-borns first poop, the meconium. On the list are Firmicutes, particularly lactic acid bacteria.

How a baby is born affects their early microbiome. The first big wave of microbial colonization occurs during birth when microbes from the birth canal and vagina are passed to the baby. When babies are born by caesarean delivery, their microbiota is more akin to that of the mother's skin. There is some evidence that this is linked to development of eczema, asthma, and celiac disease later in life.

Microbes that aid in milk digestion, such as Bifidobacterium and some lactic acid bacteria, dominate the microbiome during the first few months after birth. There is a clear difference between individuals who received breast milk and those who received formula milk. Breast milk itself has been shown to be a rich source of microbes and molecules that have anti-inflammatory properties.

Once a solid diet is introduced, the microbial species that populate the gut change significantly. Bifidobacterium is replaced with Bacteroides and Firmicutes, as they are required to help with the breakdown of more complex carbohydrates and the production of vitamins.

By the time children reach the age of 3 years, their microbiome is fully established and thought to remain relatively stable for life.

Bacteroides and Firmicutes dominate the microbiota of children who have grown up in highly developed countries or regions within countries. In contrast, Prevotella are at the top of the list in children from less developed regions. This can affect lifelong immunity and health.

Changes in gut microbiome

Allergic diseases that develop during childhood, such as eczema, asthma, and allergies, have been linked to low bacterial diversity, particularly to low abundance of Bifidobacterium and higher levels of fungi, such as Candida.

The incidence of food allergies has been steadily rising. Although research in this field is still mostly in its infancy, there are some studies that show a difference in the microbial diversity in the gut of children with food allergies compared with those without.

Peanut allergy could be cured with probiotics

Find out how a peanut allergy treatment that includes a probiotic Lactobacillus is revolutionizing children's health.

Neuronal and hormonal molecules produced in the gut convey messages to the brain. If communication along this gut-brain axis is perturbed, due to a change in the microbiota, the brain can be affected.

Female mice, which were fed a fast food-style diet, produced offspring with behaviors similar to that seen in autism-spectrum disorders (ASD).

Recent research points to a possible mechanism. High levels of Ruminococcus in young pigs were indicative of serum cortisol levels and lower concentrations of the neurotransmitter n-acetyleaspartate (NAA). Abnormal NAA levels have previously been linked with ASD.

The gut microbiome and disease

But the influence of our microbiome doesn't stop in childhood. There is increasing evidence linking our gut flora to diseases in later life.

Chronic fatigue syndrome (CFS) is on this list.

Interestingly, up to 90 percent of people with CFS also have irritable bowel syndrome (IBS), which is associated with changes in the gut microbiota.

Recent research identified the specific gut microbe profiles of individuals with CFS and IBS and those with CFS without IBS. This knowledge may allow scientists to develop specific probiotic interventions to address the microbial imbalances associated with CFS and IBS. Our microbiome is also thought to play a role in cancer. Changes in microbial diversity have been linked to bowel

cancer and breast cancer.

Whether this is a cause or a side effect of cancer growth is as yet unclear. But research in mouse models points to certain bacterial species playing an active role in tumordevelopment by driving inflammation and DNA damage.

The detrimental effects that the microbial profile of an individual's gut may have one health are coming increasingly clear. But is there light at the end of the tunnel?

Will probiotics stave off the looming threat?

Research to date has mostly focused on the effect that probiotic bacteria, or "good bacteria" have on certain diseases. A recent study showed that after adding Lactobacillus reuteri to the diet of mice that displayed ASD-like symptoms, their behavior returned to normal.

L. reuteri was also effective in reversing depression-like symptoms in mice that had previously been exposed to stress. Certain foods, like yogurt and kefir, contain probiotic bacteria. While Lactobacillus are one of the best known probiotic species, and some are widely available in foods or as supplements, there are others that harbor the potential to improve health.

In a mouse model of multiple sclerosis (MS), Prevotella histicola, isolated from human intestine, was able to suppress the development of MS.

The researchers showed that P. histicola lead to a reduction in inflammatory cells, accompanied by an increase in anti-inflammatory cells. High levels of Prevotella are known to be a hallmark of a high-fiber diet.

The metabolic products of some gut bacteria have even been shown to protect against type 2 diabetes and better health in later life. Whether probiotics are an effective treatment for eczema is still unclear, although there is some evidence that risk of developing eczema is lower in children whose mothers consumed probiotics, including Lactobacillus and Bifidobacterium, during pregnancy.

While we may be some way off an easy probiotic fix for all health problems, it is clear that research is now increasingly focused on finding those bacteria that can contribute to the prevention or treatment of common diseases.

In combination with a healthful diet that promotes bacterial diversity, a new area of symbiosis between man and microbe might be upon us.

Courtesy: Medical News Today

Cinnamon Essential Oil

What Is Cinnamon Essential Oil?

The cinnamon essential oil is extracted through the steam distillation of the cinnamon leaf or bark. There are primarily two types of cinnamon essential oil:

a) **Cinnamon Leaf Essential Oil**

This yellowish essential oil is derived from the leaves of the cinnamon shrub.

b) **Cinnamon Bark Essential Oil**

As the name suggests, this reddish-brownish oil is derived from the bark of the cinnamon shrub.

In 2014, global production of cinnamon was 213,678 tonnes, with four countries combining for 99% of the world total: Indonesia (43%), China (33%), Vietnam (15%), and Sri Lanka (8%).

Cinnamon leaf oil is obtained by steam distillation of cinnamon leaves and the oil yield ranges between 0.5% and 1.8%. More than 47 compounds have been identified from the leaf oil, the most significant being eugenol, which constitutes 65–92% . Cinnamon leaf oil is cheaper than bark oil and is used in the flavor industry, to a lesser extent, to flavor confectionary. It is also used as a source of eugenol for the preparation of synthetic vanillin. Cinnamon oleoresin obtained by solvent extraction is a dark brown extremely concentrated and viscous liquid, closely approximating the total spice flavour and containing 50% or more volatile oil. It is used mainly for flavouring food products such as cakes and confectionary. Ground spice has been replaced by oils and oleoresin in food industry.

Apart from having different chemical compositions, both these essential oils mostly serve the same health benefits.

Therapeutic Properties of Cinnamon Essential Oil

1. Antibacterial
2. Astringent
3. Antiseptic
4. Immunostimulant
5. Detoxifying Agent
6. Carminative
7. Analgesic
8. Antifungal
9. Antidepressant
10. Galactagogue

Health Benefits

11. Boosts Brain Function
12. Improves Blood Circulation
13. Anti-Inflammatory
14. Antioxidant
15. Respiratory Problems
16. Heart Diseases
17. Diabetes
18. Mouth Freshener
19. Indigestion
20. Pain Relief
21. Arthritis
22. Toothache
23. Irregular Menstruation
24. Birth Control
25. Regularizes Urine Discharge
26. Increases Sexual Desire
27. Emotional And Spiritual Benefits
28. Helps In Weight Loss
29. Reduces Ulcers
30. Fights Parasite Development
31. Soothes Sore Throat
32. Treats Headaches
33. Effective Functioning Of Kidneys

Hair Benefits

34. Promotes Hair Growth
35. Reduces Hair Problems

Skin Benefits

36. Heals Skin
37. For Fuller Lips

Miscellaneous Benefits

38. As An Insect Repellent
39. Works As A Home Deodorizer
40. Used In Perfumes

Cinnamon Essential Oil Therapeutic Properties

1. **Antibacterial**

   This particular property makes cinnamon essential oil a key ingredient in aromatherapy to get rid of airborne bacterias (1).

2. **Astringent**

   Topical application of this oil helps in tightening of the skin (2).

3. **Antiseptic**

   The antiseptic property of cinnamon not only cures wounds but also prevents fatal septics (3).

4. **Immunostimulant**

   Helps in enhancing the immune system (4).

5. **Detoxifying Agent**

   Cinnamon essential oil is full of volatile compounds that help in detoxifying the body (5).

6. **Carminative**

   Helps eases bloating by helping the passage of intestinal gas (6).

7. **Analgesic**

   This essential oil helps in relieving pain (7).

8. **Antifungal**

   Cinnamon essential oil is known to be a powerful anti-fungal agent (8).

9. **Antidepressant**

   The calming property of cinnamon essential oil can remove negative thoughts thereby killing depression (9).

10. **Galactagogue**

    It even enhances the production of breast milk in new mothers (10).

Health Benefits Of Cinnamon Essential Oil

11. **Boosts Brain Function**

    Cinnamon essential oil is an excellent brain tonic. It not only improves brain function and increases brain activity, but also helps you combat stress, anxiety and memory loss.

    Studies conclude that the essence of cinnamon helps boost brain activity. People who sniffed cinnamon essential oil exhibited better cognitive activities like an increased attention span, better virtual recognition memory, working memory and visual-motor response speed (11).

12. **Improves Blood Circulation**

    Cinnamon helps improve blood circulation. Cinnamon contains blood thinning compounds that enhance blood circulation. Better blood circulation means lesser pain and more oxygenation. This property also benefits people who suffer from arterial diseases and prevents heart attacks. To prevent heart attacks, consume around 3 ml of cinnamon essential oil every day (12).

13. **Anti-Inflammatory**

    Cinnamon is a potent anti-inflammatory agent, and it helps reduce the stiffness of muscles and joints. People with arthritis and other inflammatory disorders should consume cinnamon essential oil to get relief (13).

14. **Antioxidant**

    Cinnamon essential oil exhibits potent antioxidant properties. These properties make it an ideal remedy for skin diseases, acne and even potentially fatal conditions like cancer. Antioxidants help purge cancerous cells and damage-inducing free radicals from your body (14).

15. **Respiratory Problems**

    Cinnamon essential oil is an excellent decongestant; it helps alleviate symptoms of cold, influenza, sore throat and congestion. Sniffing or even consuming a few drops of this oil can help relieve the symptoms of respiratory conditions. Cinnamon is a potent antifungal and also helps kill respiratory tract fungi that lead to respiratory tract mycoses (15).

16. **Heart Diseases**

The Cinnamon essential oil contains a good amount of calcium and fiber, which help protect you against heart diseases and other complications. Fiber also helps improve digestion, while calcium promotes bone health. So, include a little cinnamon essential oil in your food, as it will help you prevent coronary artery diseases and high blood pressure (16).

17. **Diabetes**

Cinnamon essential oil can help you control blood sugar, which makes it an effective remedy for people with diabetes.

Research indicates that cinnamon helps regulate blood sugar levels. Cinnamon contains a little-known water-soluble polyphenol (MHCP) that supports insulin and reduces the risk of diabetes (17).

18. **Mouth Freshener**

Cinnamon essential oil features in chewing gums and other mouth freshener products. It helps promote tooth health and reduces bad breath (18).

19. **Indigestion**

Cinnamon is used in many ethnic recipes. Apart from imparting flavor to your food, it is an effective remedy for treating stomach problems like indigestion, nausea, vomiting, upset stomach, diarrhea, and flatulence. As an effective carminative, cinnamon extract oil or cinnamon essential oil helps reduce gas from the stomach and intestines. According to The FDA (Food and Drug Association) cinnamon reduces acidity, combats diarrhea, indigestion, nausea, and other related stomach disorders (19).

20. **Pain Relief**

This essential oil plays a key role in alleviating pains including muscle pulls, aches or even stiffness of the joints (20).

How To Use

Mix 3 drops of cinnamon essential oil to 2 spoons of carrier oil (of your choice) and let it dilute. Use the resultant to massage the area of ache. But test it before applying on sensitive skin. Regular usage of this oil helps soothe stress-related aches, muscle knots, and back pain.

21. **Arthritis**

Cinnamon essential oil when used with other anti-rheumatic essential oils brings great relief to arthritis patients (21).

How To Use

Take 4-5 drops of this essential oil and mix it with base oil (coconut or mustard oil) and warm it for some time. Arthritis patients are advised to massage the painful joints every day using this blend of oil.

22. **Toothache**

The presence of high amount of eugenol makes cinnamon leaf essential oil to work wonders against a toothache and gum troubles. This makes it a good substitute for clove essential oil (22).

How To Use

Place a ball of cotton containing a few drops of cinnamon essential oil between your teeth. This can soothe the aching tooth and bring down the pain.

23. **Irregular Menstruation**

Did you know that the sweet smelling cinnamon essential works wonders for menstrual problems? It helps in soothing the cramps that are evident during these days and also makes way for regular menses (23).

24. **Birth Control**

Surprisingly, using cinnamon essential oil is considered to be a natural way for birth control (24).

25. **Manages Regular Urine Discharge**

The diuretic property of cinnamon essential oil helps in the normal and regular discharge of urine (25).

26. **Increases Sexual Desire**

Cinnamon essential oil is an aphrodisiac and thus

helps in arousing sexual desire in men and women alike. (26).

27. **Emotional And Spiritual Benefits**

Did you know that cinnamon oil is related to lower chakras? This mainly increases the self-acceptance, self-confidence and clearing of trauma in human beings by elevating the sense of belongingness and security.

NOTE: If you are allergic to cinnamon essential oil, try using its substitutes such as Cassia, Cypress, Wintergreen, Wild Orange or Frankincense essential oil.

28. **Helps in Weight Loss**

We all know that fluctuating blood sugar levels paves the way for irregular eating habits, over-eating and desires to eat sweet. Cinnamon has been named recently to be one of the sugar controlling and fat-burning elements. Adding cinnamon essential oil in foods like cookies and tea helps slow down the release of glucose in the blood, thus leading to weight loss (27).

29. **Reduces Ulcers**

The presence of eugenol in cinnamon essential oil helps in soothing the pain from all types of ulcers in the body; especially that are a result of poor eating habits. It also helps in curbing the intensity of ulcer relapse in the mucous membrane (28).

30. **Fights Parasite Development**

Cinnamon essential oil when used with other oils like oregano, thyme and cumin, is known to diminish the growth of harmful parasites, especially mycelial parasites, in the body. (29)

31. **Soothes Sore Throat**

Inhalation of this oil helps in clearing mucus filled nasal passage and curbs mucus buildup too. Also, when had with warm lemon water and honey, cinnamon essential oil helps in soothing the inflammation and alleviating pain, thus soothing sore throats (30).

32. **Treats Headaches**

Diffusing of cinnamon essential oil in the room or even a few drops on the pillow helps relieve headaches. This is due to the presence of volatile compounds in this essential oil that helps in proper blood circulation (31).

33. **Effective Functioning Of Kidneys**

This oil has proven to be effective in promoting the effective functioning of kidneys, thus preventing any damage induced by alloxan and environmental toxins. It also helps shoo away Urinary Tract Infections (UTI) that are painful for both women and men. The antifungal and antimicrobial properties of cinnamon are capable of killing these infections (32).

How To Use

Take a warm bath with essential oils, such as cinnamon, eucalyptus and tea tree oil, in the bath water. This method is known to provide instant relief from the conditions.

Benefits Of Cinnamon Oil For Hair

34. **Promotes Hair Growth**

Including a few drops of cinnamon essential oil in the hair mask promotes proper blood circulation in the scalp by providing vital nutrients to hair follicles, thus promoting hair growth (33).

35. **Reduces Hair Problems**

The antiviral, antifungal, antimicrobial and antibacterial properties of cinnamon essential oil due to the presence of compounds such as eugenol and cinnamaldehyde helps in diminishing all hair related troubles including dandruff and itchiness (34).

How To Use

Add 2-3 drops of cinnamon oil to your regular hair oil and massage through your scalp. Shampoo after 2-3 hours for best results.

Cinnamon Essential Oil Skin Benefits

Check out the best benefits of cinnamon essential oil for your skin.

36. **Heals Skin**

This essential oil works wonder in soothing skin

conditions like ruptures, rashes, acne due to its high microbial property (35).

How To Use

Mix a few drops of cinnamon essential oil with the soothing carrier oil like coconut oil and apply to the harmed area. It will start showing its effect within a few days.

37. **For Fuller Lips**

How cinnamon oil for lips is effective? When mixed with cassia essential oil, cinnamon essential oil makes your lips naturally swell thus making it look more fuller and appealing. Now you know how to get sexy lips at home (36).

Cinnamon Essential Oil Miscellaneous Benefits

38. **As An Insect Repellent**

Studies show that cinnamon leaf essential oil is one of the most powerful anti-insect solutions. The naturally sweet and spicy aroma does not affect the human beings but is fatal to the mosquito larvae (37).

39. **Works As A Home Deodorizer**

You know what makes your Christmas plum cake smell good right? Well, a pinch of the sweet-spicy cinnamon makes the cake all the more delicious. So you can imagine the effect of the cinnamon smell.Its deodorizing capabilities cannot be denied.

40. **Used In Perfumes**

Unsurprisingly, cinnamon essential oil is used in a plethora of perfumes owing to its addictive aroma (38).

How To Use Cinnamon Essential Oil

1. **In The Diffuser**

The warmth and sweet aroma imparted by cinnamon essential oil help in opening of your heart and mind. You can very well diffuse a combination of cinnamon oil and others for soothing of mind and the soul.

2. **As Massage Oil**

A massage oil made out of cinnamon essential oil as a base works wonders in relieving muscle and joint pain.

After knowing the cinnamon essential oil benefits and its best uses, now know the recipes using cinnamon oil.

Effective Skincare Recipes Using Cinnamon Essential Oil

Who doesn't like to use homemade and effective face masks for skincare? Here are a few easy to make and DIY cinnamon oil recipe you can note and use.

1. **Honey And Cinnamon Oil Face Wash**

Try this natural and homemade face wash that will bring out the inner glow.

What You Will Need

- 1 tablespoon coconut oil
- 3 tablespoons honey (preferably raw)
- 1 tablespoon apple cider vinegar
- 15-20 drops cinnamon essential oil
- 2 capsules of live probiotics (if you have them)

How To Make

Mix all the ingredients using a hand blender till it's a smooth paste and your face wash is ready to use. Bottle it up and keep in a cool place for prolong usage.

2. **Frankincense And Myrrh Body Lotion**

This particular lotion is full of vitamins and is known to hydrate the skin well.

What You Will Need

- 1/4 cup olive oil
- 1/4 cup coconut oil
- 1/4 cup Beeswax
- 1/4 cup shea butter
- 2 tbsp Vitamin E
- 20 drops frankincense essential oil
- 20 drops myrrh essential oil
- 20 drops of cinnamon essential oil

How To Make

Start by using the base oils, beeswax and shea butter and put them in a glass bowl. Now, place

the bowl in a saucepan with water and heat it on a medium flame. Refrigerate the mixture at least for an hour for solidification. Take it out and whip it till it's fluffy and add essential oils and vitamin E to the mix. Fill the lotion in a bottle and store in a cool place.

Cinnamon Oil Dangers

Being very concentrated in nature, a lot of precautions are required to be taken before making use of cinnamon essential oil. Here are a few important ones to keep in mind:

- Always dilute with other carrier oils
- This oil is not safe for kids under the age of 6
- Using the product without proper dilution can lead to burns and skin sensitivity
- Do not inhale the product directly from the bottle as it may cause irritation in the nasal passages.
- Try testing the sensitivity on your feet before using it on the problem area. Do not, I repeat, do not overuse as it can cause serious troubles.
- Avoid contact with eyes, nose, and ears.

Time for you to use cinnamon essential oil and enjoy its incredible health benefits. You can get it at a local convenience store near you. Choose a variety that is good in quality, even if it is a tad more expensive.

Now that you know all about the benefits of Cinnamon leaf essential oil, what are you waiting for? Tell us if you found this post on cinnamon oil uses useful. Leave a comment below.

In 2008, The European Food Safety Authority considered toxicity of coumarin, a significant component of cinnamon, and confirmed a maximum recommended tolerable daily intake (TDI) of 0.1 mg of coumarin per kg of body weight. Coumarin is known to cause liver and kidney damage in high concentrations and metabolic effect in humans with CYP2A6 polymorphism.[38][39] Based on this assessment, the European Union set a guideline for maximum coumarin content in foodstuffs of 50 mg per kg of dough in seasonal foods, and 15 mg per kg in everyday baked foods.[40]

According to the maximum recommended TDI of 0.1 mg of coumarin per kg of body weight, which is 5 mg of coumarin for a body weight of 50 kg:

	Cinnamomum cassia	**Cinnamomum verum**
milligrams of coumarin/kilograms of cinnamon	100 mg – 12,180 mg/kg	less than 100 mg/kg
milligrams of coumarin/grams of cinnamon	0.10 mg – 12.18 mg/g	less than 0.10 mg/g
TDI cinnamon at 50 kg body weight	0.4 g – 50 g	more than 50 g

Note: Due to the highly variable amount of coumarin in C. cassia, usually well over 1,000 mg of coumarin per kg of cinnamon and sometimes up to 12 times that, C. cassia has a very low safe intake level to adhere to the above TDI.[41]

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!"

● 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.

● 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!!

● The unjust salary theorem asserts that

Scientists can never earn as much as sales people .

The theorem is proved as Follows:-

POWER = WORK/TIME

Probably, you know that knowledge is

also defined as 'Power' and time as 'Money'.

Substitute these into the Formula of power to

obtain KNOWLEDGE = WORK/MONEY

Solving for money, one finds:

MONEY = WORK/ KNOWLEDGE, i.e

'THE LESS YOU KNOW THE MORE YOU EARN'.

● Q:- What is ' IT '?

- Astronomers do IT All night
- NEWTO N did IT with Force.
- MAXWELL did IT with Magnetism
- WATT did IT with Power.
- JOULE did IT with Energy
- OHM did IT with resistance
- PASCA L did IT with Pressure.
- Hertz did IT frequently
- AMPERE let IT flows

For FRANKLIN IT was an Electrifying experience EDISON claims to have invented IT'

● In a Police Station :

ATOM – I would like to report a missing electron.

Policeman :- Are you sure ?

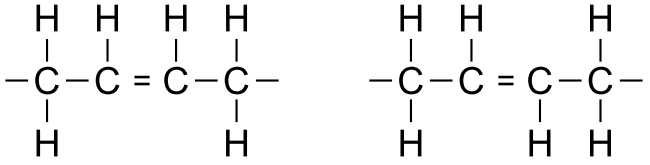
ATOM:- Yes, I am positive.

Member's PAGE

ISOMERIZATION in OILS and Fats

Isomers are compound with identical chemical formulae, but with different molecular arrangement:-

Geometric Isomerization - A double bond can have two configurations: Cis (c) and Trans (t)



(cis)

(trans)

Comparison of Melting point (^{0}C) of cis and trans Isomers

cis Fatty Acid	Melting Point	trans fatty Acid	Melting Point
Linoleic Acid(C 18:3, c, c, c,)	-11^{0}C	Linoleic Acid(C 18:3, c, t, t)	49^{0}C
		Linoleic Acid(C 18:3, t, t, t,)	71^{0}C
Linoleic Acid(C 18:2, c, c)	-5^{0}C	Linoleic Acid(C 18:2, t, t)	56^{0}C
Oleic Acid (C 18:1, c)	14^{0}C	Oleic Acid (C 18:1, t)	44^{0}C

The cis form, generally found in natural fats, is more reactive and requires relatively low activation energy to be changed to trans isomers.

The trans isomers have melting point similar to those for saturated fatty acid e.g. Stearic Acid (C -18:0), 70^{0}C and Palmitic Acid (C- 16:0) ,63^{0}C. So trans Fatty Acid and Saturated fatty acid both can lead to an increase in low-density lipoprotein, Cholesterol (LDLC) in the blood stream. Many dietary guidelines specify recommended maximum daily intake of these fatty acids.

Formation of Geometric Isomers

During hydrogenation, depending on catalyst and process condition Trans Isomers are readily formed. For example hydrogenation of Soybean oil, trans Isomers can rise up to 50% mainly as trans oleic (laidic) acid. Here trans forms of PUFA will be minimum, as linolenic acid is selectively converted to linoleic acid which in turn is selectively converted to oleic acid.

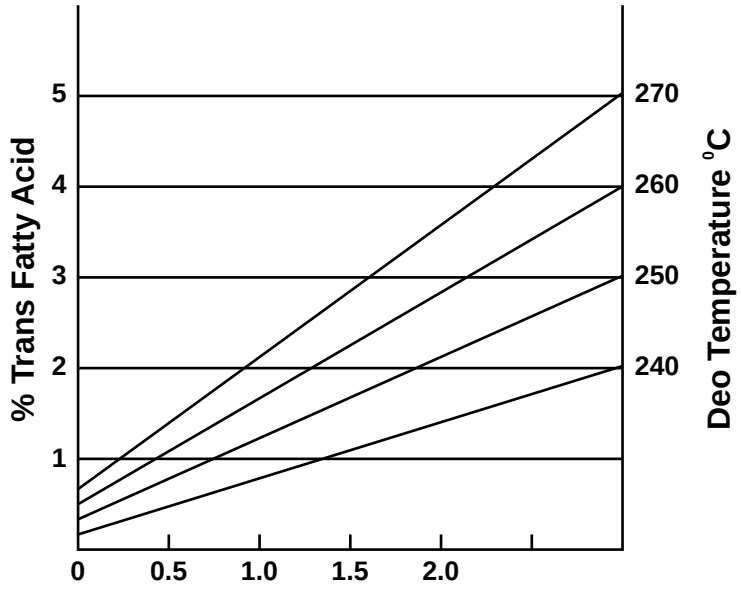
Development of low trans products

Low Trans products are generally manufactured using hard stocks made from interesterified

Blends and saturated fats and non-hydrogenated natural fats can be blended with 80% soya bean , Rapeseed , Sunflower oil etc. This method removes trans acid and The product will be less than 1% trans acid.

Dynamic of Trans acid Formation

It is observed during Deodorization of oils, trans acid formation increases at a higher temperature and higher contact time. See below graph-



Deodorization Temperature

It is analysed that at 240^{0}C and contact time of oil at Deodoriser between 1 to 1.5 hr. can control less than 1% trans.

For Soya bean and Rapeseed oil, recommended temperature of Deodorization, not more than 240^{0}C and for Palm we can go up to 250^{0}C.

It is also observed that packed column Deodorization also called Soft Column Deodorisaton , minimise both Tocopherol losses and formation of thermally Induced geometric isomers

Conclusion

It is studied that very selective partial hydrogenation and low temperature (240^{0}C). deodorization with minimum contact time can reduce the Trans fatty acid in the processed oil.

Now a days" Healthy" margarine and spread products have been developed for on health conscious population. These products are generally low in saturates , Trans fatty acid and high in PUFA.

M.C. Pandey
VICE President
JVL Agro Foods
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