OIL TECHNOLOGISTS' ASSOCIATION OF INDIA

JANUARY 2018 - JUNE 2018

EASTERN REGION

FOR LIMITED CIRCULATION

CONTENTS

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**Prof. R. K. Trivedy has taken over as National President OTAI for the year 2017-2019.*

Editor
S. K. Roy

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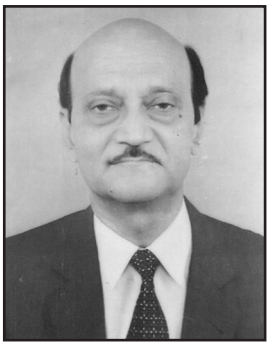
From the Editor's Desk



We are very much concerned about the quality of oil we take. Justifiably so!!

There are various types of Vegetable oils we consume, like Raw, Refined, Partially Hydrogenated, & Hydrogenated. There is ample chance of consuming Trans Fatty acids in the process, depending upon on the type of oil we consume, which is directly responsible for Coronary Heart Diseases.

F.S.S.A.I. has proposed a maximum limit of 2% in the vegoils & fats by weight as part of the goal to make India trans fat free by 2022. However European and Americans are much more stringent on this issue. The Current permitted level of trans Fat is 5% in India. The W.H.O. has communicated and emphasized on the Government's accross the world to totally eliminate the use of Trans Fat from World food supplies by 2023.

Trans fatty acids are made usually through Hydrogenation of oils, which provides the oil with plasticity or hardening depending on the process. It helps to increase shelf life of oils and the food manufactured, like Biscuits, margarines, snacks, crackers and also stabilize their flavours.

The authorities are constantly putting pressure on the Industry to reduce the trans fat and has come to the permitted level of 5% from 10% being permitted earlier. Further it is Mandatory to disclose the % of Trans Fat on the Label of the Food product and I would request the consumers to go through the affixed label and find out the Presence of Trans Fat and of course reject incase of presence higher % of Trans Fat.

In addition we may stop frying at a very high temperature in our day to day food consumption in our kitchen to eliminate the chances of formation of trans fat, in addition other harmful products like Acrylamaide.

Trans fats are responsible to raise the L.D.L. (Low density lipoprotein) or the Bad cholesterol in the Blood, thereby increasing the risk of coronary heart diseases.

Wishing you a Healthy life!!

S. K. ROY
Editor

Ack. The E.T...May'18

About Ourselves

1. Dr. Kakali Bandopadhya, Head & Associate Prof. Guru Nanak Institute of Technology delivered a lecture on “Trans Fat in Junk Food - A receipe of disaster” on the 8th June in OTAI (E.Z.) Lecture Hall.
2. “A certificate course on Awareness Generation in Agriculture Phytochemicals, Food, Nutrition, Food Processing and Enterprenucrship” Jointly organised in collaboration with A.F.S.T, OTAI (E.Z.), N.S.I. (Kolkata) and S.M. MRBRC Kolkata was inaugurated on the 23rd June.

THE ENIGMA OF OMEGA FATTY ACIDS

By

Dr. Surjit Kumar Saha

Chartered Engineer & Oil Technologist

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Edible oils contain three kinds of fatty acids, the Saturated fatty acids (SAFA), Mono-unsaturated fatty acids (MUFA) and the Poly-unsaturated fatty acids (PUFA) depending upon the number of unsaturations sites or double bonds present in them. Thus saturated fatty acids do not contain any double bonds; the monounsaturated fatty acids contain only one double bond while the polyunsaturated fatty acids contain two or more double bonds. The polyunsaturated fatty acids are further classified into two types depending on the number of double bonds present in them. The fatty acids which contain two double bonds are termed as omega-6 fatty acids or linoleic acid while the fatty acids which contain three or more double bonds are terns as omega-3 fatty acids. There are three types of omega-3 fatty acids which are a linolenic acid (ALA) that is found in plant oils, eicosapentaenoic aicd (EPA), and docosahexaenoic acid (DHA) both of which are commonly found in marine oils. The omega-3 and omega-6 fatty acids are essential for human health and are called as the essential fatty acid (EFA) since these are not synthesized in the human body and have to be supplemented through diet.

According to Dr Artemis P Simopoulos, founder and president of the Center for Genetics, Nutrition and Health, Washington DC and other experts on fatty acids, human beings have evolved from a diet where the ratio of omega-6 to omega-3 fatty acids was probably about 1:1; that is, our early ancestors ate as much omega-3 fatty acids as omega-6 fatty acids. But the present generation now consumes far more omega-6 fatty acids that omega-3 fatty acids with ratios as high as 16:1, on an average mainly due to changes in agricultural practices and food processing over the last 100 years or so. Though omega-6 fatty acids are considered “good” fats because they lower LDL (bad) cholesterol, high amounts or very high ratios of omega-6 to omega-3 fatty acids may increase inflammation in the body, which in turn may contribute to heart disease, cancer, asthma, rheumatoid arthritis, and other chronic health problems. It has been found that people who eat a lot of omega-3 fatty acids relative to omega-6 fatty acids, as in Japan for example, have lower rates of cardiovascular disease.

Research carried out in many countries have linked a higher omega-6 to omega-3 fatty acid ratio to an increased risk of depression and bone loss, etc. Excessive amounts of omega-6 fatty acids and consequently a very high omega-6 to omega-3 ratio, as is found

in the present diets mainly due to consumption of junk foods, promote the pathogenesis of many diseases, including cardiovascular disease, cancer, and inflammatory and autoimmune diseases, whereas increased levels of omega-3 fatty acids (a lower omega-6 to omega-3 ratio), exert suppressive effects. Recent research has shown that in the secondary prevention of cardiovascular disease, a ratio of 4:1 of omega-6 to omega-3 fatty acids was associated with a 70 percent decrease in total mortality. A ratio of 2.5:1 reduced rectal cell proliferation in patients with colorectal cancer. The lower omega-6 to omega-3 ratio in women with breast cancer was associated with decreased risk. A ratio of 2:1 suppressed inflammation in patients with rheumatoid arthritis, and a ratio of 3:1 had a beneficial effect on patients with asthma, whereas a ratio of 10:1 and more had adverse consequences.

These studies indicate that the optimal ratio of omega-6 to omega-3 fatty acids may very with the disease which is consistent with the fact that chronic diseases are multigenic and multifactorial. Therefore, it is quite possible that the therapeutic dose of omega-3 fatty acids will depend on the degree of severity of disease resulting from the genetic predisposition. A lower ratio of omega-6 to omega-3 fatty acids is more desirable in reducing the risk of many of the chronic diseases of high prevalence in many countries. The World Health Organization (WHO) recommends polyunsaturated fatty acid (PUFA) to saturated fatty acids (SAFA) ratio of 0.8 to 1.0 and linoleic acid (Omega-6) to alpha linolenic acid (Omega-3) ratio of 5-10 in the diet. The American Heart Association recommends total fat intake to less than 25-35 percent of total calories. A saturated fatty acid intake of not more than 10 percent of total calories, a monounsaturated fatty acid intake in the range of 10-15 percent and polyunsaturated fats upto 10 percent of the total calories.

Experts in this field suggest that a healthier balance between the omega-6 and omega-3 fatty acids should be 4:1 or lower. But the idea that this will protect against illness is still unproven. In its official recommendations for dietary intakes, the Institute of Medicine says that based on limited studies, a reasonable ratio of omega-6 to omega-3 fatty acids is between 5:1 and 10:1. Most people could benefit from more omega-3 fatty acids, which would automatically lower the ratio. That means that earing more fatty fish like salmon, sardines, mackerel, trout, carps, etc rich in EPA and DHA or Linseed, walnut, soyabean and mustard oil rich in ALA would be beneficial for health. Another way to improve the balance of omega-6 to omega-3 fatty acids is to consume more monounsaturated oils such as olive, mustard, sesame and rice-bran oil, which have lower levels of omega-6 fatty acids, in place of some polyunsaturated oils. Monounsaturated fats may have an even more favorable effect on blood cholesterol than polyunsaturated

fats in particular because they are less likely to lower HDL (good) cholesterol. This means that oils having high amounts of omega-6 fatty acids such as sunflower oil, safflower oil, etc. need to be avoided irrespective of the widespread publicity regarding their benefits by vested interests. However, these oils can be used for preparing healthy oil blends with other oils by lowering the omega-6 to omega 3 ratio.

The present generation gets much of their omega-6 fatty acids from processed and fast foods, such as chips, cookies, margarines, and french fries. Thus, a high intake of omega-6 fatty acid is usually a sign of a poor diet. Cutting back on such foods would therefore improve diet, regardless of the ratio of omega-6 to omega-3 fatty acids. However, due to the regression of the healthy dietary ratio of the omega-6 to omega-3 fatty acids over the years due to changes in agricultural technologies coupled with consumption of funk foods by the present generation and considering the dietary recommendations by experts, it would seem for the present to aim for consumption of oils having equal amounts of saturated, mono-unsaturated and poly-unsaturated fatty acids as also equal amounts omega-6 and omega-3 fatty acids in their composition for optimal health. Since such composition cannot be found in a single edible oil, blending of different oils to target the aforesaid optimal ratios appears to be answer and this attributes great significance to the concept of blending of oils for better health. The consumer therefore needs to be educated on top priority in this regards so that they do not fall prey to the widespread misleading publicities by vested interests.

TAILORING THE DIGESTION RATE OF OMEGA-3'S

Olio is an Inform column that highlights research, issues, trends, and technologies of interest to the oils and fats community.

By

Laura Cassiday

Olio is produced by Inform's associate editor, Laura Cassiday. She can be contacted at laura.cassiday@aocs.org.

Incorporating omega-3 fatty acids into foods and beverages presents a challenge: The omega-3's must be protected from oxidative degradation during storage, but then released at the appopriate site within the human gastrointestinal tract (GIT) upon ingestion. Recently, reseachers from Nanchang University, in China, and the University of Massachusetts, in Amherst, USA, encapsulated omega-3 fatty acids in nanoemulsions and microgels and studied their gastrointestinal fates using a simulated GIT (Chen, F., *et al.*, http://dx.doi.org/10.1016/j.foodres.2017.07.039, 2017).

Nanemulsions, a simple and cost-effective way to control omega-3 stability and bioavailability, are tiny lipid droplets coated with an emulsifier and dispersed in an aqueous solution. However, in some applications, the encapsulated bioactive lipid may be degraded too rapidly during storage or released too early within the GIT. For tighter control of the bioactive lipid's stability and release, researchers have previously incorporated nanoemulsions into biopolymer microgels. To prepare microgels, researchers typically mix a nanoemulsion with a biopolymer solution (proteins and/or polysaccharides) to form a particle, and then alter the system conditions to promote polymer gelation. In previous studies, researchers have designed microgels that protect bioactive lipids during longterm storage and then release them in the mouth, stomach, small intestine, or colon. The site of release can be controlled by altering the composition and structure of the microgel to respond to differing conditions within the GIT, such as pH, ionic strength, temperature, or enzyme activity.

In a prior study led by Ze-Yuan Deng at Nanchang University and D. Julian McClements at the University of Massachusetts, researchers showed that the oxidative stability of flaxseed oil, a plant-based source of omega-3 fatty acids, could be greatly improved by encapsulating it in nanoemulsion-loaded alginate microgels (Chen, F., *et al.*, https://doi.org/10.1016/j.foodhyd.2016.09.001, 2017). They also found that the addition of caseinate, a protein from milk that acts as an antioxidant, to the microgels further improved their

oxidative stability. In the new study, the researchers used a simulated GIT to study the digestion and release of omega-3 fatty acids from these delivery systems.

The GIT model simulated the mouth, stomach, and small intestine of the human digestive tract. In this in vitro system, the mouth phase (pH 6.8) contained simulated saliva with 3% mucin, a protein in saliva that acts as a lubricant. The stomach phase (pH 2.5) contained simulated gastric fluid with 0.32% pepsin, a digestive enzyme produced in the stomach. The samples were swirled throughout incubation to mimic the churning action of the stomach. Finally, the small intestine phase (pH 7.0) contained simulated intestine fluid with bile salts (surfactants that aid digestion of lipids) and lipase (an enzyme that catalyzes lipid hydrolysis).

The team prepared four different delivery systems for the encapsulation of flaxseed oil: nanoemulsions (NE), nanoemulsions containing 2% caseinate (NE +C), hydrogel beads composed of alginate microgels (HB), and hydrogel beads containing 2% caseinate inside (HB + C). The nanoemulsions consisted of small lipid droplets (about 0.22 ìm in diameter), whereas the hydrogel beads were visible with the naked eye (at least 100 ìm in diameter). The researchers characterized the particle size, charge, and structure, before and during each stage of the simulated GIT.

Next, the researchers caculated the release of free fatty acids—a measure of lipid digestion—from the delivery systems during the small intestine phase of the GIT model. The small intestine is the site where the majority of omega-3 fatty acids are absorbed by the human body. The lipid droplets in inform October 2017, Vol. 28 (9) • 35 the nanemulsion systems were rapidly digested during the first 5 minutes of incubation. More than 76% of the free fatty acids were released from NE, whereas the addition of caseinate slightly slowed the release, with 65% of free fatty acids digested from the NE + C sample in 5 minutes. The researchers attributed the rapid release from the NE samples to the large surface area of lipids exposed to lipase in the simulated small intestine. The addition of caseinate may have slightly inhibited lipase activity, possibly by shielding the lipid molecules from the lipase. For both NE samples, about 96% of free fatty acids were released after 2 hours of digestion.

The initial release of free fatty acids was much slower when the nanoemulsions were loaded into microgels. For the HB system, only about 37% of free fatty acids were released during the first 5 minutes of digestion. Again, the caseinate appeared to inhbit lipid digestion, with 22% of free fatty acid released after 5 minutes from the HB + C system. In this case, the caseinate trapped within the microgel may have slowed the diffusion of lipase into the bead. The total amount of free fatty acids released after 2 hours was lower

for the HB than the NE systems: 83% and 56% for the HB and HB +C systems, respectively.

“For nanoemulsions, the lipase molecules can readily adsorb to the lipid droplet surfaces and promote their digestion,” the researchers explain. “However, when the lipid droplets are trapped inside microgels, the lipase molecules have to move through the biopolymer network in the beads before they can reach the lipid droplet surfaces, which slows down digestion.” This research suggests that shelf-stable drug delivery systems for functional foods could be designed to control the digestion and release of omega-3 fatty acids within different regions of the GIT, with possible applications in controlling blood triglyceride levels, inducing satiety, or controlling the release rate of bioactive lipids, the researchers say.

Information

Chen, F., *et al.* (2017) “Encapsulation of omega-3 fatty acids in nanoemulsions and microgels: impact of delivery stystem type and protein addition on gastrointestinal fate.” Food. Res. Int., in press (available online July 17, 2017), http://dx.doi.org/10.1016/j.foodres.2017.07.039

Chen, F., *et al.* (2017) “Inhibition of lipid oxidation in nanoemulsions and filled microgels fortified with omega-3 fatty acids using casein as a natural antioxidant.” Food Hydrocolloids 63, 240–248. https://doi.org/10.1016/j.foodhyd.2016.09.001

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STUDIES ON THE EFFECTS OF FORTIFICATION IN SOYBEAN OIL DURING FRYING

By

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Edible oils from plant, animal, or synthetic origin, are used in frying, baking, and other forms of cooking, and in salad dressings, bread dips etc. Plant-derived edible oils consist of carboxylic acids with long hydrocarbon chains, but petroleum-based oils which lack the carboxyl group on the end. The carboxyl group makes the oils edible, providing a site for human enzymes to attack and break down the chain in a process called beta-oxidation. There are a wide variety of cooking oils from plant sources such as olive oil, palm oil, soybean oil.

The fat fried foods are popular among the consumers due to its crispiness and unique flavor and colour. In this process, food is immersed in hot oil with a contact among oil, air, and food at a high temperature of 150 oC to 190oC, where oil acts as a heat transfer medium and contributes to the texture and flavour of fried food. The simultaneous heat and mass transfer of oil, food and air during fat frying produces the desirable and unique quality of fried foods.

It was known that after frying some changes of the physico-chemical properties of oil occurs such as due to several oxidative and thermal reactions. During frying, due to hydrolysis, oxidation and polymerization processes the composition of oil changes which in turn changes the flavor and stability of its compounds (Gloria and Aguilera, 1998).

Physicochemical changes in the oil are due to three factors :

- Oxidative stability is very important factor in oil quality especially for frying therefore the frying oil must have high oxidative stability during use (Tabee, *et. al.,* 2008)
- Hydrolytic changes due to water vapours from the product undergoing frying (Gertz and Klostermann, 2002)
- Thermal changes due to oil being maintained at high temperatures.

If oxidative stability of oil can be improved at the time of frying, then that will be beneficial for the consumer. Generally at the time of cooking or frying some seasonings are added to the oil and among them one very common seasoning is Fenugreek Seed or *'methi'*.

It was observed that addition of *methi* in a common edible oil such as Soybean Oil (SBO) can improve the oxidative stability of that oil. The acid value of SBO, before frying is 0.45, increased after 1st frying to 0.67, but in oil fried with methi, it was seen that the changes were relatively low after 1st frying like 0.456. In fact the same time of stability can be observed in case of other physic-chemical properties like viscosity viz. after 1st frying of SBO without methi the viscosity increased about 14.28 times than the control oil. However when methi was used during frying, it was increased by 7.14 times. Therefore methi can be utilised as an antioxidant during frying of SBO. As, oils with lower values of viscosity and density are highly appreciable to consumers the addition of this type of seasoning can increase the consumers acceptance.

Reference :

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2. Gloria, H., Aguilera, J.M., Assessment of the quality of heated oils by differential scanning calorimetry. J. Agric. Food Chem. 46, 1998, pp 1363–1368.
3. Tabee ES, Azadmardm S, Dimirchi M, Jagerstad PC, Dulla JA. Oil Chem.Soc. 2008; 85:857.

SUFFERING FROM OSTEOARTHRITIS? HAVE FISH OIL, SPINACH

Consuming one gram of fish oil every day and including spinach in the diet could help reduce the pain of patients with osteoarthritis, the most common from of arthritis that generally affects the hands, hips and knees.

In the study published in the journal Rheumatology, the researchers examined the link between diet and the effective self management of osteoarthrities.

Analysing 68 previous studies in the field, they found that a low-dose supplement of fish oil (one and a half standard capsules) could result in pain reduction for patients with osteoarthritis and help improve their cardiovascular health.

Essential fatty acids in fish oil reduce inflammation in joints, helping to alleviate pain, the study said.

An increase in foods rich in vitamin K such as kale, spinach and parsley was also found to deliver benefits to patients with osteoarthritis.

Vitamin K is needed for vitamin-K-dependent (VKD) proteins, which are found in bone and cartilage.

An inadequate intake of the vitamin adversely affects the working of the protein, affecting bone growth and repair and increasing the risk of osteoarthritis.

“The importance of a good diet and regular exercise should never be underestimated. Not only does it keep us fit and healthy, but as we have learned from this study, it can also lessen painful symptoms of osteoarthritis,” said study co-author Margaret Rayman, Professor at the University of Surrey in Britain.

“We are what we eat and it is important that we have the right amount of nutrients from our food to ensure that our body systems work as they should,” Rayman added.

The researchers also found that a reduction of weight for overweight and obese patients and the introduction of exercise tailored to mobility could also help ease the symptoms of osteoarthritis.

Not only does obesity increase strain on joints, it can cause low-grade, systemic inflammation in the body aggravating the condition further.

A calorie restricted diet, combined with strengthening, flexibility and aerobic exercises, was identified as an effective approach in reducing pain in overweight patients.

There is no evidence that a calorie restricted diet does anything beneficial for lean patients with the condition, the study said.

IMPORT OF VEGETABLE OILS
Oil Year Nov. '17 - Mar. '18 - Up by 2%
Financial Year 2017-18 (April-March) Up by 9.5%

Import of vegetable oils during March 2018 is reported at 1,146,051 tons compared to 1,114,325 tones in March 2017, consisting 1,122,685 tone of edible oils and 23,366 tons of non-edible oils i.e. up by 3%. The overall import of vegetable oils during November 2017 to March 2018 is reported at 5,931,829 tons compared to 5,798,776 tons i.e. Up by 2%.

Import of Vegetable Oil (Edible & Non-edible) Nov. '17 - Mar. '18

Month	2017-18			2016-17			%
	Edible	Non-edible	Total	Edible	Non-edible	Total	Change
Nov.'17	1,225,315	23,495	1,248,810	1,155,863	19,601	1,175,464	(+) 6%
Dev.'17	1,058,289	30,494	1,088,783	1,174,296	35,389	1,209,685	(-) 10%
Jan.'18	1,246,847	44,294	1,291.141	1,012,085	16,774	1,028,859	(+) 25%
Feb.'18	1,124,999	32,045	1,157,044	1,234,255	36,188	1,270,443	(-) 9%
Mar.'18	1,122,685	23,366	1,146,051	1,097,876	16,449	1,114,325	(+) 3%
Total	5,778,135	153,694	5,931,829	5,674,375	124,401	5,798,776	(+) 2%

Import during Financial Year 2017-18 (April-March) :

Import of Vegetable Oil during Financial Year 2017-18 (April-March) reported at 15,573,295 tons consisting 15,181,180 tons of edible oils and 392,115 tons of non-edible oils compared to 14,217,756 tons to 2016-17 i.e. up by 10%.

Import of Vegetable Oil (Edible & Non-edible) Apr.'17 to Mar.'18 (Qty. in MT)

Month	2017-18			2016-17			%
	Edible	Non-edible	Total	Edible	Non-edible	Total	Change
Apr.'17	1,324,014	15,475	1,339,489	1,236,068	12,819	1,248,887	(+) 7%
May'17	1,323,792	60,647	1,384,439	1,004,685	20,193	1,024,878	(+) 35%
June'17	1,293,777	51,091	1,344,868	1,158,902	10,554	1,169,456	(+) 15%
July'17	1,489,137	35,587	1,524,724	1,118,066	22,619	1,140,685	(+) 34%
Aug'17	1,336,925	24,347	1,361,272	1,248,951	12,876	1,261,827	(+) 8%
Sep'17	1,501,283	17,994	1,519,277	1,376,650	23,343	1,399,993	(+) 9%
Oct'17	1,134,117	33,280	1,167,397	1,157,855	15,399	1,173,254	(-) 1%
Nov'17	1,225,315	23,495	1,248,810	1,155,863	19,601	1,175,464	(+) 6%
Dec'17	1,058,289	30,494	1,088,783	1,174,296	35,389	1,209,685	(-) 10%
Jan'18	1,246,847	44,294	1,291,141	1,012,085	16,774	1,028,859	(+) 25%
Feb'18	1,124,999	32,045	1,157,044	1,234,255	36,188	1,270,443	(-) 9%
Mar'18	1,122,685	23,366	1,146,051	1,097,876	16,449	1,114,325	(+) 3%
Total	**15,181,180**	**392,115**	**15,573,295**	**13,975,552**	**242,204**	**14,217,756**	**(+)9.5%**

On 1st March 2018, Union Government increased import duty on Crude Palm Oil, RBD Palmolein and RBD Palm Oil. Import duty on CPO increased to 44% from 30% (effective duty 48.4%) and RBD Palmolein and Refined Palm Oil to 54% from 40% (effective duty 59.4%) without changes in import duty on sunflower oil, rapeseed oil and soyabee oil.

This increase in duty is welcome step. Yet, the government has missed the opportunity to provide a 20% duty difference between crude and refined oils as requested by the Association to encourage domestic refining industry and promote “Make in India”.

Stock Position at Port & in Pipeline

The stock of edible oils as on 1st April, 2018 at various ports is estimated at 770,000 tons (CPO 350,000 tons, RBD Palmolein 160,000 tons Degummed Soybean Oil 80,000 tons, Crude Sunflower Oil 160,000 tons and 20,000 tons of Rapeseed (Canola) Oil) and about 1,342,000 tons in pipelines. Total stock at ports and in pipelines is reported to 2,112,000 tons, descreased by 85,000 from 2,197,000 tons in March 2018. India’s total demand for edible oils during 2017-18 is estimated at 23.00 lakh tons. Monthly requirement is about 19.00 lakh tons and operate at 30 days stock against which currently holding stock over 21.12 lakh tons equal to 33 days requiremens.

Stock Position at Ports & Pipelines

(Qty. in ’000 M.T.)

	1st Apr 2018	1st Mar 2018	1st Feb 2018	1st Jan 2018	1st Dec 2017	1st Nov 2017	1st Oct 2017	1st Sept. 2017	1st Aug. 2017	1st July 2017	1st June 2017	1st May 2017	1st Apr 2017
Port Stock	770	757	855	876	847	884	979	907	883	738	770	785	688
Pipeline	1342	1440	1340	1300	1420	1460	1610	1590	1590	1540	1390	1335	1225
Total Stock	2112	2197	2195	2176	2267	2344	2589	2497	2473	2278	2160	2120	1913

Import of Refined & Crude Oil Ratio

During Nov.’17 - Mar.’18, Import of refined oil (RBD Palmotein) showing declining trend, decreased to 770,581 tons from 1,135,708 tons is same period of last year. Import of Crude edible oils has increased to 5,007,554 tons from 4,538,667 (16-17), mainly due to increased in import of Crude Palm Oil and Sunflower Oil while Soyabean Oil decreased. The overall crude oil import share increased to 87% from 80% while refined oil decreased to 13% from 20%.

GRASS-FED MILK : HEALTH OR HYPE?

Olio is an Inform column that highlights research, issues, trends, and technologies of interest to the oils and fats community.

By

Laura Cassiday

Throughout much of human history, the dietary ratio of omega-6 to omega-3 fatty acids has been about 1:1. Today, with greatly increased consumption of vegetable oils and processed foods high in omega-6 fatty acids, the average ratio in most Western diets ranges from 10:1 to 25:1. The health consequences of this dramatic shift are uncertain, but some studies have linked elevated omega-6/omega-3 ratios to chronic inflammation, obesity, cardiovascular disease, and other ailments. Now, a paper in *Food Science & Nutrition* claims that grass-fed milk can help restore the historical balance of fatty acids in humans, by virtue of a six-fold lower omega-6/omega 3 ratio than conventional milk (Benbrook, C.M., *et al.*, http://dx.doi.org/10.1002/fsn3.610, 2018). However, organic industry involvement and other issues may cast doubt on some of the study's conclusions.

The study compared the fatty acid compositions of conventional, organic, and grass-fed milk. In the United States, most cows in conventional dairies consume about 6% of their daily dry matter intake (DMI) from pasture during grazing season. On an annual basis, the cows consume abou 53% of their DMI from forage, which includes both grazing and stored forage such as dried alfalfa, and 47% from corn and concentrate feeds. Organic milk must conform with the organic standard set by the United States Department of Agriculture, which specifies that lactating cows must consume at least 30% of their daily DMI from pasture during a grazing season of at least 120 days. Over the entire year, most cows fed an organic diet consume about 80% of their DMI from pasture and stored forage and about 20% from grains and concentrates.

The grass-fed milk in this study came from the Wisconsinbased cooperative CROPP, which markets the Organic Valley Grassmilk brand. CROPP has even more stringent forage requirements than the USDA organic program: Lactating cows must consume over 60% of their DMI from pasture during grazing season, with a grazing season of at least 150 days. In addition, cows in the Grassmilk program must consume 100% of their yearly DMI from pasture and stored forage, with no grains or concentrates allowed.

In a previous study, Benbrook and colleagues found that organic milk contained higher

levels of omega-3 fatty acids than conventional milk (Benbrook, C.M., *et al.,* http://dx.doi.org/10.1371/journal.pone.0082429, 2013). However, the total amount of omega-3 fatty acids in milk—organic or conventional—was minuscule compared with good sources of omega-3s, such as oily fish. In their new study, Benbrook and colleagues added Grassmilk to their analysis to determine if a completely grain-free diet would increase omega-3 levels above those seen in organic milk. The 1,163 full-fat Grassmilk samples were collected over a three-year period (2014–2016) throughout the United States.

The researchers found that Grassmilk contained 0.0489 g total omega-3 fatty acids per 100 g of whole milk, compared with 0.0198 g/100 g conventional whole milk and 0.0321 g/100 g organic whole milk. Grassmilk contained about 1.4-fold more eicosapentaenoic acid (EPA; 0.00357 g/100g versus 0.0025 g/100 g) and 1.3-fold more docosapentaenoic acid (DPA; 0.0047 g/100 g versus 0.0037 g/100 g) than conventional milk. The level of docosahexaenoic acid (DHA) in all milk samples was much lower: unquantifiable in conventional and organic milk, and only 0.00092g/100 g of Grassmilk. Most of the observed increase in omega-3 fatty acids in Grassmilk came from a 2.4-fold increase in alpha-linolenic acid (ALA) compared with conventional milk (0.0382 g/100 g versus 0.0159 g/10 g).

With regard to omega-6 fatty acids, Grassmilk contained 0.0454 g/100 g milk, compared with 0.0948 g/100 g conventional milk and 0.0711 g/100 g organic milk. The major omega-6 fatty acid in all milk samples was linoleic acid (LA), with 0.0387 g/100 g Grassmilk, 0.0639 g/100 g organic milk, and 0.0856 g/100 g conventional milk.

Grassmilk contained more conjugated linoleic acid (CLA; 0.0431 g/100 g) than conventional milk (0.0192 g/100 g) or organic milk (0.0227 g/100 g). CLA, a *trans* fatty acid produced naturally by ruminant animals, was recently linked with a reduced risk of heart failure in 3,806 older British men (Wannamethee, S.G., *et al.,* http://dx.doi.org/10.1161/JAHA.117.006653, 2018). The increased omega-3 fatty acids combined with the decreased omega-6 fatty acids led to a reduction in the omega-6/omega-3 ratio in Grassmilk (0.954) compared with conventional milk (5.774) and organic milk (2.276).

To explore whether these changes in fatty acid composition could have a meaninful impact on the human diet, Benbrook and colleagues modeled total LA and ALA intakes in the daily diet of a moderately active, 19–30 year old woman across 36 diet scenarios. Eighteen scenarios considered three levels of fat intake (20%, 33%, and 45% of total energy), two levels of dairy product consumption (3 and 4.5 servings per day), and the three types of milk (conventional, organic, and Grassmilk). The remaining 18 scenarios tested the same

variables, in combination with a reduced non-dairy LA intake resutling from dietary substitutions (e.g., pita chips instead of corn chips, margarine made from canola oil instead of soy oil). The researchers focused on the LA/ ALA ratio in these models because they claim that the USDA does not publish sufficient, reliable data on the total omega-6 and omega-3 contents of many common foods. In addition, the authors say that the LA/ALA ratio is a reliable proxy for the omega-6/omega-3 ratio because LA and ALA are the major dietary fatty acis in nearly all foods.

For a moderate fat intake (33% of total energy) and a moderate dairy intake (3 servings per day), the total dietary LA/ALA ratio was 8.64 for Grassmilk, 11.33 for conventional milk, and about 10 (exact value not shown) for organic milk. Switching from moderate to high consumption of dairy reduced the ratios further, down to 5.95 for Grassmilk, about 10 for conventional milk, and about 7.8 for organic milk. Lowering the amount of LA non-dairy fat in the diet reduced the LA/ALA ratio for all types of milk and made the differences between the milk types less pronounced. For example, for a moderate fat intake, moderate dairy intake, and reduced-LA diet, the LA/ALA ratio was about 4 for Grassmilk, 4.5 for organic milk, and 5 for conventional milk (estimated from a graph; exact values not given). The lowest LA/ALA ratio (3.14) could be obtained with a high intake of Grassmilk (4.5 daily servings), a low intake of dietary fat (20%), and a low intake of non-dairy LA.

The researchers also compared the fatty acid content of Grassmilk with the mean fatty acid content of seven common fish species (canned tuna, tilapia, halibut, sockeye slamon, catfish, trout, and Atlantic salmon). When scaled to the US per capita daily intake of dairy products, Grasmilk provided 171.7 mg per day of ALA and 174 mg of LA, with an LA/ALA ratio of 0.954. In addition, Grassmilk provided 23.2 mg per day of EPA + DPA + DHA. When scaled to the US per capita daily consumption of finfish, the 7 fish species provided an average of 5.5 mg ALA per day and 38.8 mg of LA, with an LA/ALA ratio of 6.5. The fish provided an average of 79.3 daily mg of EPA + DPA + DHA.

Although this paper provides evidence that grass-fed cows produce milk with a slightly improved fatty acid composition, many questions remain. For example, experts have not yet agreed on an optimal omega-6/omega-3 ratio, and some question whether the 1:1 ratio presumably attained in hunter-gatherer diets is ideal for today's conditions. The cardioprotective benefits of omega-3 fatty acids, particularly long-chain omega-3's such as DHA and EPA from fish, have been well established, but the omega-6/omega-3 ratio is a far less reliable predictor of cardiovascular health (Harris, W.S., https://doi.org/10.1007/s11883-006-0019-7, 2006). Therefore, it is uncertain whether lowering the omega-6/omega-3 ratio in the diet will actually translate to health benefits.

The researchers used LA/ALA as a proxy for omega-6/omega-3 for all foods, even fish, where this is clearly not accurate for many oily fish high in long-chain omega-3 fatty acids. The seven fish averaged in the study, which include four oily fish, have a reported LA/ALA ratio of 6.5, which the authors point out as being much higher than that of Grassmilk (0.954). However, if one calculates the average omega-3 level (ALA + EPA + DPA + DHA) of the seven fish species from information provided by the researchers (Table 9 in the paper), then the omega-6/omega-3 ratio would be about 0.457. In this light, the authors' statement, "Although oily fish have superior concentrations of longchain omega-3 fatty acids, most fish have low levels of ALA (the major omega-3), and an omega-6/omega-3 ratio near 7," seems misleading.

The researchers do not provide many details about their nutritional modeling, so it is difficult to assess whether their model accurately reflects the average diet of a 19–30-year-old woman. But in any case, the data show that reducing LA levels is likely to have a more profound effect on the LA/ALA ratio than switching from conventional whole milk to whole Grassmilk. Also, many people avoid whole milk because of worries over added fat and calories, and reduced-fat Grassmilk would be less effective in lowering LA/ALA ratios because it would contribute less to the total dietary fat. It does not appear that the researchers included fish in their dietary model, noting that about 70% of the US population does not consumer fish regularly or at all. However, it is likely that a single 3-oz serving of salmon per week, with between 1.1 and 1.9 g of omega-3s, could have much greater effects on the omega-6/omega-3 ratio than Grassmilk. Thus, although Grassmilk may be an alternative for people who do not like fish to help improve their ALA levels, Grassmilk cannot be considered a good source of omega-3 fatty acids.

Another aspect that likely makes Grassmilk inferior to fish is the type of omega-3 it provides. ALA is a plant source of omega-3 found in seeds, nuts, vegetable oils, and grass. Upon ingestion, the human body can convert ALA to the more beneficial, longer-chain omega-3 fatty acids EPA and DHA. The conversion rate of ALA to EPA and DHA is very low, typically on the order of a few percent or less, although the conversion can be improved by reducing the intake of LA (reviewed in Cassiday, L., *Inform* 28, 6–13, 2017). Therefore, it seems unlikely that much of the ALA in Grassmilk would be converted to long-chain omega-3s, which have proven health benefits. Reducing the amount of LA in the diet, as modeled by the researchers, would improve the ALA conversion rate, but it would still be less efficient than consuming EPA and DHA directly through fish.

In addition to these issues, a possible conflict of interest exists for this study, as it was funded and conducted by various organic interest groups, in particular the Organic

Valley/CROPP Cooperative that sells Grassmilk. This column has discussed the issue of industry-funded research in the past (Cassiday, L., *Inform* 26, 36–37, 2016). Although such research is not by definition suspect, certain safeguards should be taken to avoid bias or the appearance of bias. Benbrook and colleagues fully disclosed their conflicts of interest in this study. However, the study has been given a free pass by most of the media touting the benefits of grass-fed milk, with little or no mention of conflicts of interest, whereas a study funded by a large agricultural company such as Monsanto would undoubtedly receive more scrutiny and accusations of bias.

The first author of the study, Charles Benbrook, is no stranger to controversy. Benbrook, an agricultural economist, has long been an outspoken activist and critic of conventional agriculture and crop biotechnology. Benbrook's 2013 paper on the fatty acid composition of organic milk, which was funded almost exclusively by Organic Valley, received criticism for equating organic production with pasture feeding (Entine, J., and Summers, J., https://tinyurl.com/GLP-milk, 2013). In a 2012 study, again funded almost exclusively by the organic industry, Benbrook and his coworkers claimed that cultivation of genetically modified crops leads to increased pesticide use, which is contrary to data from other researchers (e.g., Klümper, W., and Qaim, M., https://doi.org/10.1371/journal.pone.0111629, 2014). Although lauded and quoted by many anti-GMO groups, the paper was widely criticized by scientists.

In May 2015, Benbrook left his position as a professor at Washington State University after his contract was not extended. Also in 2015, two separate Freedom of Information Act requests—one by *The New York Times*—forced the release of dozens of emails between Benbrook and members of the organic and anti-GMO movements. The emails revealed that Benbrook, Organic Valley, and other allies crafted a coordinated media campaign to promote their 2013 study prior to its online publication, enlisting the help of well-known GMO critics, organic aficionados, celebrity doctors, and television personalities such as Michael Pollan, Marion Nestle, Dr. Oz, and Dr. Mercola to "help assure that the release and outreach effort is broad and on-message." Other email correspondence indicates that an organic group offered Benbrook payment for certain "deliverables" from his research.

Benbrook's history, as well as some methodological problems, may cast doubt on his most recent paper. Even if the study's conclusions are valid, the data do not address whether Grassmilk is more healthful than conventional milk. In addition to perceived healthfulness, many consumers of grass-fed or organic milk believe that the production systems are better for animal welfare and the environment. However, the validity of these

beliefs often varies from farm to farm. A well-managed conventional dairy can be better for animals and the environment than a poorly managed grass-fed dairy. Studies of grassfed versus grain-fed beef cattle have produced variable results as to which system has the lowest carbon footprint. Organic and grass-fed production systems are generally much less efficient than conventional dairies. With a growing world population and dwindling land available for grazing, it may not be practical or desirable for everybody to increase their intake of grass-fed milk to levels recommended by the researchers.

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TRANS FAT IN JUNK FOOD – A RECIPE OF DISASTER

By

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Junk food is a pejorative term for food containing high levels of calories from sugar or fat with little fibre, protein, vitamins or minerals. Junk food is called by fast food. The concepts of fast food and junk food are almost same. They offer the fast service but also give disadvantages indirectly to the foodies.

Functions of Fat in Foods:

Shortening : A fat that tenderizes, or shortens, the texture of baked products by impeding gluten development, making them softer and easier to chew.

Emulsion : A liquid dispersed in another liquid with which it is usually immiscible (incapable of being mixed).

Surfactant : Surface-active agent that reduces a liquid's surface tension to increase its wetting and blending ability.

Plasticity : The plasticity of fat is its ability to hold its shape but still be molded or shaped under light pressure.

Flavor : The flavor developed in certain foods by fats is very difficult to duplicate.

Texture : Fats also contribute texture.

Appearance : Foods are made more appealing by pigments located in a food's natural fats.

Satiety or Feeling Full : Fats induce a sense of fullness, or satiety.

Fat's melting point is determined by the following four characteristics of the fatty acid:

- Degree of saturation
- Length
- Cis-trans configuration
- Crystalline structure

Unsaturated Fat : Unsaturated fat is a fat molecule containing one or more double bonds between the carbon atoms. Since the carbons are double-bonded to each other, there

are fewer bonds connected to hydrogen, so there are fewer hydrogen atoms, hence the name, 'unsaturated'. *Cis* and *trans* are terms that refer to the arrangement of the two hydrogen atoms bonded to the carbon atoms involved in a double bond. In the *cis* arrangement, the hydrogens are on the same side of the double bond. In the *trans* arrangement, the hydrogens are on opposite sides of the double bond.

TRANS FAT – CHEMICAL OUTLINE :

Trans fat is the common name for unsaturated fat with *trans*-isomer. Because the term refers to the configuration of a double carbon-carbon bond, trans fats are sometimes monounsaturated or polyunsaturated, but never saturated. Trans fats do exist in nature but also occur during the processing of polyunsaturated fatty acids in food production.

Hydrogenation of Fat :

The process of hydrogenation adds hydrogen atoms to unsaturated fats, eliminating double bonds and making them into partially or completely saturated fats. However, partial hydrogenation, if it is chemical rather than enzymatic, converts a part of *cis*-isomers into *trans*-unsaturated fats instead of hydrogenating them completely. Trans fats also occur naturally in a limited number of cases: Vaccenyl and conjugated linoleyl (CLA) containing trans fats occur naturally in trace amounts in meat and dairy products from ruminants, although the latter also constitutes a cis fat.

Cis Vs Trans : The same molecule, containing the same number of atoms, with a double bond in the same location, can be either a *trans* or a *cis* fatty acid depending on the configuration of the double bond. For example, oleic acid and elaidic acid are both unsaturated fatty acids with the chemical formula C9H17C9H17O2.They both have a double bond located midway along the carbon chain. It is the configuration of this bond that sets them apart. The configuration has implications for the physico-chemical properties of the molecule. The *trans* configuration is straighter, while the *cis* configuration is noticeably kinked as can be seen from the three-dimensional representation shown earlier.

The trans fatty acid elaidic acid has different chemical and physical properties, owing to the slightly different bond configuration. It has a much higher melting point, 45°C, than oleic acid, 13.4°C, due to the ability of the trans molecules to pack more tightly, forming a solid that is more difficult to break apart. This notably means that it is solid at human body temperatures.

Health risks of Trans Fats :

Coronary heart disease : The primary health risk identified for trans fat consumption is an elevated risk of coronary heart disease (CHD). Trans fat behaves like saturated fat by raising the level of LDL, but, unlike saturated fat, it has the additional effect of decreasing levels of HDL. The net increase in LDL/HDL ratio with trans fat is approximately double that happens due to saturated fat.

Alzheimer's Disease : The intake of both trans fats and saturated fats promote the development of Alzheimer disease.

Cancer : An increased intake of trans fatty acids may raise the risk of breast cancer by 75%.

Diabetes : There is a growing concern that the risk of type 2 diabetes increases with trans fat consumption.

Obesity : Research indicates that trans fat may increase weight gain and abdominal fat, despite a similar calorie intake.

Liver Dysfunction : Trans fats are metabolized differently by the liver than other fats and interfere with delta 6 desaturase. Delta 6 desaturase is an enzyme involved in converting essential fatty acids to arachidonic acid and prostaglandins, both of which are important to the functioning of cells.

PARLIAMENT NEWS

Lok Sabha : Starred Question No. 564 : Answered on 6th April 2018

Tax Rebate for Promotion of Exports

Shri Radheshyam Biswas:

Will the Minister of Finance be pleased to state:

(a) whether the Government has made any provisions for tax rebate for promotion of exports;

(b) if so, the details thereof;

(c) the value of rebate provided during the last three years along with the role of the said rebate in increasing the exports; and

(d) the monitoring system in place to ensure proper utilization of the said rebate?

Answer

Minister of State in the Ministry of Finance

(Shri Shiv Pratap Shukla)

(a), (b), (c) and (d) : A statement is placed on the Table of the House.

STATEMENT REFERRED TO IN REPLY TO THE LOK SABHA STARRED QUESTION

(a) Yes, Madam. To ensure the competitiveness of goods and services and promote exports, Government had made provisions for rebate of duty under Central Excise law and now for zero rating of exports under GST law. The essence is to make Indian goods and services competitive in the international market by ensuring that taxes do not get added to the cost of exports and taxes are not exported out of India.

(b) The Government has made provisions for rebate of duty for promotion of Exports under Central Excise law. After the roll out of GST from 1st July, 2017, provisions of rebate under Central Excise are applicable on the following commodities which are currently under Central Excise, namely, Crude, Motor Spirit, Diesel, ATF & Natural gas and tobacco and tobacco products. Under GST, Exports and supplies to SEZ are zero rated as per section 16 of the IGST Act, 2017. By zero rating it is meant that there is no burden of tax either on the input side or output side on exported goods/services. Zero rating of exports and supplies to SEZ is sought to be achieved through the refund mechanism which can be refund of IGST paid on exported goods or accumulated input tax credit, when exported without payment of duty.

(c) Central Excise : The value of rebate provided during the last three years is as follows, Central Excise and Service Tax Rebate for Years from 2015-16 to 2017-18 (upto Feb., 2018)

(in Rs. Crore)

Sl. No.	Years	Central Excise Rebate	Service Tax Rebate
1	2015-16	23042.19	137.00
2	2016-17	20596.99	96.40
3	2017-18*	11223.82*	176.4*

*Note : Figures are provisional

GST Refund sanctioned upto the end of Mar.'18

Total No. of Shipping Bills (upto 31st Jan.'18)	Total IGST refund (upto 31st Mar.'18)	Total ITC refund by Centre (upto 31st Mar.'18)	Total ITC refund by States (upto 31st Mar.'18)
273017	Rs. 9604	Rs. 5510	Rs. 2502

Thus, in all, Rs. 9,604 crore (IGST refunds), Rs. 5,510 crore (ITC refund by Centre) and Rs. 2,502 crore (ITC refund by States) all totalling to Rs. 17,616 crore has been sanctioned.

(d) Rebate is given only of the duty paid on exported goods and as such no further monitoring on utilization of rebate is required as taxes stand paid before sanction of rebate.

The event of tax payment is varified before sanction of rebate.

Lok Sabha : Unstarred Question No. 6645 : Answered on 6th April 2018

Increase in Import Duty

Shrimati K. Maragatham:

Will the Minister of Finance be pleased to state:

(a) whether the Government is exploring the options for increase in the import duty to the maximum allowed limit for short periods to tide over the trend of falling prices of farm produce due to cheap imports;

(b) if so, the details thereof;

(c) whether each country commits to a ceilling on customs duties on a certain number of products and no country can raise duties above the bound rates as per World Trade Organisation norms; and

(d) if so, the details thereof?

Answer

Minister of State in the Ministry of Finance

(Shri Shiv Pratap Shukla)

(a) There is no such proposal under consideration, for the present.

(b) Does not arise in view of (a) above.

(c) and (d) : The WTO requires member countries to notify the bound tariffs on products as per the commitments resulting from the WTO negotiations. Country wise bound tariff commitments are listed in the documents called the Schedule of Commitments and are an integral part of the WTO Agreement. WTO member countries have the flexibility to increase or decrease their tariffs so long as they do not raise them above their bound levels. If one WTO member raises applied tariffs above their bound level, other WTO members can take the country to the WTO's dispute settlement for resolving the issue.

Lok Sabha : Unstarred Question No. 6145 : Answered on 04.04.2018

Freight Classification

Janardan Singh Sigriwal

Will the Minister of Railways be pleased to state:

(a) the norms/criteria laid down for freight classification under the goods tranport system;

(b) when the Railways has recently made further changes in the categorisation of different commodities for determining the applicable rates; and

(c) the manner in which Railways ensure transparency in the decision making process in this regard?

Answer

Minister of State in the Ministry of Railways

(Shri Rajen Gohain)

(a) to (c) A Statement is laid on the Table of the House.

Statement Referred to in Reply to Parts (A) to (C) of Unstarred Question No. 6145 by Shri Janardan Singh Sigriwal to be Answered in Lok Sabha on 04.04.2018 Regarding Freight Classification.

(a) The norms/criteria laid down for freight classification under the goods transport system and cost of service and value of service, which inter-alia includes what the traffic can bear taking into account railway's competitiveness and elasticity of demand.

(b) Yes, Madam. There has been following changes in classification of different commodities as given in Goods Tariff :-

1. The classification of Coal & Coke, Red Mud and Ochre have been revised.
2. Following commodities have been included in the Goods Tariff :-
   i. Oliflux & Monazite added under Minerals and Ores other than Iron Ore.
   ii. Groundnut seeds added under Oil Cakes and Seeds.
   iii. Waxy Crude Oil added under Petroleum Products & Gases.
   iv. Books/Exercise Books/Note Books and Work Books added in Division 'A'.

(c) Decisions are taken as per powers delegated under the Railways Act, 1989 after approval by the competent authority. All policy instructions are uploaded on the website of Indian Railways on real time basis.

Lok Sabha : Unstarred Question No. 6122 : Answered on 04.04.2018

Crops and Vegetables Developed by BARC

Shrimati Meenakashi Lekhi

Will the Prime Minister be pleased to state :

(a) the details of crops and vegetable varieties developed by Bhabha Atomic Research Centre (BARC) during the last three years; and

(b) the steps taken by the Government ot popularies the usage of these crops and vegetable varieties amongst farmers?

Answer

The Minister of State For Personnel, Public Grievances & Pensions and Prime Minister's Office (Dr. Jitendra Singh):

(a) By using radiation induced mutagenesis along with cross breeding, Bhabha Atomic Research Centre (BARC) has developed two mutants of rice (Trombay Raipur Rice-1 (TRR-1), Trombay Konkan Kolam (TKKR-13*) and one mutant of cowpea {Trombay Cowpea 901 (TC901)*} which are identified for release. BARC has also developed several mutants of groundnut, mustard cowpea, blackgram, greengram,

soybean, rice and wheat which are undergoing advance field trails in State Agricultural Universities. The major desirable traits is these crops include higher yield, seed size, improved agronomic and quality traits, early maturity and stress tolerance.

(b) The BARC developed mutant crop varieties have high patronage from the farming community and are extensively grown in different states of the country. Popularization is done by linkages established with State Agricultural Universities (through kisan mela, frontline demonstrations/exhibitions and awareness programmes).

Lok Sabha : Unstarred Question No. 6109 : Answered on 04.04.2018

Use of Nuclear Energy

(relevent extract only)

Bhagurath Prasad

Will the Minister of Atomic Energy be pleased to state

(a) the details of use of nuclear energy in electricity, agriculture, medicine and health sector;

(b) the comparative status of usage of nuclear energy in the said sector in the country vis-a-vis China and Japan; and

(c) the steps taken by the Government to encourage the use of atomic energy in the said sector?

Answer

The Minister of State For Personnel, Public Grievances & Pensions and Prime Minister's Office (Dr. Jitendra Singh):

(a) Applications of nuclear energy and radiation have played a significant role in the field of electricity production, agriculture, medicine and health. Contributions of Department of Atomic Energy (DAE) have made a positive impact on improvement in the treatment of disease and the quality of life of citizens in the country.

Electricity Generation :-

The total electricity generation from the Nuclear Power Plants during the last three years was 115292 Million Units.

Agriculture :-

Using radiation induced mutagenesis technology, DAE has developed 42 varieties in

oilseeds (groundnut), pulses (urdbean, mungbean, Pigeonpea, cowpea), rice and jute, which have been released and notified for commercial cultivation across the country.

Government of India (Department of Atomic Energy) has set up two radiation technology demonstration units, one commissioned in the year 2000 for high dose irradiation at Vashi, Navi Mumbai, and another in 2002, for low dose irradiation, i.e. Krushi Utpadan Sanrakshan Kendra (KRUSHAK) facility at Lasalgaon near Neshik. The facilities are being operated by the Board of Raidation & isotope Technology (BRIT). Two plants are also set up one each by Maharashtra government and Gujarat government. Currently, 15 irradiation plants including those in Private Sector are functional in the country carrying out radiation processing of agricultural/food products. Presently fruits like Mango and Pomegranate and vegetable like onions and garlic are being irradiated for shelf life extension.

Medicine and Health

In so far as Agriculture sector is concerned, Ministry of Food Processing Industries (MOFPI) grants subsidy to gamma radiation processing plants under SAMPADA (Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters) which are installed for gamma radiation processing of food products.

In so far as Health & Medicine sectors are concerned .

Lok Sabha : Unstarred Question No. 6444 : Answered on 6th April, 2018

Smaller Packs for Edible Oils

Shri Y. S. Avinash Reddy & Shri Prabhakar Reddy Kotha :

Will the Minister of Health and Family Welfare be pleased to state :

(a) whether it is a fact that Food Safety and Standards Authority of India (FSSAI) has suggested the Government to direct edible oil traders to make it available in smaller packs for rural India;

(b) if so, the details thereof and the reasons thereof; and

(c) the response of the Government to this request?

Answer

The Minister of State in the Ministry of Health and Family Welfare

(Ashwini Kumar Choubey)

(a) to (c) : Sub-Regulation 2.3.15 (1) of Food Safety and Standards (Prohibition and Restriction on Sales) Regulations, 2011 provides :

"No person shall sell or expose for sale, or distribute, or offer for sale, or dispatch, or deliver to any person for the purpose of sale any edible oil

(a) which does not conform to the standards of quality as provided in the Food Safety and Standards Act, 2006 (34 of 2006) and rules/regulations made thereunder; and

(b) which is not packed in a container, marked and labelled in the manner as specified in Food Safety and Standards Authority of India (FSSAI) regulations."

The reduce the sale of loose edible oil in the country, FSSAI has advised various Associations representing Edible Oil Industry to bring out small sachets/pouches of edible oil to be within reach of economically weaker sections.

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A REVIEW

*The book entitled **"A treatise on Analysis of Food, Fats and Oils"** is an example of unique competence and contribution of the authors, S. K. Roy, N. K. Pramanik and A. R. Sen.*

The book is the first of its kind in India. It covers the traditional and modern analytical methods for the characterization and quality of fats, oils as well as other food items.

The authors are well reputed and qualified and they have applied their collective wisdom and expertise in including and presenting more appropriately and meticulously the analytical methods.

The book can also be viewed as a rarer type as it deals with the statutory and industrial aspects of fats, oils and their products, and pollution control in vegetable oil industry.

In fact these aspects are of extreme use and importance to those concerned with these issues.

The book is already well received by the readers and users in the academic and industiral circles throughout India because of the highly relevent and benefficial methodologies and basic-cum technological information. The book will be recognised in due course of time as one of the top quality analytical books in the area of food, fats and oils.

Prof. D. K. Bhattacharyya
21-6-2003

Regarding availability/price enquiries may be made to :
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BOOK REVIEW

A book entitled “Perfumery Materials, Production and Applications” has been authored by an very eminent Professor (Dr) D. K. Bhattacharyya, Emeritus Fellow (AICTE), Adjunct Professor Bengal Engineering and Science University, former President, O.T.A.I and a Scientist of National and International repute.

The book speaks for itself about his mastery and competence in the discipline of “Perfumery Materials”.

“The book demonstrates the scopes of certain specific reactions and raw materials in producing new synthetics. The enormous scopes of biotechnology involving bio-conversion processes’, with isolated enzymes and by fermentation biotechnology involving selective microorganisms has been indicated in making synthetics. The applications of natural aromatic oils in aromatherapy, food, cosmetics/toiletries, imitation perfumery and allied sector have been included.

Standardisation and evaluation of natural aromatic (essential oils and incidence of their adulteration have been elaborated in order to ascetain their quality and authenticity for sustaining the business in the industry” says Prof (Dr) R.N. Mukherjee, Former, Professor and Head, Deptt of Chemical Engg, University of Jadavpur. The book will fulfill a long felt want in the discipline of Essential Oils and will cater to the various categories of Scholars, Scientists and Technologists. The book has already been well appreciated in India and abroad, though published by the Stadium Press L.L.C., USA.

Those interested to procure a copy of this Valued book on Essential Oils may contact Professor D. K. Bhattacharyya at Phone No (033) 2461 9662.

(S. K. Roy)
Editor

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