LIPID UNIVERSE

Volume - 11, Issue 4

October - December 2023

Oil Technologists' Association of India (North Zone)

OTA

Office | Institutional | Hotel | Restaurant | Commercial | Airport | Hospital | Corporate

Squire Shelf Furniture LLP

SQUIRE SHELF FURNITURE LLP

Plot No. 45, Sector-8, IMT Manesar,
122051, Gurugram Haryana
Ph.: +91 9468456994
Email : squireshelf@gmail.com
web : www.squireshelf.com

Editor-in-chief desk..............

The global Emulsifiers market size is growing at a compound annual growth rate (CAGR) of 6.9%. It is accounted for USD 7.87 billion in 2022 and is expected to hit around USD 15.27 billion by 2032 during the forecast period 2023 to 2032.

Asia - Pacific region is expected to dominate the market for Emulsifiers during the forecast period. In countries like China, India and Japan, owing to the growing population and increasing disposable income, the demand for Emulsifiers has been increasing in the region.

The food products segment is projected to hold more than 40% of the Emulsifiers market in the region, and the personal care and cosmetics segment is projected to hold the second - largest share with more than 25% of the Emulsifiers market in the region.

Emulsifiers are compounds that help mix two or more immiscible substances, such as oil and water, into a stable and uniform mixture.

There are two main types of Emulsifiers used in cosmetics and skin care products : oil- in-water (o/w) Emulsifiers and water - in - oil (w/o) Emulsifiers.

Oil - in- water (o/w) Emulsifiers are used in products where the water content is higher than the oil content. These Emulsifiers are commonly used in lotions and creams, as they provide a lightweight and non- greasy texture that is easily absorbed into the skin.

Water - in - oil (w/o) Emulsifiers, on the other hand, are used in products where the oil content is higher than the water content. These Emulsifiers are commonly used in heavier creams and ointments, as they provide a more occlusive barrier that helps lock in moisture and protect the skin.

Emulsifiers are characterized by their hydrophilic lipophilic balance (HLB), a number from 2 to 20 that indicates which tendency is more dominant. An HLB less than 6 favours water- in-;oil emulsions, a value greater than 8 favours oil-in-water emulsions. Values of 7-9 indicate good wetting agents.

Emulsifiers are a crucial ingredient in cosmetics, skin care and hair care products that not only help stabilize oil and water molecules to create a uniform texture but also play a vital role in ensuring the effectiveness of the active ingredients to penetrate deeper into the skin to deliver optimal results for all the customers.

Yours truly

C.S. Joshi

Editor-in-chief

Editor-in-chief desk..............

Editor's desk..............

The concept of Omega-6: Omega-3 ratio is being challenged now -a-days by new researches describing the lack of scientific validation to support using this ratio as an indicator of health diet. They believe that it is time to move away from the Omega-6: Omega-3 ratio and reevaluate the benefits of the much-maligned Omega -6 fat.

Some researchers believe that a more reliable indicator is the Omega - 3 index which is the better predictor for coronary heart disease. The Omega-3 index focuses on the sum of two Omega -3 fatty acids - EPA and DHA (eicosapentaenoic acid and docosahexaenoic acid). An optimal Omega -3 index is 8% or higher.

According to latest researcher the science provides a clear and powerful argument for the benefits of Linoleic Acid (Omega-6) beyond the Omega-6 Omega-3 ratio or Omega-3 index. She wonders if there will also be a place for a Recommended Dietary Allowance for Linoleic Acid (Omega -6).

However, ICMR (Indian Council of Medical Research) had clear stand, till date, on the basis of our Indian diet. They set recommendation for the ratio of Omega -6 to Omega -3 to be in the range of 5 to 10. According to the guidelines of ICMR and FAO/ WHO both, the oil must be aimed to obtain a nearby ratio of SFA: MUFA: PUFA varying from 1:1:1 to 1:1.5:1. Based on the FAO/WHO and ISSFAL guidelines, it is also recommended to consume minimum 1g per day of ALA (alpha linolenic acid) and 0.25 to 0.5 g per day of (EPA + DHA).

Yours truly
Dr. S. Adhikari
Editor

Editor's desk................

Contents

Advertisers

OIL TECHNOLOGISTS' ASSOCIATION OF INDIA

(North Zone)

Zonal Executive Committee (ZEC) for the period 2023-2026 (For 3 years)

S.NO	DESIGNATION	NO. OF POSITION	NAME
1.	President	1	Mr. C. S. Joshi
2.	Vice – President (Elected).	1	Mr. S. K. Solanki
3.	Hony. Secretary	1	Dr. Anil Kumar Sharma
4.	Jt. Hony. Secretary- Editor	1	Dr. Syamal Adhikari
5.	Hony. Treasurer	1	Ms. Sneha Mishra
6.	Member	10	Mr. Amit Agarwal
			Mr. Ashwani Kr. Sharma
			Mr. H. C. Goyal
			Dr. Neelam Lohiya
			Mr. Rabindra Gandhi
			Dr. Rajni Chopra
			Mr. Ravi Kant Singh
			Dr. S. K. Handoo
			Dr. S. N. Naik
			Mr. Srinibas Acharya

Co-opted Members		Special Invitees	CEC Nominees
CEC Dr. S.K. Pattnayak	**ZEC** Mr. Prabhat Kumar Dr. Bhushan Dole	Dr. C Vasudevappa Dr. H.S. Oberoi	Dr. Trilochan Mohapatra Mr. S.K. Solanki

Editorial Board	Mr. C.S. Joshi Dr. S. Adhikari Dr. H.B. Singh Dr. Sammaiah Dr. Neelam Lohiya Dr. S.N. Naik	Dr. Ashutosh Upadhaya Dr. S.K. Handoo Mr. Srinibas Acharya Mr. . Romesh C. Arora

RETHINKING LINOLEIC ACID FROM OMEGA-6, OMEGA-3 RATIO AND OMEGA -3 INDEX

Abstract

Humans have evolved to eat a variety of foods. No one component is entirely bad or entirely good. Many diets popular today, approach nutrition through a narrow, simplified lens. Every decade one component of our diet is placed centre stage as the villain that is responsible for all of our woes. In recent decades, the spotlight has been turned on fats.

1. Fats play a critical role in nutrition but are often viewed through the narrow lens of the omega-6: omega-3 ratio. The western diet skews the ratio toward omega-6, which has been maligned for different health conditions, from chronic heart disease to diabetes.

2. New research confirms linoleic acid, an omega-6 fatty acid, has many positive implications on human health, including promoting the accumulation of lean mass, the proper functioning of the mitochondria, and the ability to stave off heart disease, diabetes, and fatty liver disease.

3. Martha Belury, the Carol S. Kennedy professor of human nutrition in the Department of Human Sciences at the Ohio State University, in Columbus, Ohio, USA, has followed the data throughout her research career, shifting her focus from omega-3 to the health benefits of omega-6 fatty acids.

4. Because of the strong evidence for linoleic acid as a protective fat for many chronic diseases, the omega-6: omega-3 ratio is now considered a misleading or outdated method of categorizing dietary fats and has been replaced by the omega-3 Index, which has been shown in clinical studies to predict coronary heart disease more accurately.

Fat is essential, providing a source of energy and a feeling of satiety. There are essential fatty acids that humans cannot produce, including linoleic acid (omega- 6) and alpha-linolenic acid (omega-3). Both fatty acids are obtained from the food we eat and play a critical role in major cellular events, including metabolism, inflammation, cell differentiation, and cell death. Some dietitians and nutritionists have advocated for eating an equal amount of omega-6 and omega-3 fatty acids, resulting in a 1:1 ratio. This diet is presumed to mimic the ancient human diet, though no definitive data supports what early humans actually ate consistently. The modern American diet ranges from a value of 10:1 to 15:1.

The overarching nutritional message has been that the modern diet suffers from an "omega imbalance." The imbalance is a 'concern,' because omega-6 fatty acids, which skews the index to higher numbers, have been assumed to promote poor health outcomes and disease, including increased 'bad' cholesterol (LDL), inflammation, and coronary heart disease. Surprisingly, no randomized controlled clinical trials actually support any of these claims.

The concept of the omega-6: omega-3 ratio is "flawed and unhelpful," says William Harris, professor of basic biomedical sciences at the University of South Dakota, in describing the lack of scientific validation to support using this ratio as an indicator of healthful diet.

Harris is the founder and president of the Fatty Acid Research Institute, a non-profit research and education organization created to further the study of fatty acids and disease. To expand on Harris's point, measuring the ratio is difficult because each fatty acid appears as various species in different ratios in different reservoirs in the body. According to Harris, this simple

Metric has "both theoretical and practical complications" that create fundamental misunderstandings that have cascaded through the field. He has published numerous articles describing the lack of scientific validation to support using this ratio as an indicator of healthful diet.

Martha Belury, Carol S. Kennedy professor of human nutrition in the Department of Human Sciences at the Ohio State University, Columbus, Ohio, USA, concurs with Harris's assessment. She believes it is time to move away from the omega-6: omega-3 ratio and re-evaluate the benefits of the much maligned omega-6 fat.

"Science and health are short-changed if we oversimplify," said Belury. "While omega-3 has an important role in health, omega-6 has a pivotal role to play as well. This is an important message for consumers and practitioners."

Linoleic Acid: The Villain of Modern Gluttony?

Belury began her career arguing for omega-3 fatty acids. One of her studies during her doctoral program aimed to evaluate the protective nature of omega-3 fatty acid in a mouse model for skin cancer. As is standard, she set up a control, in this case an omega-6 fatty acid, to compare the results. To her surprise, the results showed omega-6 fatty acid offered unanticipated protection too.

"Dogma exists in science like it does everywhere and sometimes scientists are blind to results that go against what they anticipate," said Belury. "Shifting the paradigm is difficult. It requires time, patience, and money."

Belury was fortunate to have an advisor and mentor who encouraged her to pursue the truth no matter where the data took her. She is now confident in one thing—lipids are not a simple or straight forward story.

Belury says nutrition does not operate like a binary system where one fat is good and one is bad. Rather, fatty acids require a more nuanced approach to illustrate the complexity of the natural world. Her research follows a series of clues, supported by studies around the world, to unravel the complex interactions this fatty acid has in human health.

When Research Counters Conventional Wisdom

Linoleic acid is the most common form of omega-6 fatty acid. It is found in vegetable oils, nuts, seeds, and animal products. As the American diet has evolved, linoleic acid, a component of soybean and many other vegetable oils, has increasingly found its way into processed foods. Today, soybean oil accounts for as much as 45 percent of the dietary intake of linoleic acid in the United States.

In 2014, a team of researchers from Uppsala University and the Karolinska University Hospital in Sweden published the results of the Lipogain clinical trial.

The double-blind, randomized, seven-week study examined the role of two dietary fats on body fat accumulation and ectopic fat storage. The study while small—only 39 participants were enrolled—revealed that the type of fat consumed has a powerful impact on liver fat accumulation, fat distribution, and body composition. Participants were fed either muffins baked with linoleic-rich sunflower oil or palm oil, a saturated fatty acid that is commonly used in food around the world. While both groups gained weight, the group fed the palm oil muffins gained more liver fat, total fat, and abdominal fat. The group fed the sunflower oil-rich muffin gained more lean tissue. The study supported much of Belury's research on the positive health outcomes of linoleic fatty acid.

In 2020, Belury published the results of a similar study that measured the effect of linoleic acid on measurements associated with body fat and metabolism on 15 post-menopausal, nondiabetic women with metabolic syndrome.

During menopause, estrogen plummets. A woman's body composition changes, leading to weight gain around the abdomen. Metabolic syndrome is characterized by abdominal obesity, low good cholesterol (HDL), and elevated triglycerides, glucose, and blood pressure. These conditions increase the risk for heart disease and diabetes. During the 16-week study, participants received two teaspoons of linoleic acid-rich vegetable oil per day.

The study results showed that supplementing the diet with linoleic oil increased total and high molecular weight adiponectin concentration, a hormone released by fat tissue that helps cells in the body use blood glucose more effectively. The linoleic oil also increased the concentration of oxylipins, a family of oxygenated products produced by fatty acids that may play a role in mitigating cardiovascular disease. These findings suggest linoleic supplements deserve greater scrutiny in patients with metabolic syndrome.

From A Ratio to an Index

Some researchers are still confounded by the notion that omega-3 and omega-6 were ever embroiled in a zero-sum competition. Both are components of a healthful diet and play an important role in the body and human health. While many nutritionists now see the error in the simplicity of the omega-6: omega-3 ratio, the concept has become enmeshed in the conventional dietary narrative. This concept has also influenced research funding trends, stifling researchers' ability to explore the health implications of fatty acids on a variety of diseases. However, a more reliable indicator has emerged—the omega-3 index, a measure of the weight percent of total red blood cell membrane fatty acids.

The omega-3 index focuses on the sum of two omega-3 fatty acids: eicosapentaenoic acid and docosahexaenoic acid. An optimal omega-3 index is 8 percent or higher. The index has been shown in multiple observational and cohort studies to be a better predictor for coronary heart disease, sudden cardiac death, and impaired cognitive function. The omega-3 index is also easier to measure than the omega-6: omega-3 ratio. Similar to the A1C test that is used to evaluate the glycemic status for patients with diabetes, the omega-3 index can be measured with a simple blood test.

Beyond the omega-6: omega-3 ratio or omega-3 index, the science provides a clear and powerful argument for the benefits of linoleicacid. It is now time for fellow researchers, practitioners, reporters, and funding agencies to take a more holistic approach to fat and begin the slow shift in how we view this critical component of our diet. In the future, Belury wonders if there will also be a place for a Recommended Dietary Allowance for linoleic acid.

"Fatty acids are among the simplest molecules in nutrition, but there is still so much we do not understand," said Belury. "My hope is that in the future researchers can study linoleic acid to understand its role in human health."

Ref.: AOCS--Nov./Dec.-2022

Compiled by:

Dr. S. Adhikari

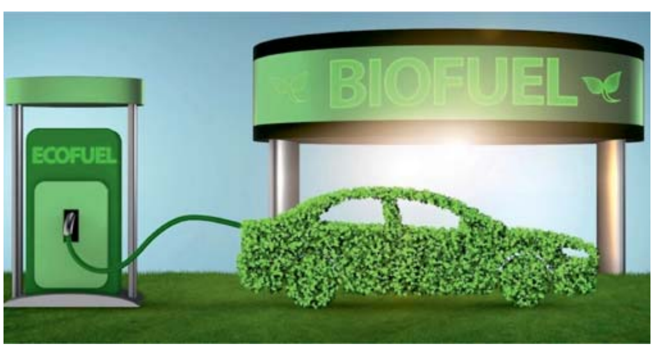
TRADE NEWS

India's EV wave is the future but biofuels are changing the game now:

Rising crude oil import bills have pushed the Indian government to look for other alternatives fuel sources such as Ethanol and Biodiesel. On our journey to majority electrification, biofuels are a legitimate way to a more sustainable fuel industry. Currently, the transport sector, railways and aviation are the major end-users of bio diesel in India. As per a FY2021 quarterly update, India's biodiesel market demand stood at 0.17 million tonnes despite major setbacks due to the pandemic induced disruption in supply chains.

The report predicted a healthy growth of 8.60 per cent CAGR until 2030, with a forecasted demand set to reach 0.26 million tonnes.

Initiation of the 2019 National Policy on Biofuels and the Food Safety and Standards Authority of India's (FSSAI) Repurposed Used Cooking Oil (RUCO) project have further encouraged legacy players and startups alike to jump on the bandwagon. With India's primary energy demand set to double by 2040, the use of alternative fuels such as Biodiesel is bound to grow as well. These fuels also help reduce the environmental impact as the end product is 95 per cent carbon-free on average. Used cooking oil, anima'- fats, imported crude vegetable oils and Jatropha seeds are used to produce alternative fuels such as Biodiesel.



But with India only contributing to 1 per cent of the global biofuel production, alternative fuels are still a niche in our country. That is where the Central Government is providing support to domestic players such as Mumbai-based UCO aggregator, Aris Bioenergy, to invest and tap into the market's potential. 'Since 2018 we are developing the aggregation system in Maharashtra and a few other states such as Karnataka, Telangana and Gujarat. We are aggregating feedstock such as UCO and supplying them to refineries that are converting it into biodiesel. These refineries are recognised by the FSSAI to produce biodiesel from UCO. We are also in a joint venture with Green Fuels UK to build twenty biodiesel refineries in India. Our first conversion plant will come up in Khopoli which will use UCO and other feedstock from Maharashtra to make

Indonesia Energy Ministry plans B40 Biodiesel Road text next Months

The world's largest palm oil producer mandated that biodiesel sold in the country be blended with 30% of palm-based biodiesel to cut its energy imports and increase consumption of palm oil - the feedstock to the fuel.

JAKARTA: Indonesia's energy ministry plans to begin road tests for a biodiesel programme using 40% palm based bio- content (B40) in February, a senior government official said on Monday.

The energy ministry plans to tests two types of B40 blending, one using 30% fatty acid methyl ether (FAME) and 10% distilled palm methyl ester (DPME), and another using 30% FAME and 10% palm based diesel known as green diesel.

The use of B40 must be followed by quality improvement, of both biodiesel and diesel oil," said Dadan Kusdiana, the ministry's director- general of renewable energy.

Kusdiana said the road test would take around five months and the decision on mandatory B40 implementation would be taken after the tests were completed.

The government had planned to launch the B40 programme from 2021 to 2022, but the high price of the vegetable oil has made it too costly. The Indonesian Palm Oil Association (GAPKI) expected B40 to be delayed beyond this year.

Brand Battles: Locals Vs the giants

The Indian consumer market is seeing a dynamic shift, with the resurgence of local brands as formidable challengers to industry giants like Tata, Britannia, HUL and Nestle. Data from Kantar's Brand Footprint report showcases local brands like Sargam, Vidisha and Bhagwati making remarkable leaps in consumer brand rankings, shaking up the nearly $180 billion FMCG market. Karnataka-based brand Teju Masala, for example, has grown 65% in one year. But what are these local brands doing differently? Should the biggies be threatened?

Source Indian Express

rattles Palm Oil Market

A flood of cheap sunflower oil from Russia and Ukraine is putting downward pressure on palm oil prices as the two top producers take advantage of currency depreciation to grab a larger share of the edible oils market.ÿþ Last Year Palm oil prices soared after Russia's invasion of Ukraine disrupted sunflower oil supplies from the Black Sea region.

Now, sunflower oil, which typically commands a hefty premium, is cheaper than soybean oil and holding a negligible premium over palm oil, said CEO of Dubai-based trader Glentech Group.

"Aggressive selling of sun flower oil from Black Sea region is putting pressure on palm oil and other edible oils," he said.

Crude sunflower oil is offered at $895 a metric ton including cost, insurance and freight (CIF) to India for October shipments, compared with $850 for crude palm oil. A year ago, sunflower oil held a premium of over $400 per ton over palm oil, compared to $45 now.

Russia has been harvesting a record sunflower seed crop of more than 17 million tons and farmers are aggressively selling seeds, said a leading Russian edible oil refiner who declined to be identified.

Since crushing has gained momentum, sunflower oil exports are likely to rise this year to 4.5 million tons from last year's 3.7 million tons, the refiner said.

In dollar terms, prices have come down in the last three months but Russian farmers are still getting decent returns because of the Rouble's depreciation, he added.

The Russian currency has lost more than 38% against the U.S. dollar this year.

Ukraine, which was struggling to ship sunflower oil after Russia withdrew from the Black Sea grain deal, has also been aggressively selling sunflower seeds, said a Ukrainian exporter.

"Ukraine neighbours are processing imported seeds and exporting oil," he said.

Ukraine's central bank devalued the hryvnia currency by 25% against the U.S. dollar in July 2022.

The United States Department of Agriculture (USDA) predicts Ukraine's sunflower seed crop will reach 14 million tons, up from 12.2 million a year earlier but below the 17.5 million tons harvested in the 2021/22 season.

The European Union's production could rise to 10.6 million tons from 9.2 million tons, the USDA estimated.

Indonesia and Malaysia lead in palm oil exports, with Argentina, Brazil, and the United States the top soy bean oil sellers.

India, the biggest importer of both palm oil and sun flower oil, could import a record 3.2 million tons of sunflower oil in the new marketing year starting from Nov. 1 but its palm oil imports could fall 8% to 9 million tons, said managing partner at GGN Research, an edible oil trader and broker.

Usually India imports around 200,000 tons of sunflower oil per month, but in the last few months it is making purchases of more than 300,000 tons, he said.

Unlike palm oil, sunflower oil availability is limited, with stocks expected to be depleted in the December quarter due to aggressive selling, said a Singapore-based dealer with a global trading house, adding that could push its premium above $150 per ton in near future.

Palm oil prices this week fell to their lowest level in 3-1/2 months as stocks in Malaysia hit an 11-month high.

Source : Economic Times

Comeback of biogas in new-age of renewable energy

Biogas is not a bygone. In fact it may soon be the game changer to disrupt LPG and natural gas usage. Even as startups are setting up biogas plants, conglomerates like Reliance Industries and Adani Group are betting thousands of crores on this segment. With the world's largest manufacturing facility for biogas plant set up in Pune by global social enterprise Sistema Bio, Host Kalpana Pathak explores how India's oldest answer to fuel problems is finally getting the push.

Source : Indian express

IMPORTANT FIGURES

Table 01: Major Oilseeds: World Supply and Distribution (Commodity View) Million Metric Tons

	2020/21	2021/22	2022/23	2023/24
Production				
Oilseed, Copra	5.78	6.07	6.03	6.05
Oilseed, Cottonseed	42.05	41.51	42.68	41.36
Oilseed, Palm Kernel	19.09	19.14	19.87	20.51
Oilseed, Peanut	50.42	51.89	49.36	50.41
Oilseed, Rapeseed	74.72	75.79	88.82	86.98
Oilseed, Soybean	369.22	360.43	374.39	398.88
Oilseed, Sunflower seed	48.84	56.86	52.38	56.80
Total	610.12	611.68	633.52	660.99
Imports				
Oilseed, Copra	0.08	0.08	0.06	0.07
Oilseed, Cottonseed	0.84	1.02	1.38	1.19
Oilseed, Palm Kernel	0.14	0.14	0.16	0.15
Oilseed, Peanut	4.33	4.05	4.17	4.43
Oilseed, Rapeseed	16.66	13.84	20.06	15.96
Oilseed, Soybean	165.50	155.52	164.78	167.65
Oilseed, Sunflowerseed	2.74	3.80	3.99	2.91
Total	190.28	178.44	194.59	192.34

	2020/21	2021/22	2022/23	2023/24
Exports				
Oilseed, Copra	0.10	0.12	0.11	0.15
Oilseed, Cottonseed	0.96	1.27	1.47	1.28
Oilseed, Palm Kernel	0.06	0.12	0.05	0.05
Oilseed, Peanut	5.06	4.42	4.66	4.85
Oilseed, Rapeseed	18.14	15.32	20.21	17.09
Oilseed, Soybean	165.18	154.25	171.12	170.29
Oilseed, Sunflowerseed	2.90	3.91	4.23	3.09
Total	192.40	179.42	201.84	196.80
Crush				
Oilseed, Copra	5.71	5.95	5.91	5.96
Oilseed, Cottonseed	32.55	32.15	32.58	32.74
Oilseed, Palm Kernel	19.08	18.92	19.88	20.44
Oilseed, Peanut	19.68	19.83	19.32	19.49
Oilseed, Rapeseed	71.91	72.20	81.03	81.98
Oilseed, Soybean	316.04	314.50	313.41	329.50
Oilseed, Sunflowerseed	44.96	46.69	51.29	52.37
Total	509.92	510.24	523.42	542.48
Ending Stocks				
Oilseed, Copra	0.05	0.06	0.05	0.04
Oilseed, Cottonseed	1.67	1.49	1.52	1.51
Oilseed, Palm Kernel	0.18	0.29	0.26	0.29
Oilseed, Peanut	5.05	5.09	4.52	4.37
Oilseed, Rapeseed	6.36	4.49	7.85	7.39
Oilseed, Soybean	100.26	98.00	101.92	114.21
Oilseed, Sunflowerseed	2.46	7.94	4.10	3.89
Total	116.02	117.36	120.22	131.69

Table 02: Major Oilseeds: World Supply and Distribution (Country View) Million Metric Tons

	2020/21	2021/22	2022/23	2023/24
Production				
Brazil	144.89	135.18	165.00	166.94
United States	124.52	131.35	125.75	121.45
China	65.81	62.07	68.08	67.33
Argentina	51.25	49.85	31.57	54.41
India	39.18	43.17	42.41	40.89
Other	184.46	190.06	200.72	209.97
Total	610.12	611.68	633.52	660.99
Imports				
China	104.12	93.40	108.06	107.35
European Union	22.19	22.82	22.40	20.50
Mexico	7.86	7.23	8.13	7.92
Japan	5.70	5.78	5.49	5.76
Argentina	4.82	3.84	9.06	5.70
Turkey	3.73	3.68	4.16	4.17
Thailand	4.26	3.33	3.34	3.92
Egypt	3.76	4.61	2.01	3.04
Indonesia	3.00	2.80	2.72	3.00
Vietnam	2.17	2.06	2.33	2.88
Other	28.69	28.89	26.88	28.11
Total	190.28	178.44	194.59	192.34
Exports				
Brazil	82.02	79.45	95.95	99.95
United States	62.78	59.55	55.12	48.78
Canada	15.20	9.58	12.23	12.30
Ukraine	4.05	5.71	8.37	6.85
Paraguay	6.35	2.28	5.81	6.01
Argentina	6.36	3.98	5.06	5.80
Australia	4.03	6.66	7.71	5.20
Other	11.61	12.21	11.60	11.91
Total	192.40	179.42	201.84	196.80

	2020/21	2021/22	2022/23	2023/24
Crush				
China	130.00	124.95	134.50	137.10
United States	62.66	63.87	64.35	66.68
Brazil	51.12	54.82	57.31	60.87
European Union	46.66	47.91	48.15	49.19
Argentina	43.67	42.79	34.60	38.89
India	32.39	32.20	34.78	33.52
Russia	18.75	21.20	24.25	25.70
Ukraine	15.40	12.50	15.68	16.73
Indonesia	13.02	12.79	13.36	13.57
Canada	12.07	10.40	11.75	12.20
Mexico	7.67	7.46	8.17	7.76
Turkey	5.25	5.31	6.18	5.37
Malaysia	4.99	4.83	5.09	5.33
Japan	4.68	4.79	4.63	4.70
Pakistan	5.48	5.60	3.88	4.40
Other	56.15	58.85	56.75	60.49
Total	509.92	510.24	523.42	542.48
Ending Stocks				
China	33.00	30.37	36.46	37.84
Brazil	29.81	27.72	35.56	37.80
Argentina	26.16	25.05	18.68	25.93
United States	8.64	9.14	8.96	8.25
European Union	2.79	3.31	3.48	3.24
Other	15.62	21.78	17.08	18.63
Total	116.02	117.36	120.22	131.69

Table 03: World Oilseeds and Products Supply and Distribution Million Metric Tons

	Area Harvested	Beginning Stocks	Production	Imports	Total Supply	Exports	Food Use Dom.	Domestic Consumption	Ending Stocks
Major Oilseeds									
2010/11	245.59	77.57	459.59	105.02	642.18	108.11	35.90	445.03	89.04
2011/12	249.06	89.04	447.11	113.33	649.48	111.07	36.10	466.12	72.29
2012/13	257.81	72.29	475.44	114.72	662.45	118.25	36.48	472.01	72.18
2013/14	261.64	72.18	503.79	133.93	709.90	133.97	37.36	494.78	81.15
2014/15	268.08	81.15	540.07	143.59	764.81	147.52	38.85	521.33	95.96
2015/16	265.77	95.96	524.89	154.32	775.16	153.93	40.15	527.86	93.38
2016/17	270.62	93.46	577.26	167.86	838.57	171.61	41.58	556.28	110.68
2017/18	281.95	110.68	583.84	176.51	871.03	177.50	43.03	574.85	118.68
2018/19	282.95	118.68	601.50	168.11	888.29	172.09	43.74	582.18	134.02
2019/20	281.32	134.02	582.03	189.93	905.98	191.77	45.19	601.92	112.29
2020/21	287.92	112.29	610.12	190.28	912.69	192.40	46.86	604.27	116.02
2021/22	296.73	116.02	611.68	178.44	906.14	179.42	47.82	609.36	117.36
2022/23	303.35	117.36	633.52	194.59	945.47	201.84	49.07	623.40	120.22
2023/24	308.06	120.22	660.99	192.34	973.55	196.80	50.61	645.06	131.69
Major Protein Meals									
2010/11	nr	10.53	256.89	75.10	342.52	77.92	0.33	251.46	13.14
2011/12	nr	13.14	267.54	79.41	360.09	81.13	0.40	263.95	15.01
2012/13	nr	15.01	269.49	75.23	359.73	79.48	0.43	266.76	13.49
2013/14	nr	13.49	282.67	81.00	377.16	83.54	0.44	278.47	15.15
2014/15	nr	15.15	300.79	82.88	398.82	86.61	0.45	293.51	18.71
2015/16	nr	18.71	306.02	84.15	408.88	87.39	0.47	302.96	18.52
2016/17	nr	18.87	320.78	85.67	425.32	89.73	0.52	316.18	19.42
2017/18	nr	19.42	331.33	88.16	438.91	90.99	0.54	326.30	21.62
2018/19	nr	21.62	333.31	90.99	445.92	95.26	0.61	329.64	21.02
2019/20	nr	21.02	346.80	91.10	458.92	96.04	0.70	341.21	21.67
2020/21	nr	21.67	349.58	92.82	464.07	97.41	0.77	346.39	20.27
2021/22	nr	20.27	349.58	93.99	463.85	96.31	0.81	346.99	20.55
2022/23	nr	20.55	356.43	92.93	469.91	96.61	0.84	355.58	17.73
2023/24	nr	17.73	370.41	96.82	484.96	100.73	0.87	364.20	20.03
Major Vegetable Oils									
2010/11	17.51	16.98	149.15	56.68	222.81	60.62	109.78	142.16	20.03
2011/12	18.52	20.03	157.87	61.32	239.22	64.73	115.38	151.10	23.39
2012/13	19.23	23.39	161.25	64.75	249.39	68.27	120.26	157.68	23.44
2013/14	20.12	23.44	171.59	66.65	261.67	70.12	125.17	165.93	25.62
2014/15	20.96	25.62	177.50	70.14	273.26	76.55	130.28	169.77	26.94
2015/16	22.06	26.94	176.38	70.43	273.75	73.84	134.70	176.98	22.92
2016/17	23.18	22.91	189.16	76.22	288.30	82.01	138.43	182.42	23.87
2017/18	24.14	23.87	198.76	76.03	298.66	80.99	142.34	190.96	26.72
2018/19	24.60	26.72	204.01	82.27	313.00	86.86	145.44	197.63	28.51
2019/20	25.04	28.51	207.61	82.73	318.85	87.15	148.50	201.25	30.45
2020/21	25.36	30.45	207.11	81.25	318.82	85.75	151.05	204.29	28.77
2021/22	25.96	28.77	207.83	74.55	311.15	79.56	149.27	202.46	29.13
2022/23	27.09	29.13	217.21	83.64	329.98	88.15	152.74	210.94	30.89
2023/24	27.69	30.89	223.60	84.78	339.26	89.82	157.34	218.75	30.70

Table 04: United States Oilseeds and Products Supply and Distribution Local Marketing Year Thousand Metric Tons

	Area Harvested	Beginning Stocks	Production	Imports	Total Supply	Exports	Crush	Domestic Consumption	Ending Stocks
Major Oilseeds									
2010/11	37,179	5,545	100,432	945	106,922	41,938	49,323	57,665	7,319
2011/12	35,131	7,319	92,442	1,285	101,046	37,813	50,316	57,621	5,612
2012/13	36,676	5,612	93,323	1,605	100,540	37,156	50,250	57,621	5,763
2013/14	35,428	5,763	98,986	3,067	107,816	45,569	51,455	58,294	3,953
2014/15	38,991	3,953	116,050	1,851	121,854	51,109	55,108	63,989	6,756
2015/16	38,403	6,756	115,891	1,130	123,777	53,968	55,055	62,940	6,869
2016/17	39,247	6,869	126,942	1,502	135,313	60,084	56,257	65,628	9,601
2017/18	42,801	9,601	131,483	1,419	142,503	59,315	60,168	69,361	13,827
2018/19	41,328	13,827	130,716	1,116	145,659	48,861	61,033	70,258	26,540
2019/20	36,826	26,540	106,980	1,216	134,736	47,067	63,037	71,711	15,958
2020/21	38,809	15,958	124,523	1,205	141,686	62,781	62,655	70,266	8,639
2021/22	41,063	8,639	131,350	1,182	141,171	59,553	63,868	72,476	9,142
2022/23	39,920	9,142	125,752	1,523	136,417	55,117	64,349	72,344	8,956
2023/24	38,845	8,956	121,454	1,522	131,932	48,777	66,683	74,909	8,246
Major Protein Meals									
2010/11	nr	341	38,032	2,241	40,614	8,488	49,323	31,748	378
2011/12	nr	378	39,450	3,032	42,860	9,170	50,316	33,354	336
2012/13	nr	336	38,593	3,393	42,322	10,460	50,250	31,548	314
2013/14	nr	314	39,291	3,798	43,403	10,803	51,455	32,308	292
2014/15	nr	292	43,210	3,873	47,375	12,144	55,108	34,941	290
2015/16	nr	290	42,773	4,070	47,133	11,178	55,055	35,680	275
2016/17	nr	275	43,117	3,920	47,312	10,826	56,257	36,078	408
2017/18	nr	408	47,063	3,736	51,207	13,005	60,168	37,639	563
2018/19	nr	563	46,530	3,935	51,028	12,447	61,033	38,160	421
2019/20	nr	421	48,773	4,121	53,315	12,826	63,037	40,103	386
2020/21	nr	386	48,257	4,385	53,028	12,623	62,655	40,014	391
2021/22	nr	391	49,269	3,570	53,230	12,459	63,868	40,418	353
2022/23	nr	353	50,054	4,297	54,704	13,520	64,349	40,770	414
2023/24	nr	414	51,494	4,228	56,136	14,111	66,683	41,581	444
Major Vegetable Oils									
2010/11	0	1,991	9,775	3,612	15,378	1,861	49,323	11,794	1,723
2011/12	0	1,723	10,032	3,831	15,586	1,146	50,316	12,873	1,567
2012/13	0	1,567	10,231	3,801	15,599	1,387	50,250	13,068	1,144
2013/14	0	1,144	10,425	4,016	15,585	1,116	51,455	13,498	971
2014/15	0	971	10,938	4,230	16,139	1,174	55,108	13,679	1,286
2015/16	0	1,286	11,210	4,527	17,023	1,248	55,055	14,573	1,202
2016/17	0	1,202	11,434	4,731	17,367	1,416	56,257	14,720	1,231
2017/18	0	1,231	12,109	4,783	18,123	1,342	60,168	15,541	1,240
2018/19	0	1,240	12,199	4,702	18,141	1,092	61,033	15,889	1,160
2019/20	0	1,160	12,636	4,901	18,697	1,504	63,037	15,986	1,207
2020/21	0	1,207	12,701	4,950	18,858	1,042	62,655	16,515	1,301
2021/22	0	1,301	13,060	5,263	19,624	1,048	63,868	17,303	1,273
2022/23	0	1,273	13,268	6,271	20,812	334	64,349	19,361	1,117
2023/24	0	1,117	13,579	6,624	21,320	330	66,683	19,891	1,099

Table 05: Middle East Oilseeds and Products Supply and Distribution Thousand Metric Tons

	2020/21	2021/22	2022/23	2023/24
Production				
Oilseed, Cottonseed	1,140	1,431	1,790	1,218
Oilseed, Rapeseed	415	382	495	460
Oilseed, Soybean	285	289	319	309
Oilseed, Sunflowerseed	1,608	1,796	1,949	1,597
Other	155	160	160	165
Total	3,603	4,058	4,713	3,749
Domestic Consumption				
Meal, Cottonseed	648	798	1,004	714
Meal, Soybean	9,044	9,642	8,975	9,435
Meal, Sunflowerseed	2,695	2,258	2,291	2,432
Other	1,203	1,059	1,359	1,456
Total	13,590	13,757	13,629	14,037
SME				
Meal, Cottonseed	525	647	814	579
Meal, Soybean	9,042	9,640	8,973	9,435
Meal, Sunflowerseed	1,798	1,506	1,528	1,622
Other	804	769	946	997
Total	12,168	12,561	12,260	12,633
Imports				
Meal, Cottonseed	35	57	46	60
Meal, Soybean	6,122	6,281	4,860	5,820
Meal, Sunflowerseed	1,027	992	1,039	1,177
Other	873	828	921	1,006
Total	8,057	8,158	6,866	8,063

	2020/21	2021/22	2022/23	2023/24
Imports				
Oil, Palm	2,912	3,332	3,150	3,305
Oil, Rapeseed	84	81	117	105
Oil, Soybean	710	537	203	438
Oil, Sunflowerseed	2,429	2,754	3,536	3,150
Other	226	223	258	247
Total	6,361	6,927	7,264	7,245
Industrial Dom. Cons.				
Oil, Palm	180	225	245	240
Oil, Rapeseed	10	10	25	25
Oil, Soybean	75	65	70	62
Oil, Sunflowerseed	20	20	25	25
Other	56	50	61	63
Total	341	370	426	415
Food Use Dom. Cons.				
Oil, Palm	2,175	2,421	2,430	2,525
Oil, Rapeseed	256	240	300	315
Oil, Soybean	943	1,065	1,000	1,057
Oil, Sunflowerseed	2,829	2,832	3,057	3,212
Other	648	690	730	697
Total	6,851	7,248	7,517	7,806
Domestic Consumption				
Oil, Palm	2,355	2,646	2,675	2,765
Oil, Rapeseed	266	250	325	340
Oil, Soybean	1,043	1,140	1,080	1,134
Oil, Sunflowerseed	2,859	2,862	3,097	3,252
Other	713	752	801	770
Total	7,236	7,650	7,978	8,261

Table 06: European Union Oilseeds and Products Supply and Distribution Thousand Metric Tons

	2020/21	2021/22	2022/23	2023/24
Production				
Oilseed, Rapeseed	16,732	17,389	19,620	20,100
Oilseed, Soybean	2,600	2,833	2,549	3,065
Oilseed, Sunflowerseed	8,898	10,328	9,166	10,650
Other	542	534	525	338
Total	28,772	31,084	31,860	34,153
Domestic Consumption				
Meal, Rapeseed	12,550	12,300	13,800	13,900
Meal, Soybean	28,342	27,842	26,792	26,892
Meal, Sunflowerseed	6,260	7,160	6,985	7,000
Other	1,916	2,038	2,157	1,984
Total	49,068	49,340	49,734	49,776
SME				
Meal, Rapeseed	8,929	8,751	9,819	9,890
Meal, Soybean	28,300	27,800	26,750	26,850
Meal, Sunflowerseed	4,135	4,736	4,619	4,629
Other	1,062	1,154	1,204	1,081
Total	42,427	42,441	42,392	42,450
Imports				
Meal, Rapeseed	467	576	843	750
Meal, Soybean	16,504	16,536	16,014	15,800
Meal, Sunflowerseed	2,571	2,563	2,756	2,475
Other	1,668	1,755	1,855	1,744
Total	21,210	21,430	21,468	20,769

	2020/21	2021/22	2022/23	2023/24
Industrial Dom. Cons.				
Oil, Palm	3,860	2,700	2,400	2,300
Oil, Rapeseed	6,675	6,600	6,920	7,050
Oil, Soybean	1,100	1,100	1,100	1,250
Oil, Sunflowerseed	500	500	500	515
Other	587	587	580	585
Total	12,722	11,487	11,500	11,700
Food Use Dom. Cons.				
Oil, Palm	2,300	1,950	2,000	2,000
Oil, Rapeseed	2,400	2,575	2,900	2,800
Oil, Soybean	1,275	1,150	1,200	1,150
Oil, Sunflowerseed	4,300	4,800	4,700	4,900
Other	2,247	2,229	2,032	2,081
Total	12,522	12,704	12,832	12,931
Domestic Consumption				
Oil, Palm	6,360	4,850	4,600	4,500
Oil, Rapeseed	9,125	9,225	9,870	9,900
Oil, Soybean	2,430	2,305	2,355	2,455
Oil, Sunflowerseed	4,813	5,313	5,213	5,428
Other	2,847	2,829	2,617	2,666
Total	25,575	24,522	24,655	24,949
Imports				
Oil, Palm	5,970	4,979	4,850	4,650
Oil, Rapeseed	314	593	402	375
Oil, Soybean	493	459	621	400
Oil, Sunflowerseed	1,599	2,177	2,102	2,300
Other	1,570	1,576	1,546	1,523
Total	9,946	9,784	9,521	9,248

Table 07: China Oilseeds and Products Supply and Distribution Thousand Metric Tons

	2020/21	2021/22	2022/23	2023/24
Production				
Oilseed, Peanut	17,993	18,308	18,330	18,600
Oilseed, Rapeseed	14,049	14,714	15,531	15,400
Oilseed, Soybean	19,602	16,395	20,284	20,500
Oilseed, Sunflowerseed	2,570	2,154	1,900	2,250
Other	11,600	10,503	12,031	10,581
Total	65,814	62,074	68,076	67,331
Imports				
Oilseed, Peanut	1,373	785	940	1,150
Oilseed, Rapeseed	2,795	1,657	5,335	3,400
Oilseed, Soybean	99,740	90,501	100,846	102,000
Oilseed, Sunflowerseed	137	157	277	300
Other	72	297	665	500
Total	104,117	93,397	108,063	107,350
Domestic Consumption				
Meal, Peanut	4,090	4,077	4,005	4,100
Meal, Rapeseed	11,404	11,951	13,041	13,015
Meal, Soybean	72,875	69,630	73,950	76,750
Other	10,225	9,895	11,464	11,775
Total	98,594	95,553	102,460	105,640
SME				
Meal, Peanut	4,597	4,583	4,502	4,608
Meal, Rapeseed	7,776	8,165	8,941	8,922
Meal, Soybean	71,750	68,530	72,800	75,600
Other	8,680	8,426	9,221	9,539
Total	92,803	89,704	95,463	98,669
Food Use Dom. Cons.				
Oil, Palm	4,200	3,300	3,200	3,800
Oil, Peanut	3,567	3,323	3,418	3,490
Oil, Rapeseed	8,100	8,300	8,900	8,600
Oil, Soybean	17,600	16,700	16,750	17,700
Oil, Sunflowerseed	2,067	955	1,839	1,941
Other	1,640	1,646	1,705	1,611
Total	37,174	34,224	35,812	37,142
Domestic Consumption				
Oil, Palm	6,550	5,100	5,600	6,300
Oil, Peanut	3,567	3,323	3,418	3,490
Oil, Rapeseed	8,100	8,300	8,900	8,600
Oil, Soybean	17,600	16,700	16,750	17,700
Oil, Sunflowerseed	2,067	955	1,839	1,941
Other	2,278	2,169	2,452	2,361
Total	40,162	36,547	38,959	40,392
Imports				
Oil, Palm	6,818	4,387	6,190	6,400
Oil, Peanut	346	166	292	300
Oil, Rapeseed	2,365	973	1,998	1,700
Oil, Soybean	1,221	291	409	400
Oil, Sunflowerseed	1,640	513	1,555	1,550
Other	862	798	967	1,005
Total	13,252	7,128	11,411	11,355

Table 08: India Oilseeds and Products Supply and Distribution Thousand Metric Tons

	2020/21	2021/22	2022/23	2023/24
Production				
Oilseed, Cottonseed	11,675	10,316	11,166	10,614
Oilseed, Peanut	7,300	8,700	6,300	6,400
Oilseed, Rapeseed	8,600	11,100	11,300	11,700
Oilseed, Soybean	10,456	11,889	12,411	11,000
Oilseed, Sunflowerseed	150	140	215	150
Other	1,003	1,021	1,022	1,021
Total	39,184	43,166	42,414	40,885
Domestic Consumption				
Meal, Cottonseed	4,584	4,238	4,443	4,311
Meal, Rapeseed	3,650	4,375	4,350	4,750
Meal, Soybean	5,850	6,273	6,650	6,975
Other	2,445	2,348	2,176	2,204
Total	16,529	17,234	17,619	18,240
SME				
Meal, Cottonseed	3,714	3,434	3,600	3,493
Meal, Rapeseed	2,597	3,113	3,095	3,380
Meal, Soybean	5,500	5,873	6,225	6,525
Other	2,191	2,177	2,021	1,991
Total	14,003	14,597	14,941	15,389
Food Use Dom. Cons.				
Oil, Cottonseed	1,360	1,250	1,315	1,300
Oil, Palm	8,850	7,800	8,300	9,100
Oil, Peanut	1,160	1,185	1,050	1,050
Oil, Rapeseed	2,700	3,700	3,600	3,800
Oil, Soybean	4,950	5,825	5,400	5,100
Oil, Sunflowerseed	2,250	1,900	2,700	2,800
Other	400	375	400	421
Total	21,670	22,035	22,765	23,571
Domestic Consumption				
Oil, Cottonseed	1,408	1,295	1,361	1,346
Oil, Palm	9,225	8,150	8,900	9,750
Oil, Peanut	1,170	1,195	1,060	1,060
Oil, Rapeseed	2,780	3,780	3,680	3,880
Oil, Soybean	4,950	5,825	5,400	5,100
Oil, Sunflowerseed	2,250	1,900	2,700	2,800
Other	747	674	710	741
Total	22,530	22,819	23,811	24,677
Imports				
Oil, Cottonseed	8	4	1	3
Oil, Palm	8,411	8,004	10,045	9,300
Oil, Peanut	0	0	0	0
Oil, Rapeseed	25	34	6	5
Oil, Soybean	3,251	4,231	3,968	3,300
Oil, Sunflowerseed	1,958	1,956	2,988	2,700
Other	157	80	111	135
Total	13,810	14,309	17,119	15,443

Table 09: Major Protein Meals: World Supply and Distribution (Commodity View) Million Metric Tons

	2020/21	2021/22	2022/23	2023/24
Production				
Meal, Copra	1.90	1.97	1.95	1.97
Meal, Cottonseed	14.90	14.77	14.96	15.05
Meal, Fish	4.89	5.01	4.76	5.09
Meal, Palm Kernel	9.98	9.86	10.34	10.65
Meal, Peanut	7.84	7.89	7.70	7.77
Meal, Rapeseed	41.52	42.13	47.30	47.80
Meal, Soybean	248.35	246.75	246.44	258.66
Meal, Sunflowerseed	20.20	21.20	22.99	23.44
Total	349.58	349.58	356.43	370.41
Imports				
Meal, Copra	0.62	0.58	0.62	0.61
Meal, Cottonseed	0.29	0.28	0.24	0.29
Meal, Fish	3.41	3.60	3.29	3.44
Meal, Palm Kernel	7.10	7.26	7.88	7.52
Meal, Peanut	0.10	0.13	0.12	0.11
Meal, Rapeseed	8.37	7.69	9.32	9.03
Meal, Soybean	65.36	67.15	62.86	66.75
Meal, Sunflowerseed	7.58	7.30	8.60	9.07
Total	92.82	93.99	92.93	96.82
Exports				
Meal, Copra	0.55	0.68	0.56	0.68
Meal, Cottonseed	0.41	0.45	0.28	0.33
Meal, Fish	2.95	2.85	2.70	2.97
Meal, Palm Kernel	7.58	7.87	7.78	8.01
Meal, Peanut	0.13	0.18	0.18	0.16
Meal, Rapeseed	8.23	7.68	9.69	9.30
Meal, Soybean	69.43	68.83	66.55	69.84
Meal, Sunflowerseed	8.14	7.77	8.88	9.45
Total	97.41	96.31	96.61	100.73
Domestic Consumption				
Meal, Copra	2.00	1.87	2.02	1.91
Meal, Cottonseed	14.80	14.61	14.89	15.02
Meal, Fish	5.42	5.69	5.40	5.57
Meal, Palm Kernel	9.36	9.39	10.52	10.08
Meal, Peanut	7.82	7.84	7.65	7.72
Meal, Rapeseed	41.83	41.87	47.16	47.29
Meal, Soybean	244.73	244.79	245.85	253.56
Meal, Sunflowerseed	20.45	20.93	22.08	23.06
Total	346.39	346.99	355.58	364.20
Ending Stocks				
Meal, Copra	0.04	0.04	0.04	0.04
Meal, Cottonseed	0.12	0.10	0.13	0.13
Meal, Fish	0.19	0.26	0.22	0.21
Meal, Palm Kernel	0.83	0.69	0.61	0.69
Meal, Peanut	0.03	0.04	0.03	0.03
Meal, Rapeseed	1.25	1.53	1.29	1.53
Meal, Soybean	16.56	16.84	13.74	15.75
Meal, Sunflowerseed	1.26	1.05	1.67	1.66
Total	20.27	20.55	17.73	20.03

Table 10: Major Protein Meals: World Supply and Distribution (Country View) Million Metric Tons

	Beginning Stocks	Production	Imports	Total Supply	Exports	Industrial Dom.	Food Use Dom.	Domestic Consumpti	Ending Stocks
Oil, Palm									
2010/11	6.51	49.38	34.91	90.80	37.12	10.64	33.99	45.19	8.49
2011/12	8.49	52.31	37.84	98.65	39.73	12.46	36.24	49.35	9.57
2012/13	9.57	56.34	41.39	107.30	43.00	14.67	39.51	54.82	9.48
2013/14	9.48	59.20	41.16	109.84	43.09	16.21	40.27	57.11	9.63
2014/15	9.63	62.09	43.86	115.58	47.33	14.35	42.42	57.40	10.85
2015/16	10.85	58.75	41.79	111.38	43.79	16.41	41.85	58.95	8.63
2016/17	8.58	65.57	45.63	119.79	48.94	16.72	43.06	60.44	10.41
2017/18	10.41	70.51	46.02	126.93	48.66	19.85	44.74	65.28	12.99
2018/19	12.99	74.17	49.89	137.05	51.49	22.72	47.20	70.61	14.95
2019/20	14.95	73.11	47.05	135.11	48.36	23.10	47.03	70.84	15.91
2020/21	15.91	73.28	46.85	136.04	48.54	23.51	48.35	72.56	14.94
2021/22	14.94	72.96	41.70	129.61	43.97	22.90	45.97	69.52	16.12
2022/23	16.12	77.56	47.27	140.95	49.39	25.73	48.11	74.55	17.01
2023/24	17.01	79.46	48.40	144.88	50.55	26.99	50.43	78.13	16.19
Oil, Coconut									
2010/11	0.75	3.52	1.78	6.06	1.80	1.60	1.87	3.50	0.75
2011/12	0.75	3.27	1.83	5.85	1.86	1.48	1.86	3.37	0.62
2012/13	0.62	3.48	1.89	5.99	1.93	1.62	1.90	3.56	0.50
2013/14	0.50	3.37	1.74	5.61	1.91	1.51	1.72	3.27	0.43
2014/15	0.43	3.31	1.82	5.56	1.94	1.44	1.70	3.18	0.44
2015/16	0.44	3.20	1.61	5.25	1.58	1.47	1.63	3.13	0.54
2016/17	0.54	3.38	1.54	5.46	1.79	1.55	1.63	3.21	0.47
2017/18	0.47	3.69	1.75	5.91	1.76	1.65	1.74	3.42	0.73

Table 11: World Palm Oil, Coconut Oil, and Fish Meal Supply and Distribution Million Metric Tons

	2020/21	2021/22	2022/23	2023/24
Production				
China	92.35	88.43	95.45	97.71
United States	48.26	49.27	50.05	51.49
Brazil	38.23	41.23	43.12	45.61
European Union	30.19	30.75	30.68	31.43
Argentina	32.82	31.98	25.49	28.80
Other	107.75	107.92	111.63	115.37
Total	349.58	349.58	356.43	370.41
Imports				
European Union	21.21	21.43	21.47	20.77
China	7.12	7.18	8.37	8.87
Vietnam	6.15	6.44	6.07	6.23
Indonesia	5.50	5.73	5.66	5.93
United States	4.39	3.57	4.30	4.23
Thailand	3.36	3.51	4.03	4.05
Korea, South	3.45	3.42	3.44	3.40
Other	41.66	42.71	39.61	43.36
Total	92.82	93.99	92.93	96.82
Exports				
Argentina	29.33	27.60	21.82	24.48
Brazil	16.58	20.21	21.34	22.00
United States	12.62	12.46	13.52	14.11
Ukraine	5.02	3.92	4.60	6.00
Indonesia	5.33	5.85	5.87	5.91
Canada	5.63	4.81	5.69	5.75
Russia	2.74	3.10	3.80	4.18
Other	20.16	18.37	19.97	18.31
Total	97.41	96.31	96.61	100.73

	2020/21	2021/22	2022/23	2023/24
Industrial Dom. Cons.				
Domestic Consumption				
China	98.59	95.55	102.46	105.64
European Union	49.07	49.34	49.73	49.78
United States	40.01	40.42	40.77	41.58
Brazil	21.18	21.62	22.27	23.11
India	16.53	17.23	17.62	18.24
Russia	8.20	8.49	8.94	9.44
Mexico	7.61	7.62	7.83	7.94
Vietnam	7.59	7.66	7.63	7.77
Indonesia	6.44	6.53	6.66	6.73
Thailand	6.04	5.97	6.28	6.48
Other	85.12	86.56	85.38	87.51
Total	346.39	346.99	355.58	364.20
SME				
China	92.80	89.70	95.46	98.67
European Union	42.43	42.44	42.39	42.45
United States	38.60	39.26	39.29	40.14
Brazil	20.75	21.26	21.90	22.65
India	14.00	14.60	14.94	15.39
Russia	6.72	6.89	7.27	7.68
Mexico	7.32	7.39	7.54	7.68
Other	95.12	96.78	95.17	97.93
Total	317.74	318.34	323.97	332.58
Ending Stocks				
Brazil	4.48	3.89	3.40	3.92
Argentina	2.42	2.93	2.54	2.68
European Union	1.15	1.30	1.02	1.11
China	0.78	0.34	0.88	0.79
Vietnam	0.72	0.79	0.56	0.77
Other	10.73	11.30	9.32	10.75
Total	20.27	20.55	17.73	20.03

NATURAL MOISTURIZERS AND EMULSIFIERS

Abstract

Botanical extracts have remained the most important resource for healing and beautifying in the natural world.

Homemade moisturizers that are made with all natural ingredients are full of skin-nourishing minerals and vitamins.

There are only 3 required ingredients for making natural moisturizers: a Carrier Oil, Water, and an Emulsifier.

Optional additives can further enrich a natural homemade moisturizer with ingredients such as Thickeners, Butters, Preservatives, Colourants, Aromatic Oils, and Floral Waters.

In order to prevent contamination when developing moisturizers, it is important to sterilize everything with which the moisturizer will come into contact.

The Power of Botanicals

We have been primping, perfuming, and decorating our bodies since the beginning of time to enhance our attractiveness and magnetism. While we've given up practices like face masks made of crocodile manure and lead paint for whitening the skin, natural skin care has always had an enduring attraction. Since Cleopatra's time, botanical extracts have remained the most important resource for healing and beautifying in the natural world.

Adding botanical extracts such as essential oils in the correct amount to your own handmade creams and lotions allow for customization of your products, contributing to both psychological and physiological well-being.

This is why blends that provide a combination of important botanicals in creams, lotions, and ointments are gaining popularity.

Benefits of Making Natural Moisturizers

The advantage of homemade natural moisturizers is that they can be customized by the producer by using specific ingredients for their inherent properties. Homemade moisturizers that are made with all natural ingredients are full of skin-nourishing minerals and vitamins. Their natural benefits include the ability to hydrate and rejuvenate skin, the ability to restore damaged skin cells, and the ability to prevent future damage caused by harsh environmental factors by creating protective temporary barriers on skin. Producing homemade moisturizers has the added advantage of being eco-friendly, as the use of natural products means that chemicals are neither being used on the skin nor polluting the atmosphere. Because products can be stored in reusable containers and can be custom labeled for each new product after being sterilized, there is less waste from the disposal of packaging.

There is a large variety of moisturizers, the most popular being face creams, body lotions, body butters, and face milk. They can all be easily produced at home with a few simple natural ingredients that basically need to be melted together and cooled before they are stored in their containers for later use. Creams and lotions are comprised of three things: 1) a "base" or "carrier" oil, which will be a healing and nourishing oil of personal preference, 2) water that is purified of toxins and pollutants, also known as distilled water, although pure floral waters or other water-based liquids may also be used, and 3) an emulsifier (usually a wax, although it can also be a combination of other natural ingredients that provide emulsifying properties once they are combined).

Emulsifiers are the binding agents that keep the water and the oil joined together in a moisturizer, because these two components will not combine otherwise; they are a necessary component for creating the fixed and lasting emulsion of oil and water.

Most commercial body butters are actually dense creams that have more wax content in them. A lotion is simply a diluted cream, and a milk is a diluted lotion. Each product is slightly more diluted than the one before: *BUTTER* (thick, heavy, oily) **’!** *CREAM* (thinner than butter and usually whipped) **’!** *LOTION* (thinnest, lightweight) **’!** *MILK* (more liquid than lotion but richer).

Types of Emulsions

There are two types of emulsions although both types contain the same ingredients - oil and water. They are: *Oil-in-Water* Emulsions and *Water-in-Oil* Emulsions.

Oil-in-Water moisturizers are those with more water than oil. These are also referred to as water-based products. The oil or fat droplets simply disperse in the layer of water. These emulsions are used more in moisturizing products (e.g. body lotions and day creams.

Water-in-Oil moisturizers are usually oil-based products used for a fatty feel (e.g. night creams and sunscreen and makeup). In this emulsion, water droplets are suspended in the oil layer. This type is the ideal base for dry or sensitive skin, as it is milder and leaves the skin’s lipid bilayer undamaged.

Ingredients for Natural Moisturizers

Carrier Oils

a carrier oil will be the main, “base,” ingredient in a moisturizer recipe. The ideal carrier oil is one that is healing, nourishing, rejuvenating, and protecting. Popular choices for oils include Olive and Jojoba. Oils are safe to use, they are effective, and they are free from the chemicals found in commercial moisturizers. They can be custom-picked for their particular skin benefits and to match certain skin types.

Emulsifiers

Waxes are the most commonly used emulsifier. Emulsifying waxes are derived from plant-based fatty alcohols. Waxes also thicken a cream – without a wax, creams would have the runny consistency of a salad dressing. The molecular makeup of an emulsifying wax attracts oil particles and absorbs water particles. Because the oil remains mixed in with the water, the wax helps the oil penetrate the skin and replace lost moisture. In the process of producing a homemade moisturizer, the emulsification occurs after the heated oil phase, the heated water phase, and the cool down phase has been completed.

POPULAR EMULSIFIERS – EMULSIFYING WAXES (“E-WAXES”) AND ALCOHOLS:

BEESWAX is not an emulsifier on its own. Beeswax and Borax in combination make a natural emulsifying system, but their consistency will not have the same high quality that emulsifiers made with Cetearyl Alcohols can offer. A very small amount of Borax is required, but using beeswax without it can make a cream or lotion fail. An emulsion can be created with a combination of natural ingredients. These ingredients must always be combined in order to have an emulsifying effect, unlike wax, which works all on its own. A good starting combination for a natural emulsifier is Beeswax, Liquid Lecithin, and Borax. Here is a simple formula for a basic natural emulsion recipe: *80% Beeswax, 10% Borax, and 10% Liquid Lecithin.*

EMULSIFYING WAX NF (INCI NAME: CETEARYL ALCOHOL (AND) POLYSORBATE 60) can be used to create thin or thick emulsions, depending on the concentration used. The typical usage rates are 3-6% of the total recipe weight. The advantage of using this emulsifying wax for cosmetic preparations is that it does not leave a residue on the skin. It has excellent stability and will not cause the ingredients in a product to separate.

(INCI NAME): CETEARYL ALCOHOL is a fatty alcohol that is a combination of Cetyl and Stearyl alcohols. It is known to be a skin softener and conditioner, lending emollience to a moisturizer. The typical usage rates are 1-25% of the total recipe weight. It can be used as a thickener and stabilizer as well. Using 1% will thicken a product to the consistency of a light lotion. For the rich consistency of a hand cream, a maximum amount of 25% is suggested. It can be used as a co-emulsifier if used at concentrations of 2% or less.

(INCI NAME): CETEARETH-20 can be used on its own or it can be combined with other emulsifiers such as Glyceryl Stearate. It gives a silky, shiny feeling to the finished product. The typical usage rates are 1-6% of the total recipe weight. The maximum usage level recommended is 30%.

(INCI NAME): GLYCERYL STEARATE is both an emulsifier and a stabilizer for emulsions, the latter being a chemical that inhibits emulsions from separating. It helps reduce the surface tension of the substances that are to be emulsified. It works as a lubricant giving skin the appearance of being soft and smooth by forming a barrier on the skin's surface, thereby slowing the rate of water loss. Usually, it is used in combination with another emulsifier such as Polysorbate 20 or Ceteareth-20. The typical usage rates are 1 - 5% of the total recipe weight.

(INCI NAME): CETEARYL ALCOHOL/ CETEARETH-20 is not a wax but rather a waxy pellet that is used in lotions. It is especially beneficial for lotions that are intended to be thick and waxy such as those for the tougher skin of elbows and feet. The typical usage rates are 2% or 6% of the total recipe weight. It can also be combined with an emulsifying wax.

Before Adding An Emulsifying Wax To A Moisturizer Recipe, A Few Factors Need To Be Taken Into Consideration:

NATURAL VS. SYNTHETIC EMULSIFIERS: Even the most "natural" emulsifiers need to be extracted, separated, and processed out of plant oils and fats until they become the emulsifiers that are commonly used.

CERTIFIED VS. NOT CERTIFIED: A supplier should be able to clarify whether or not an emulsifier is organically certified for those that are strict on using only certified products. Not all "natural" emulsifiers are going to be certified, as there are high costs to become certified.

GLOBAL STATUS: Criteria to consider may include the status of the emulsifier being vegan, halal or kosher.

SUSTAINABILITY: Some DIY cosmetic producers insist on using only fair, sustainable, non-bioengineered oils for emulsifiers such as palm oil or palm oil derivatives. There are varying levels of sustainability and emulsifiers that are palm-derived do not always carry the name "palm." Some of the examples of plant/palm-derived ingredients include Cetyl Alcohol, Cetearyl Alcohol, Palm Kernel, Olive, Sunflower, high- and mid-oleic Sunflower, Peanut, and Coconut oils.

HLB: HLB stands for "Hydrophilic Lipophilic Balance." There is a belief that emulsifiers that are water-soluble (higher HLB value) are best suited for oil-in-water emulsifications and those that are oil-soluble (lower HLB value) are best suited for water in oil emulsifications.

OPTIMUM OIL PHASE CONCENTRATIONS: The performance of the emulsifier is affected by the amount of oil used in the products, so it is important to know in which particular oil phase the emulsifier would work best.

VISCOSITY RANGE: The type of emulsifier used can adjust the viscosity of the product. The emulsifier selected should suit the desired viscosity range, whether it is that of a body milk moisturizer or that of a thick night cream.

REQUIREMENT OF A STABILIZER/CO-EMULSIFIER: Co-emulsifiers are emulsifiers that are not meant to emulsify on their own and are instead used to enhance the activity of an existing emulsifier. Some emulsifiers might require the addition of a stabilizer or co-emulsifier for increased product viscosity and stability. The requirements of the formula should be considered before adding a co-emulsifier. To illustrate, if an emulsifier works only with a synthetic stabilizer, it should not then be used in an organic or natural formula.

BEST WORKING PH RANGE: Emulsifiers have ideal pH ranges at which they work best. Departing from this range may cause changes in the texture, appearance, viscosity or stability of the product. It is even more vital to consider the pH range when creating the product's preservative. To illustrate, if using a weak acidic preservative that works most efficiently at a pH that is lower than the pH at which the emulsifier works, then either the preservative or the emulsifier needs to be changed.

ALCOHOL TOLERANCE: Due to their binding and emollient properties and their ability to alter the consistency of liquid products, fatty alcohols that protect and soften the skin are often incorporated in emulsions and are then referred to as "co-emulsifiers," because they are meant to support the other "main" emulsifier. Alcohol has the power to weaken many emulsions, however. Suppliers can provide more information regarding the alcohol tolerance of a product if alcohols are going to be applied to emulsions.

OIL PHASE CHARACTER: It is imperative that the chosen emulsifier suits the ingredients in the moisturizer. Sometimes the oils used will be plant oils, waxes, and butters and at other times they might be fractionated oils, fatty alcohols or monoesters rather than triglycerides (fats and oils.

COLD VS. HOT PROCESS: The most commonly used emulsifiers come in the forms of pellets, flakes or powders that need to be melted with the oil or water phases. This can be a disadvantage if heat-sensitive ingredients are also being used, but should be used if ingredients do need to be melted. Liquid emulsifiers are available that allow for a cold blending technique.

SHEAR TOLERANCE: Some emulsifiers require a homogenizer, which is a mixer that produces fine particles and droplet sizes, as well as a "high shear" - the rate at which fluid moves between two parallel plates, one being stationary and the other moving at a constant speed. Some emulsifiers cannot withstand high shear and would be destabilized by a homogenizer.

APPLICATION DOSAGE: The emulsifier is generally added at approximately 20% of the oil phase, though some work best at lower or higher concentrations. The concentration can be reduced with the addition of co-emulsifiers or stabilizing agents.

Complied by

C. S. Joshi
Director Farelabs & President, OTAI- NZ

HEALTH NEWS

Chia genome sequenced, revealing potential health benefits

Background

Chia, a nutrient-rich food crop primarily grown in Southern Mexico and Central America, is crucial for long-term food and nutrition security. Global crop enhancement programs have increased grain production and saved several lives, but hidden hunger remains a significant issue. It is essential to diversify the diet of humans by adding produce of nutrient-dense minor crops and orphan crops grown in marginalized areas to ensure long-term food and nutrition security.

The emphasis on these crops has enhanced global demands, increased consumers, and made them valuable in mitigating climate change threats. Constructing genetic resources for these underutilized crops could enhance their manufacture and sustainability.

About the study

In the present study, researchers investigated the chia transcriptome.

The research involved genomic sequencing, transcriptomic analysis of metabolic genes (rosmarinic acid production, seed mucilage synthesis, and fatty acid metabolism), and the discovery of useful genetic indicators for the enhancement of crops. Chia seeds of the second-generation inbred varieties were grown in eight-inch-wide containers with autoclaved soil and meticulously watered in a controlled greenhouse environment.

Young leaves were collected from 14-day-old seedlings that had been pretreated under dark conditions for 2.0 days, frozen in nitrogen solution, and transported for genome deoxyribonucleic acid (DNA) retrieval, sequencing, and assembling. They created two Dovetail HiC genetic libraries and a Chicago HighRise deoxyribonucleic acid sequencing library for genomic scaffolding. For the de novo assembly, they used an array of 2x150bp paired-end genetic reads obtained by shotgun-type sequencing. The initial data set included 956 million pairs of gene reads from paired-end genetic libraries.

The team predicted de novo repeats, combining six plant libraries with the identified de novo gene repeats. They performed genetic model estimation using biopeptide datasets from five species and four Lamiaceae plants. The researchers used a trained dataset with external clues generated from previously published ribonucleic acid sequencing (RNA-seq) analyses of 13 tissues for genetic model estimation.

The team in silico analysed the presence of biopeptide signatures in the chia proteome that can impact human health positively. They used a library of curated biopeptides as a probe to identify similar sequence signatures in chia proteins. The HiRISE pipeline was used for genomic assembly and scaffolding improvements, predicting subcellular locations of proteins encoded by the chia genome and comparing recently published reports of *S. Hispanic a* genome sequences to their chia genomic assembly and gene mappings. The researchers created highly accurate splice site classifiers to filter splice junctions in RNA-Seq read alignments.

Results

The chia genome spanned 304 Mb and encoded 48,090 protein-encoding genes. The analysis showed that 42.0% of the genome harboured repetitive information and identified three million single nucleotide polymorphisms (SNPs) with 15,380 simple sequence repeat (SSR) regions. The researchers built the haploid-type chid genome with a 356 Mb genome size. The HiRISE scaffolding produced 304 Mb (85%) of the expected chia genomic size, with 2,185 scaffolds and a projected physical cover of 2692x.

The sequenced genome was made up of 299 Mb of scaffolds encoding haploid chromosomes or pseudomolecules. The newly published transcriptomic atlas data from 13 tissue samples mapped onto the six biggest scaffolds provided 99.0% of de novo generated transcripts. The findings indicated that the six scaffolds span nearly all of the transcribed areas and correspond to haploid chromosomes. By detecting its repeat content, the genome assembly was repeat masked, making up 42% of the chia genome. The most prevalent repeat sequences (99.6 Mb) were not classified, indicating they were not found in public databases.

For genetic model estimation and downstream evaluation, researchers only used six pseudomolecules (Sh1-6). To generate non-redundant and comprehensive gene models, 48,743 protein-encoding genes were filtered by gene filtering, analysis, and conversion The chia genome had 799 transfer ribonucleic acid (tRNA) genes, 30 and 70% more genes than those of tomato and Arabidopsis, respectively. The ribosomal RNA (rRNA) annotation identified 37 rRNA genes in the genome, of which only ten were present in the pseudochromosomes. The team identified 98 members of the lectin family homologs in chia based on sequence similarity to the Arabidopsis lectin family members.

Based on the study findings, the reference genome of the nutrition-rich orphan crop chia (Salvia his panica) provides nearly complete coverage of the gene space and contributes to genomic data resources. The 304 Mb genome assembly comprises 2,185 scaffolds covering 94% of the gene space and 48,090 protein-coding genes. The team proposes consistent naming of chia chromosomes and a reference genome nomenclature based on chromosome numbers and gene locations in pseudochromosomes. Harmonizing genome and gene nomenclature is a high priority

Ref: Gupta P et al., (2023) Reference genome of the nutrition-rich orphan crop chia (Salvia hispanica) and its implications for future breeding. Front. Plant Sci. 14:1272966.

Vegetables, legumes, and seafood diet linked to lower heart risk in older men

In a recent study published in *The Journal of nutrition, health and aging*, researchers used the *a posteriori* dietary approach involving empirically derived dietary patterns to investigate the cardiovascular outcomes of various diets in men over 75. Their study cohort comprised 539 men with major adverse cardiovascular events (MACE) scores available. Statistical analyses of the relationship of participant diet with MACE scores revealed that vegetables-legumes-seafood resulted in significantly improved cardiovascular health and reduced MACE risk when compared to diets consisting of wholegrains-milk-other fruits or discretionary-starchy vegetables-processed meats.

Age, cardiovascular disease, and the role of diet

Cardiovascular diseases (CVDs) are an umbrella term for disorders of the heart and blood vessels. They include coronary heart disease (CHD), cerebrovascular disease, and rheumatic heart disease and serve to predict major adverse cardiovascular events (MACE). CVDs are the leading cause of global human mortality, and alarmingly, their prevalence is on the rise. A combination of poor dietary choices and increased sedentary lifestyles have resulted in the number of CVD cases doubling from 271 million in 1990 to over 523 million in 2019, with these conditions estimated to claim more than 17.9 million lives each year.

Extensive research has established the impacts of modifiable lifestyle and health behaviours on CVD and MACE. Sleep, physical activity, and diet have been given special attention due to their dual causal and protective effects on cardiovascular health. Interestingly, recent studies suggest that age may play a role in the physiological response of individuals to health behavioural interventions, particularly diet.

"…there is emerging evidence on the different effects in older adults compared to their younger counterparts, whereby some research showed weaker associations between dietary patterns and CVD risk factors in adults aged 60 years and over."

Dietary patterns refer to the amalgamation of food items, nutrients, and their consumption frequency. Research into dietary patterns is slowly replacing studies on single dietary items due to the former's ability to represent synergistic effects of food invisible to the latter. Evaluations of dietary patterns are of three main types – 1. *a posteriori* (data-driven), 2. *a priori* (hypothesis-driven), and 3. hybrid (combinations of the *a posteriori* and *a priori*). The *a posteriori* approach is ideal for best understanding the impacts of diets on cardiovascular health.

"…this approach is independent of existing knowledge, takes into account multiple dimensions, provides valuable insights into the interrelationships between food combinations and the habitual dietary patterns adopted by individuals."

Previous research into the associations between dietary patterns and cardiovascular health presents two main shortcomings – they focus on younger adults, and the outcomes of interest surround CVD, CHD, or mortality, with MACE being largely ignored.

About the study

The present study aims to assess the associations between dietary patterns and MACE metrics in adult Australian men over the age of 75 years. The study sample group was derived from the Concord Health and Ageing in Men Project (CHAMP), a prospective epidemiological cohort investigating aging in men. Of the 1,705 men recruited during the first wave (2005-2007) of the CHAMP study, 794 men continued participation during the third wave (2010-2013), during which time dietary data collection was performed. Of these, 782 possessed both medical and MACE history data and were included in preliminary analyses. Participant follow-up was conducted for a median of 5.3 years.

Individuals with a history of myocardial infarction (MI), congestive cardiac failure (CCF), stroke, or coronary revascularization were excluded from the study, resulting in a final sample cohort of 539 men. Data collection comprised dietitian-administered diet history queries (for dietary intake), MACE data obtained from the New South Wales (NSW) Centre for Health Record Linkage (CHeReL), and 'other measurements.' The 'other measurements' refer to participant anthropometry, lifestyle, socio-demographics, and self-reported health factors. The Physical Activity Scale for the Elderly (PASE) metric was used to assess participants' physical activity levels.

Dietary data was assessed per the Australian Guide to Healthy Eating and comprised 23 food groups. The Kaiser–Meyer–Olkin measure and Bartlett's test were used to derive factor scores and participant dietary pattern conformity, respectively. MACE outcomes were computed using the five-point MACE scale consisting of all-cause mortality, coronary revascularisation, MI, CCF, and ischaemic stroke. A four-point MACE computation was also carried out, wherein all-cause mortality data was excluded from analyses.

Statistical analyses included median tests, Bonferroni corrections, and Cox regressions to elucidate the associations between the five- or four-point MACE with different dietary patterns, with results expressed as hazard ratios (HRs).

Study findings

Factor analysis revealed three broad dietary patterns in included participants, namely ‘vegetables-legumes-seafood’ (9.13%), ‘discretionary-starchy vegetables-processed meats’ (7.07%), and ‘wholegrains-milk-other fruits’ (7.73%).

Analyses of the associations between these dietary patterns and MACE revealed that the ‘vegetables-legumes-seafood’ dietary pattern resulted in lower HRs for both the five- and four-point MACE. In contrast, both the other dietary patterns were associated with increased MACE HRs, with ‘wholegrains-milk-other fruits’ predicting the most adverse MACE outcomes.

“…the results of this study showed that empirically derived dietary patterns can provide insight on how the interactions between foods consumed habitually in the population can influence associations. Although the middle tertile of the ‘vegetables-legumes-seafood’ dietary pattern also had higher intakes of red meat than the bottom tertile, a food group associated with increased risks of CVD mortality, the high consumption of cardioprotective foods such as vegetables may have attenuated the association.”

These findings highlight the benefits of the ‘vegetables-legumes-seafood’ diet, particularly in elderly men above the age of 75, and may form the basis for future research aimed at evaluating the differences between the dietary responses of younger and older individuals.

Ref: Luong, Rebecca, et al. “Empirically Derived Dietary Patterns Are Associated with Major Adverse Cardiovascular Events, All-cause Mortality, and Congestive Cardiac Failure in Older Men: The Concord Health and Ageing in Men Project.” The Journal of Nutrition, Health and Aging, 2023,

Study links organic Mediterranean diet to improved male fertility

Researchers in Italy have recently explored the beneficial effects of a low-carbohydrate organic Mediterranean diet on male fertility. Their study is published in the journal *Current Research in Food Science.*

Background

Infertility is a significant healthcare problem, affecting around 8 – 12% of couples worldwide. About 50% of couples’ infertility is associated with male reproductive complications. In addition to reproductive complications, unhealthy lifestyles and environmental toxin exposure are major contributors to male infertility.

Testosterone is the primary male hormone responsible for male sexual characteristics, spermatogenesis, and fertility. It plays a vital role in controlling testicular cell apoptosis and preventing sperm DNA damage. In obese men, low levels of testosterone, together with high levels of free radicals, have been found to trigger sperm DNA fragmentation.

Among various lifestyle factors, poor dietary habits are known to potentially affect fertility. However, no clear guidelines on dietary patterns are available for couples trying to conceive. The Mediterranean diet is regarded globally as the most beneficial dietary pattern for maintaining optimal health and reducing the risk of chronic diseases.

In this study, scientists have investigated the impact of consuming a low-carbohydrate organic Mediterranean diet on male reproductive health.

Study design

The study was conducted on 50 sub-fertile men, with an age ranging from 35 to 45 years. They were provided a Mediterranean dietary regimen, including 80% organic foods. Only carbohydrates with a low glycemic index were included in the diet.

Among 50 participants, 20 were separately instructed to reduce their carbohydrate intake to 35% of their daily calorie intake. All participants were asked to follow the diet plan for a period of three months.

The eating habits of all participants were assessed between 2020 and 2021. A food-frequency questionnaire assessed participants' adherence to the study diet. Blood and semen samples collected from the participants were analyzed to measure testosterone level and sperm DNA fragmentation index, respectively.

Important observations

The assessment of the pre-study eating habits of participants indicated a high intake of low-quality proteins and refined and high glycemic index carbohydrates. A high intake of coffee, dairy products, and processed foods was also observed among many participants.

Sperm DNA fragmentation and testosterone levels were measured after the implementation of personalized diet regimens for a period of three months.

A significant increase in testosterone levels was observed among participants who consumed lower amounts of refined carbohydrates and higher amounts of whole grains, fresh vegetables, and legumes while avoiding processed foods and dairy products.

Similarly, a significant reduction in sperm DNA fragmentation was observed among participants who consumed a 35% carbohydrate diet. This particular diet was rich in antioxidants because of the inclusion of red fruits and fresh vegetables. Similar to the other cohort, individuals in this group refrained from consuming dairy products and processed foods.

Study significance

The study describes the male reproductive health benefits of an organic Mediterranean diet rich in antioxidant and detoxifying foods, polyunsaturated fats, and whole grains. The diet considerably increases testosterone levels and reduces sperm DNA fragmentation.

Evidence indicates that testosterone level and carbohydrate and protein intake are inversely correlated. Reducing processed and dairy product intake and modifying carbohydrate intake in the study diet might be responsible for increased testosterone levels among participants.

Furthermore, the study diet is enriched with antioxidants and vitamins, which play vital roles as non-enzymatic antioxidants to protect sperm DNA from free radical-induced oxidative damage.

Overall, the study finds that consuming a pre-conception low-carbohydrate and 80% organic Mediterranean diet rich in legumes, whole grains, and green leafy vegetables can benefit male reproductive health.

Ref: Corsetti V. 2023. Effects of the low-carb organic Mediterranean diet on testosterone levels and sperm DNA fragmentation. Current Research in Food Science

New study pinpoints mitochondria as key player in dietary fat-cancer connection

The research study is entitled "The Central Role of Mitochondria in the Relationship between Dietary Lipids and Cancer Progression". It revealed new findings on the factors that influence the development of diseases, such as the particularly interesting relationship between dietary fats and the development of cancer. Researchers discovered a key element in this relationship: mitochondria.

In the field of nutrition, the levels of dietary fats in an organism are the results of the interaction between the diet and the metabolic pathways of lipid biosynthesis present in cells. Diet plays an important role in the onset and progression of oncological diseases; several studies have confirmed this. However, mitochondria also stand out as fundamental elements in the progression of this disease, as they act from different perspectives.

Mitochondria are essential organelles in cancer cells and play numerous roles in the energy processing of a eukaryotic cell. One thing that has gained much attention from researchers is that, while tumor cells prefer the process of glycolysis as a source of ATP, it has been shown that mitochondria in tumours can operate oxidative phosphorylation at lower capacities together with glycolysis.

On the other hand, it is evident that lipids play diverse roles in cell biology, from membrane formation and lipid storage to cell signalling. Previous research highlights that, in addition to evidence supporting "de novo" lipogenesis as an important source of lipids for cancer cells, exogenous lipid uptake also remains an important lipid contribution to such cells. By analysing both in vitro and in vivo findings, it is possible to better understand how fatty acids play a crucial role in cancer cells. From the stimulation of tumour growth to the modulation of molecular pathways involved in physiology and pathological processes.

Lipid metabolism plays a key role in the early stages of carcinogenesis. It has been observed that cancer cells show an increased ability to utilize both exogenous and endogenous lipids to support their rapid proliferation and survival

In addition, there is evidence that specific lipids, such as omega-3 fatty acids, may have protective effects against cancer. These lipids have anti-inflammatory and anti-angiogenic properties that may help slow tumour growth.

Another interesting aspect focuses on the study of the metabolome to better understand the relationship between dietary lipids and cancer. The metabolome is the total set of metabolites present in a cell under given conditions and reflects the functional and biochemical changes in a pathology such as cancer. Technological advances in mass spectrometry have allowed a detailed characterization of the metabolome, identifying specific changes in lipid composition associated with different types of cancer. This information is valuable for identifying specific biomarkers that can be used in the early diagnosis and monitoring of cancer, as well as in the development of new therapeutic approaches.

The relationship between dietary fats and cancer progression is complex and multifaceted, with mitochondria playing a crucial role in this interaction. Understanding how fats and mitochondria affect carcinogenesis and therapeutic response may have important implications for cancer prevention and treatment. Continuing to investigate this relationship will allow the development of personalized dietary and lifestyle strategies to reduce the risk of cancer and improve the quality of life of patients diagnosed with this disease.

Understanding the dynamics of these interactions is critical to advancing scientific knowledge and developing balanced strategies for nutrition and cancer prevention.

Ref: UNEATLANTICO - European Atlantic University (Universidad Europea del Atlántico)

Lysopine lipids show promise in boosting insulin secretion in diabetics

While sugar is the most frequently named culprit in the development of type 2 diabetes, a better understanding of the role of fats is also essential. By analyzing the blood profiles of dozens of people suffering from diabetes or pre-diabetes, or who have had their pancreas partially removed, researchers at the University of Geneva (UNIGE) have made two major discoveries. Firstly, the lipid composition of blood and adipose tissues fluctuates during the day, and is altered in a day-time dependent manner in diabetics, who have higher levels of toxic lipids. In addition, one type of lipid, lysoPI, is capable of boosting insulin secretion when the beta cells that normally produce it fail. These results, published in the journals *Cell Reports Medicine* and *Diabetes,* may have important implications for the treatment of diabetic patients.

The role of lipids in the physiological and pathological processes of human metabolism is gradually becoming clearer, particularly in type 2 diabetes, one of the most widespread serious metabolic disorders. Thanks to cutting-edge tools, in particular mass spectrometry, researchers are now able to simultaneously measure the levels of several hundred different types of lipids, each with its own specific characteristics and beneficial or harmful effects on our metabolism.

''Identifying which lipids are most present in type 2 diabetics could provide a basis for a wide range of interventions: early detection, prevention, potential therapeutic targets or personalised recommendations — the possibilities are immense,'' indicates Charna Dibner, a professor in the Department of Surgery, and Pierre Maechler, a professor in the Department of Cell Physiology and Metabolism, at the UNIGE Faculty of Medicine, and members of the Diabetes Faculty Centre, who led these studies. ''This is why we carried out a detailed analysis of the blood profiles of patients recruited in four European countries and confirmed some of our results on a mouse model of the disease.''

Chronobiology to better identify diabetes

The team led by Professor Charna Dibner, a specialist in circadian rhythms in metabolic disorders, carried out a ''lipidomic'' analysis of two groups of patients in order to establish the profile, over a 24-hour cycle, of multiple lipids present in the blood and adipose tissues. ''The differences between the lipid profiles of type 2 diabetics and people without diabetes are particularly pronounced in the early morning, when there is an increase in certain toxic lipids,'' explains the researcher. ''Why? We don't know yet. But this could be a marker of the severity of diabetes and paves the way for personalised care according to each patient's specific chronotype.''

And implications go beyond diabetes: if samples are taken at very different times of the day, the results can be distorted and give contradictory results. ''It's the same thing in the clinic: an examination carried out in the morning or evening, or a treatment taken at different times, can have an impact on diagnosis and even on the effectiveness of treatments.''

A crutch for beta cells

Charna Dibner and Pierre Maechler extended their lipidomic analyses to include not only people with type 2 diabetes but also a mouse model of pre-diabetes and patients who had lost around half their insulin-producing beta cells after a surgery. ''We discovered that a type of lipid, lysoPIs, increases when there is a sharp decrease in functional â cells, even before the onset of clinical symptoms of diabetes.''

The scientists then administered lysoPI to diabetic mice and observed an increase in insulin production.

The same phenomenon occurred in vitro, on pancreatic cells from diabetic patients. The lysoPIs therefore have the capacity to reinforce insulin secretion by acting as a crutch when the number of beta cells decreases or when these cells malfunction. Yet, certain foods, such as legumes, naturally contain lysoPI precursors.''

Pierre Maechler, Professor, Department of Cell Physiology and Metabolism, at the UNIGE Faculty of Medicine

By bringing to light the unsuspected role of lysoPIs, researchers will be able to explore new avenues opened by their discoveries. The development of dietary supplements or even molecules specific to lysoPI receptors could be an interesting strategy for controlling diabetes, as could taking better account of the chronobiological profiles of patients. Diabetes is a complex disease that calls for much more personalized management than is currently the case.

Ref: University of Geneva

BASIL ESSENTIAL OIL

Introduction

Tulsi oil is extracted from holy basil (Ocimum basilicum), a variety of basil that is native to the Indian subcontinent. This bushy plant can grow from two to three feet tall, with serrated oval leaves that can range from light green to purple (depending on the variety).

The Tulsi plant is extremely sensitive to frost and thrives best in warm Mediterranean climates, just as other basil species do. But while it grows best out in the garden, you can still develop this herb indoors. Because of its several beneficial properties; the Tulsi plant has been dubbed the "Queen of Herbs." The name Tulsi itself translates to "the incomparable one," which probably refers to the numerous health benefits it can provide.

Tulsi plays a great role and one of the herbs of India's ancient holistic health system called Ayurveda. In fact, Ayurveda means "knowledge of life," and herbs are in the middle of this practice. This is why it's not surprising that Tulsi oil has garnered considerable attention, particularly because of its soothing effects. The unique fragrance and medicinal qualities that holy basil oil offers absolutely make it deserving of the title "elixir of life."

Ocimum basilicum L. is the ground part of the annual herb basil of the lipodiaceae. The whole plant of basil can be used as medi- cine. Basil has the functions of sterilization, anti-inflammatory and stomach-strengthening, and can be used for the treatment of gastrointestinal tract, arthritis and other diseases. The flow- ers, stems and leaves of basil have a certain fragrance. They are an important source of seasoning in Bozhou folk areas. Basil is rich in volatile oil, volatile oil is one of the important of basil play a role of pharmacological active ingredients, the essential oil is mainly composed of eugenol, linalool, anethole.

ÿþVolatile oil evaporates easily at room temperature. As an important effective component of traditional Chinese medicine, volatile oil is widely distributed in the plant kingdom, and its content is generally less than 1%. Volatile oil mainly contains terpenoids, aromatic family, fatty family com- pounds, etc.

Botanical Name

1. Botanical name: Ocimum basilicum
2. Family Name: Lamiaceae
3. Common name: Basil or Sweet basil
4. Part Used: Leaves
5. Blends well with: Black pepper, Ginger and Fennel.

Cultivation and Harvesting

Basil is a member of the mint family. Sweet basil is the most common culinary basil. Physically, basils are characterized by square, branching stems, opposite leaves, brown or black seeds, and flower spikes Large-leaved basils, such as sweet basil, Italian basil, and lettuce-leaf basil can grow two to three feet in height. Small leaved basil such as lemon basil, dwarf basil, bush basil, or spicy globe basil will grow 8 to 12 inches in height and width. Reddish-purple variations such as Dark Opal and Purple Ruffles tend to be intermediate in size, bearing purple instead of white flowers. Although these varieties have minor nuances in flavour, they are used for food preparation. In the United States, basil is grown commercially in western and southern states where the climate is favourable including. Arizona, California, Florida, New Mexico, and North Carolina. Production statistics for basil are not tracked individually, but they are included in the larger 'herb' category. Mexico is a larger exporter of basil to the United States.

Basil is cultivated in climates with temperatures ranging from 45Ú to 80ÚF. This tender herbaceous annual is susceptible to frost and cold-temperature injury. It develops best during long days in the full sun with well-drained soil. Basil can be directly seeded or transplanted to the field in late spring once all danger of frost has passed. Rows are planted 25 to 35 inches apart, with plants spaced every six inches. Basil can also be planted in raised beds in rows of three lines.

The distance between rows is determined by a grower's equipment, but generally ranges from 10 to 15 inches. Soil is kept moist to encourage germination and improve plant establishment. Germination occurs within eight to 14 days after seed planting. Initial growth is slow, but after the first few sets of leaves appear, growth increases dramatically. Some small growers use transplants to raise basil as an annual crop for the fresh basil market.

Transplants normally require approximately 28 to 42 days for growth. Lateral branching and growth may be encouraged by topping when the plants are five inches high. Topping promotes branching and helps to maximize plant growth when three to five sets of true leaves are present. True leaves appear as the second set of leaves after a plant germinates. (The first set of leaves are the plant's food structure and are not leaves at all.)

Basil does not tolerate water stress and needs to be watered regularly. Drip irrigation is preferred since it minimizes damage to foliage caused by moisture contact with the leaves. The need for fertilizing basil is determined by soil type, previous applications of fertilizer, and previous crop type. In general, a fertilizer that provides nitrogen, phosphorus, and potassium is recommended. Fertilizer can be spread over a field and ploughed in or applied by 'side dressing,' which refers to application of a fertilizer between the rows of a growing crop. Basil is typically grown commercially without the application of herbicides after plant emergence. Growers rely on mechanical cultivation, high plant populations, use of mulch, and manual weed removal for weed control.

Although a variety of different insect, fungal, viral, and nematode pests can affect basil, relatively few pesticides are approved for use on growing basil plants. Novel or organic methods such as biological control using beneficial insects or bacteria, insecticidal soaps, plant extracts, pest traps, manual pest removal, and organic insecticides are used. In some cases, applications of chemical controls can be applied during pre-planting or pre-emergence. The part of the plant that is harvested and the timing of the harvest depend on the anticipated use of the herb. For dried basil leaves, the plant is cut just prior to appearance of flowers. To produce essential basil oil, the plant is harvested when the flowers are in full bloom. In warmer climates, three to five cuttings can be made per year. In cooler climates, the growing season may only allow two cuttings per year; the first usually begins in early summer and the second just before bloom. Basil leaves are harvested above the bottom two to four sets of true leaves for fresh and dried markets. In larger commercial operations, basil plants are cut four to five inches above the ground to allow for regrowth. Planting and harvesting dates are staggered to allow continuity in the supply of fresh basil leaves. For the fresh market, the length of the stem may be important, as is the pack or bundle size and weight. Small scale production is labour intensive and requires that workers cut leaves using a sharp sickle type knife and place the loose leaves in a tote or container.

For large scale commercial operations, harvesting is conducted by using a modified sickle bar/jerry mower pulled by a tractor. The height of the cutting blade is adjustable depending the cut required. Some growers harvest the entire plant depending on market demand.

If marketed fresh, the leaves are washed and cleaned, removing all weeds and extraneous field material.

Basil is packaged in bulk boxes in the field and transferred to storage rooms below 50ÚF for short periods of time without inducing chill damage. Shipped to a packinghouse, the herb is hand sorted and placed into small plastic clam shells for retail sales. Whole plants are wrapped in plastic to maintain their integrity.

Postharvest handling greatly impacts aroma, flavour retention, and leaf colour. When dried, the leaves are usually not subjected to temperatures over 90ÚF.

For the dried herb, low temperature drying of the leaves under forced air is used to retain maximum color prior to milling or distillation to extract essential basil oil.

Light modification by colour shade net manipulation plays an important role in the synthesis of bioactive compounds and has been shown to affect quantity and quality of essential oils in basil.

Sweet basil (*Ocumum basilicum* L. cv. 'Genovese') was used to determine whether different times of harvest could improve yield, chemical composition of essential oils and antioxidant activity under light stress conditions. The lowest accumulation of essential oils was observed in the second harvest from unshaded, control plants (1.02/ mL/100/ g) while the highest oil accumulation was achieved in first harvest from red nets (3.23/ mL/100/ g). The main constituents found in the oil were linalool (46.7–53.9%), eugenol (9.7–20.9%), 1,8-cineole (8.7–15.3%), epi-á-cadinol (3.3–4.5%) and á-trans-bergamotene (2.2–3.4%). Light manipulation by color shade nets also increased antioxidant activity. Plants grown under blue shade nets from the second harvest are characterized by the highest eugenol content (20.9%) and highest antioxidant activity (efficient concentration - EC_{50}, 0.003/ mg/ $mL^{"1}$). Direct sowing, high plant density, colour shade nets and successive harvests represents a new technology in basil production with high essential oil yield and quality.

Extraction of Basil Oil

ÿþTraditional methods for extracting volatile oil from basil include: water distillation, water distillation, organic solvent extraction, etc. Modern extraction methods include micro- wave method, supercritical fluid extraction method ultrasonic extraction method, etc. Organic solvent method is easy to bring impurities, resulting in residual organic solvent, and the cost of supercritical fluid extraction method is high.

The water vapor dis- tillation method has the method is simple, easy to operate, can greatly save time, increase the oil yield of volatile oil, save the original medicinal materials, thus it plays a role in saving energy, and also can avoid the impact of high temperature on the extraction of volatile oil. At present, steam distillation is more commonly used in the extraction of volatile oils in small-scale industry. In ÿþrecent years, with the continuous improvement of research methods and level, the extraction method of volatile oil has been further improved.

Specification of Basil Oil

Basil Oil BP, USP Grade (British and United State Pharmacopoeia):

It is extracted from the leaves and flowering tops of Basil plant by steam distillation method. Basil is of two kinds one is Holy Basil (Ocimum Sanctum) from which oil is obtained from the seeds and the other is Sweet Basil (Ocimum Basilicum). Several religions and spiritual beliefs emphasize the importance and significance of the use of basil oil. Basil is also known as the Queen of Herbs.

Specification of the Oil:

GENERAL CHARACTERISTICS

Product	BASIL OIL
Botanical Name	Ocimum Basilicum
Family	Lamiaceae
Part of the plant used	Leaves
Appearance	Clear liquid
Color	Pale yellow color clear liquid
Odor	Characteristic Odor and pleasent smell

PHYSIO-CHEMICAL PROPERTIES-

weight per ml	0.812 - 1.897
Refractive index	1.445 - 1.689
Optical rotation	(-4) - (+7)
Assay by GC	
Methyl chavicol	Min 72%
Linalool	10% - 45%
Alpha terpineol	0.2% - 9.0%
Methyl Eugenol	1.0% - 4.5%
Acidity	Complies
Storage	Store in Well Closed Container, in cool and dark storage area
Solubility	Soluble in Ethanol (70%)

BASIL OIL History

This amazing oil is native to India and is extracted from the flowering herbs by steam distillation method. This essential oil can be blended well with other essential oils like Lavender Oil, bergamot, clary sage, geranium, black pepper oil and marjoram Oil. It is non-toxic and non-irritant.

PROPERTIES

Basil Oil is a free-flowing, aromatic oil, with lesser viscosity than water. It is pale yellow to brown in color. It has a distinct aroma from the freshly crushed shoots of the basil plant. Find quality products with all supporting details at AOS PRODUCTS PVT LTD. Oil has anti-inflammatory, antimicrobial, antispasmodic, expectorant, febrifuge, nervine, ant-depressant, diaphoretic, insecticidal, antioxidant, analgesic, and stimulating properties.

CHEMICAL COMPOSITION:

It has the following major components in it: Alpapinene, Camphene, Beta-pinene, Myrcene, Limonene, Camphor, Linalool, Methyl Chavicol, Terpineol, Citronellol, Geraniol, Eugenol.

BASIL OIL USES & BENEFITS:

Aromatherapy Uses:

This oil is known to emit a sweet, warm, crispy, freshly floral and herbaceous scent. This oil is used in aromatherapy applications. It is used as an ideal oil for soothing and eliminating fatigue, headache, sadness, and discomfort of asthma. This oil is very beneficial for those who suffer from allergies, sinus congestion or infections, symptoms of fever, and poor concentration. The sweet scent of this oil helps to repel insects and eliminate bacteria. It helps to deodorize stale indoor environments, including cars and foul-smelling furniture and fabrics. Basil oil stimulates the body and mind to promote mental clarity, calm the nerves, and enhance alertness.

Therapeutic Uses:

It is reputed to have great anti-inflammatory properties that help to calm skin which is afflicted with complaints such as abrasions, acne, eczema and soothe the sores. If added to a warm bath and diluted, **sweet basil oil** may soothe menstrual cramps, *muscular aches, spasms, joint pains, gout*, joint pains, insect bites, and exhaustion.

Basil oil has expectorant properties, and ideal for reducing cough, cold, flu and fevers. It enhances immune function and comforts the distress of respiratory ailments such as bronchitis and emphysema. It helps to stabilize irregular menstrual cycles and address water retention. Its *digestive properties* give relief to the symptoms like vomiting, nausea, hiccups, and constipation.

Cosmetic Uses:

1. This impressive oil helps to nourish, refresh and support the repair of lusterless and damaged skin.
2. It helps to calm acne breakouts, **basil oil** production, alleviate dryness, and soothe symptoms of skin infections.
3. When used regularly and diluted, it exhibits exfoliating and toning properties, balances the skin tone, promotes the natural radiance of the complexion, and removes dead skin.
4. **Basil oil is used** in shampoos and conditioners, helps in regulating the scalp's oil production, facilitates healthy hair growth, and decreases the rate of hair loss.

Compiled By

Sneha Shukla,
M. Tech – Food Technology,
HBTU, Kanpur

LAUGH AND LOUD

Q. What are the elements of life?

A. Lithium and Iron = Life

****

Q. What do you call someone who says that a Lithium and Argon atom bonded?

A. Li-Ar

****

Q. Why don't people tell a lot of chemistry jokes?

A. They are scared of the reaction.

****

Fluorine and chlorine walk into a bar. The bartender greets them: "Halo gens"

Forget you are HDROGEN. You are my Number - one Element.

****

Q. Want to hear a Joke about Nitrogen Oxide?

A. NO

A neutron walked into a bar and asked how much for a drink. The bartender answered, "For you? No charge."

****

Q. How often should you tell a chemistry joke?

A. Periodically.

****

Q. What kind of dog did the chemist have?

A. laboratory retriever

****

Q. What do solids, liquids, and gasses have in common?

A. They all matter.

****

YOUNG MINDS

CRASH DIETING

by Mukesh Kumar, Farelabs

Food provides us with the nutrients we need for a healthy body and the calories we need for energy. If we consume more, the extra calories turn to fat and are stored in our bodies. If we overeat and choose wrong foods, we gain weight, and may become obese.

Obesity is increasing day by day in metros, especially among working women. So people use different crash diets to lose weight. A crash diet usually results in initial weight loss. However, this is thought to be caused by a loss of body water and lean muscle mass rather than fat. It is also accompanied by nutritional deficiencies.

Such sudden weight loss is followed by a plateau period - when weight just does not decrease. Disillusioned, the dieter usually goes on an ‘ eating binge’, and regains that weight which was lost, or even more. The gain causes the dieter to try another diet, creating a yo - yo pattern.

These diets ultimately fail and paradoxically lead to obesity for several reasons:

1. They cause a sudden weight loss that the body has no time to balance. so, the hypothalamus - the body’s weight maintaining gland - does not stabilise on a particular weight.

2. Sudden weight loss triggers the body’s life preservation mode, so the body gets into a spring - like state, ready to bounce back.

3. Metabolism is destabilised. So even small quantities of food cause rapid gain.

4. They prevent us from understanding healthy eating.

5. They prevent us from understanding that food is meant to provide nutrition and energy.

6. They drive women to binge eating all their lives.

MEMBERS' PAGE

WINTER WARM UPS

by R.C. ARORA (Ex. Manager Q.C. - S.F.F.I., New Delhi)

For most of us, winter is the nicest season of the year. We enjoy the good food, the better digestion and the weather. But the cold wind that comes with this season often leads to chills and pain in the joints. So what should be the foods and herbs that will keep you warm?

Pain in the joints is usually the result of nerve pains. This in turn is due to lack of vitamin B complex in the body. One way to add B complex to our diets is to eat a lot of whole grains. But often, the lack of B complex is combined with a deficiency of vitamin C, which is what leads to the chilly and painful filling in the nerves.

So ideally, combine your consumption of both these vitamins in this way: Eat sprouts with chopped tomatoes, cucumber, cabbage and a dash of vitamin C in the form of lime juice... If you would like to add some vitamin E to the mix - vitamin E is good for the nerves - then you can chop some almonds into this salad as well.

If your joint pain is severe, then it is suggested that you eat more flaxseeds, because these are a rich source of omega 3 fatty acids.

To keep warm, you should eat foods that take some time to be digested, because the process of digestion releases large amounts of heat in the body. The best foods for this purpose are complex carbohydrates, so porridge made of brown rice and vegetables *dalias* are all a good idea.

A good breakfast is a good way to keep warm in winter. When we eat in the morning, heat is naturally released in the body and that keeps us warm. At night, avoid rice, curd, cucumber and banana. Herbs like black pepper, ginger, garlic and cayenne pepper are excellent at raising the body temperature. And similarly, vegetables like tomatoes, carrots and beetroot are very warming and should be a regular part of your diet in winter. These foods enhance the quality of *pitta.* Eat oranges as well - because it is a winter fruit, it similarly improves *pitta*. Have regular body massages with mustard or sesame oil as both warm the body and also lubricate it well. And cook with mustard oil or sesame oil because they have what is called *garam tasir.*

Exercise regularly in the cold season because it boosts circulation. And certain *yoga* pranayams can actually make you warmer because they boost your internal energy - as advised by Dr. Shikha Sharma.

LIPID UNIVERSE

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

Subscription Form

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

NAME : .... DESIGNATION ....

ORGANIZATION ....

ADDRESS ....

....

DISTRICT .... CITY ....

STATE .... PIN CODE ....

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

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

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

Mail the Subscription Form to :
Dr. S. Adhikari, Editor, LIPID UNIVERSE
C/o Secretariat
Oil Technologists' Association of India, North Zone
D-18, Infocity Phase-II, Sector-33, Gurgaon-122001
Mobile : +91-9599056365, 9816631195
E-mail : lipiduniverse@gmail.com
: editorlipiduniverse@otai.org

Subscription Tariff

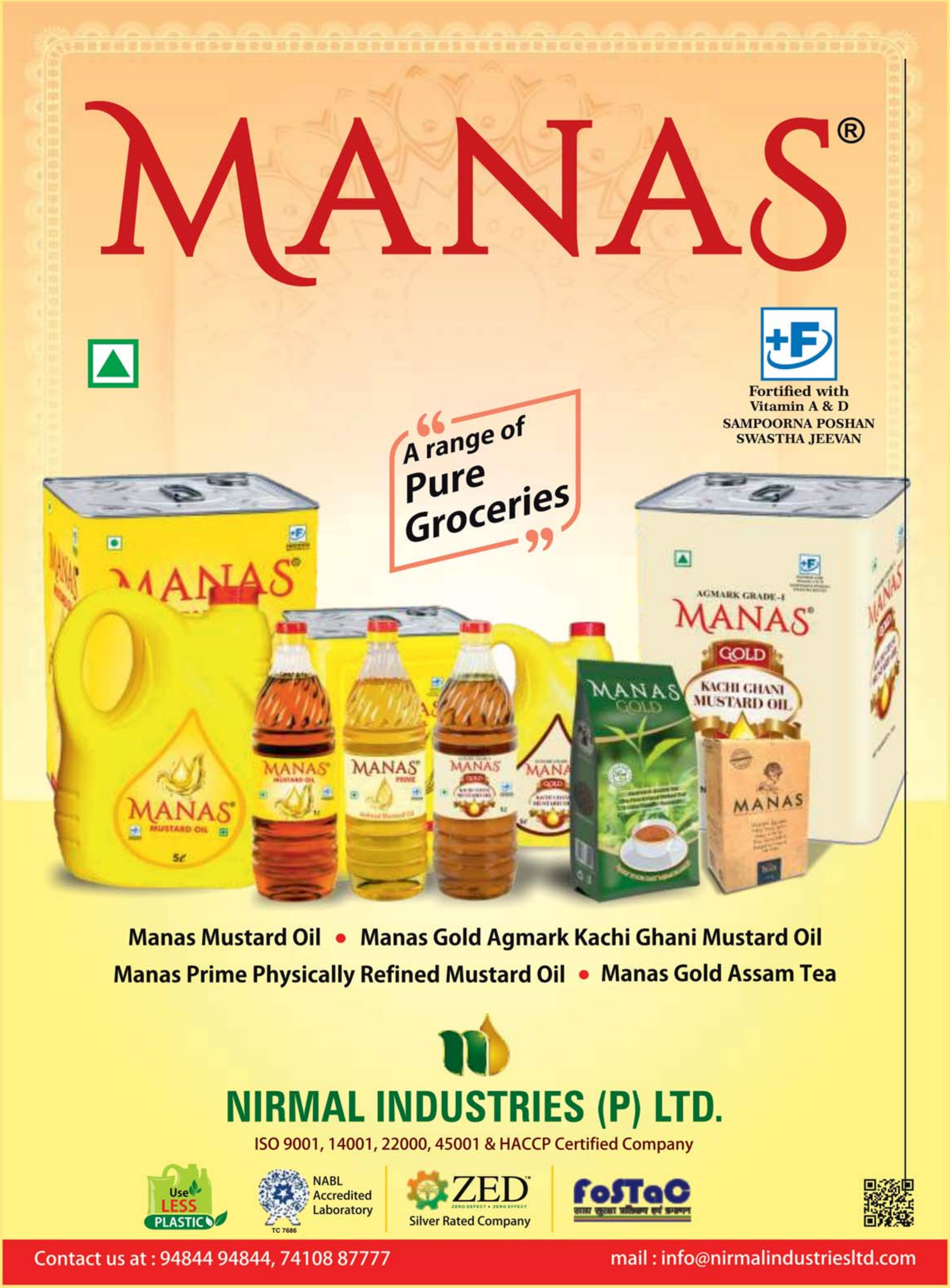
1 year : Rs. 800.00
2 years : Rs. 1500.00

MEMBERSHIP

For Membership Form & other Information Please visit our website "www.otai.org"

The quarterly periodical is published by Mr. CS Joshi, on behalf of Oil Technologists' Association of India, North Zone, CD-3/304, Sagar Complex, LSC, Pitampura, Delhi-110088. India. Phone : +91-11-27315848

Editor-in-Chief Mr. C.S. Joshi (9313066685), Editor: Dr. S. Adhikari (9816631195)
Asstt. Editor: Romesh Arora (9816631195)


MANAS®
Fortified with
Vitamin A & D
SAMPOORNA POSHAN
SWASTHA JEEVAN
"A range of Pure Groceries"
Manas Mustard Oil • Manas Gold Agmark Kachi Ghani Mustard Oil
Manas Prime Physically Refined Mustard Oil • Manas Gold Assam Tea
NIRMAL INDUSTRIES (P) LTD.
ISO 9001, 14001, 22000, 45001 & HACCP Certified Company
Use LESS PLASTIC
NABL Accredited Laboratory
TC 7686
ZED
Silver Rated Company
FoSTaC
Contact us at : 94844 94844, 74108 87777
mail : info@nirmalindustriesltd.com