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

Dear Friends,

In a rapidly evolving world where beauty, convenience, and global trade dominate consumer behavior, we often overlook the hidden costs to health, environment, and economy. Today's wellness narrative must expand beyond personal choices to systemic responsibility, considering everything from cosmetic safety to agricultural shifts and chronic disease.

A growing body of evidence now highlights the toxic effects of cosmetics on human health. Common ingredients such as parabens, phthalates, and heavy metals, found in everyday makeup and personal care products, are known endocrine disruptors. Their prolonged use has been associated with hormonal imbalances, reproductive issues, and even carcinogenic outcomes. While awareness is growing, regulatory action remains fragmented. India, a booming market for beauty products, must tighten labeling standards and safety testing protocols to protect consumers.

This is where Extended Producer Responsibility (EPR) emerges as a crucial regulatory tool. By placing the onus of post-consumer waste on manufacturers, EPR ensures accountability for packaging, plastic, and potentially hazardous waste generated by the cosmetic industry. India's EPR policy under the Plastic Waste Management Rules is a promising step, but it requires stricter implementation, broader coverage, and inclusion of non-packaging toxins - such as those in personal care items.

Beyond consumer goods, the agricultural landscape is undergoing transformation. In Myanmar, the decline in soybean meal demand - once driven by livestock and poultry feed industries - signals both economic distress and dietary shifts. Factors include political instability, rising import costs, and competition from alternative protein sources. This change not only affects Myanmar's economy but also regional trade, especially for neighboring nations invested in agri-exports.

On a more positive note, nutrition science continues to reaffirm the healing potential of plant-based foods. Tea, apples, and chocolate - long celebrated for their antioxidant richness - are now recognized as supportive agents for liver health. Their polyphenolic compounds aid in reducing oxidative stress and improving lipid metabolism, offering a natural countermeasure to modern lifestyle diseases.

At the center of many such chronic illnesses lies a biological imbalance often overlooked: lipid dysregulation. Research increasingly links lipid imbalances to chronic inflammation, particularly in the development of colon cancer. Abnormal levels of omega-6 and omega-3 fatty acids, along with dysfunctional cholesterol pathways, fuel an inflammatory environment conducive to tumor growth. This biochemical insight opens up new preventive strategies - targeting fat metabolism could hold the key to combating inflammation-driven cancers.

The common thread across these diverse issues - cosmetic toxicity, agricultural shifts, food as medicine, and lipid science - is the urgent need for integrative thinking. Health is not a siloed topic. It is shaped by policy, industry, lifestyle, and environment. Governments must act with stronger regulations; industries must innovate responsibly; and consumers must stay informed.

True wellness begins not at the surface level, but at the roots - in what we grow, consume, and allow into our bodies. The future of health lies not in isolated remedies, but in collective responsibility and a deeper understanding of the systems that sustain us.

Yours truly

C.S. Joshi

Editor-in-chief

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

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

Dear Readers,

With the gradual increase in consumer awareness for sustainability and green future, the industry is facing immense pressure of transition from traditional practices to eco- friendly and circular models - be it cosmetic toxicity, process manufacturing or packaging.

In India, the over - the - counter market is brimming with so many cosmetic and personal care products like perfume, deodorant, colouring materials, shampoo, black henna, skin lightening products etc. containing harmful materials found in the product formulations which draw attraction to develop eco- friendly product formulations for minimising environmental impacts and safety for human use.

Need of the hour is to reducing environmental impacts and promoting responsible resource management to achieve sustainability. In this context, producers, importers and brand owners have been made responsible for managing to ensure responsible disposal and recycling. They are to abide the law and Extended Producer Responsibility regulations made in India.

Essential oils offer a variety of potential benifits for well - being particularly for reducing stress and anxiety. In this issue, we have included Iris Essential Oil - it's production and applications.

In our member's page, it speaks about our skin care. How dull skin can arise from various causes and what are the tips for maintaing glow and radiant skin of our complexion using natural food ingredients, have been discussed here.

Yours truly
Dr. S. Adhikari
Editor

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

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TOXIC EFFECTS OF COSMETICS ON HUMAN HEALTH

By- Garima Tripathi[1], Himanshi Sethi[1], Lalit Prasad[1], Shafat Ahmad Khan[1], Subhalaxmi Pradhan[1] and S.N. Naik[2]*

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Abstract

A growing number of cosmetics and beauty products may lead to the adverse effect on human health. Various categories of cosmetics contain a variety of ingredients that may pose health risks over a period of time. The potential toxic effects associated with cosmetic products are skin irritation and allergies, respiratory Issues, carcinogenic risks, endocrine disruption and environmental impact etc. In this paper various cosmetic products and their ingredients and associated effects on human health have been discussed.

Introduction

Cosmetics are items that are applied to the body in order to beautify, disinfect, or improve the skin, as well as to enhance attractive features. Cosmetics include toothpaste, shampoo, conditioners, mascara, aftershave lotion, styling gel, creams, lotions, powders, fragrances, and other similar products. Cosmetics are scented and adorning substances that do not change the shape or function of the body. Cosmetics are referred to as beauty medicine. The term cosmetics was first applied to Roman slaves whose job was to perfume men and women. Since the Egyptians, each successive culture has coined unique terms to refer to cosmetics and fragrance as a single science, but after Rome, the science began to erode Women are the world's most dominant customers, controlling nearly 80% of household spending. Women's purchasing power and control can no longer be overlooked.

History of Cosmetics

Human beauty has been used for over 6000 years and has been adopted by virtually every civilization to the far reaches of the world in various forms. Cosmetology is believed to have arisen in countries like Egypt and India during the historical period. In Hindu culture, the use of Kajal has a long history. It has become a popular historical belief that eye make-up will fight off malevolent spirits and to enhance vision. Cosmetics usage has been a point of contention throughout history. As eye contamination has become more common and severe along the Nile, there has been a need to protect you from ocular scarring and the resulting blindness. As the kohl soaked into the eyes through tears, it can have continuous antibacterial benefits to both protect you and treat an infection. In today's regulatory setting, this may potentially classify kohl eyeliner as a topical antibiotic drug. As a result, kohl is one of the most successful cosmetics. Make-up became popular in the United States and Europe about 1910, thanks as a result of the impact of ballet and theatre performers. Colored make-up was introduced in Paris in 1910, Russian ballet made its debut with ochers and crimsons being the most common hues. Several Americans engaged in skin bleaching and hair straightening in the 1920s in an attempt to lighten their complexions and appear whiter. While traditional make-up has been used mostly by women to enhance their facial features, men are increasingly using cosmetics commonly associated with women to improve their face characteristics. Concealer is frequently employed by men who are aware of their appearance. Beauty product companies are going to be releasing beauty items designed specifically for men.

Cosmetic Toxicity

Carcinogens, pesticides, reproductive poisons, endocrine disruptors, plasticizers, degreasers, and surfactants are all potential carcinogens among the 10,000 synthetic chemicals listed as cosmetic ingredients by US researchers. According to studies, the average woman uses 12 different cosmetic products every day, but they can have a negative effect on human health. The majority of these items have at least 20 ingredients, many of which are detrimental to our health.

Skincare creams are a form of cosmetic.

1. Powdered substances
2. Fragrances
3. Lipsticks,
4. Detoxifiers
5. Items for babies
6. Serums, oils, and other similar products

The most dangerous ingredients in the cosmetics are as listed herewith -

***1. Deo*dorant:** A deodorant is a material that is applied to the skin to avoid or mask body odour caused by bacteria breaking down perspiration in the armpits, groyne, and feet. In Thailand, Mexico, and other nations, alum has long been used as a deodorant. Aluminum and zinc salts, as well as fragrance, are used in deodorants to hide the odor of perspiration.

2. The placenta: It is a good firmer, lifter, and hydrator for the skin. It is also good for acne-prone skin and skin that has been damaged by excessive exfoliation. Anti-ageing properties of stem cells originating from sheep placenta include increased collagen production and skin elasticity.

3. Acetate of lead: Lead acetate is a white crystalline material that is sometimes used in hair coloring materials. As a coloring agent, lead acetate is utilized. In progressive hair dye products at low concentrations. To achieve a gradual coloring effect, these products are applied over time. Since lead acetate coloring works slowly, a color shift cannot be visible for many days. Additional maintenance applications are applied after the desired result is achieved to keep the hair colored. As lead acetate reacts with the protein in the hair, the result is a dark, almost black color. The color is extremely durable and will not fade easily.

4. Phthalates: Phthalates are multipurpose chemicals used in a varied range of consumer goods, as well as cosmetics and personal care items. Phthalates, also known as plasticizers, are chemical compounds used to improve the longevity, toughness, clarity, and versatility of plastics. Many cosmetic and skincare products use them as a solvent or binding agent. Phthalates are fatty liquids that are odorless and colorless and are made up of phthalic acid. And they are the most widely used chemicals on the planet.

5. Hydroquinone: 1,4-dihydroxybenzene, also known as hydroquinone, is a natural ingredient that can be used in a number of cosmetics. Hydroquinone is an antioxidant, fragrance ingredient, an oxidizing agent in hair dyes that is used in cosmetics. Hydroquinone can also be used as a stabilizer in artificial nails to prevent the adhesive from polymerizing. Hydroquinone can be found in skin-lightening creams, serums, cleansers, lotions and moisturizers. Hydroquinone is a topical skin therapy for melasma, freckles, age and sun spots, as well as acne scars, explains the manufacturer according to the company.

6. Nanoparticles: Zinc oxide nanoparticles are used in this sunscreen to block ultraviolet rays while minimizing the white coating on the skin. Anti-aging skin creams containing proteins derived from stem cells. These proteins are packaged in liposome nanoparticles, which bind to skin cell membranes and allow the proteins to be delivered.

7. Petrochemical industry: Petrochemicals are commonly used in a range of cosmetic items for a number of purposes, including moisturizing the skin, assisting in the application of products, extending the shelf life of lotions and liquids, and uniformly dispersing fragrance within a product. The most well-known petrochemicals include mineral oil, petrolatum, and paraffin wax. Because of their occlusive properties, these ingredients are commonly used in the beauty industry: they build a barrier on the skin that many traditional makeup brands use to keep even the driest of skin hydrated for longer.

Drugs and Cosmetic Act 1964:

The drug and cosmetic act regulate a broad range of medicinal medications, diagnostics, and medical devices. Cosmetic, as described by the act, is any article meant for rubbing, pouring, sprinkling, or spraying on, or added in to or in any other way applied to the human body or any portion of it, for the purposes of washing, beautifying, enhancing beauty, or modifying look and includes any desired item for use as a cosmetic product, but excludes soap. As consumers become more conscious of the harmful effects of beauty product ingredients. Many are being phased out of product formulations by product producers. Those which are concerned should only buy goods that contain a small amount of harmful ingredients or none at all. Cosmetic products and associated toxicities: The largest organ in our body is our skin. Every day, the average person uses 9 to 15 personal care items. On average, people use 126 different ingredients on their skin. Toxins can enter the bloodstream in as little as 90 seconds. More than 125 ingredients have been linked to cancer. To improve the efficiency, consistency, value, and longevity of cosmetics, a growing variety of chemicals are integrated into their formulation as preservatives, fragrances, and surfactants.

Despite this, many of these chemical additives are harmful to humans, posing health hazards ranging from moderate hypersensitivity to potentially fatal or life-threatening intoxication. As a result, the unprejudiced use of cosmetics has recently become a major public health concern. The current study emphasizes on exposition to a wide range of harmful materials found

in formulas for cosmetics, including 1,4-dioxane formaldehyde, paraformaldehyde, benzalkonium chloride, imidazolidine urea, trace heavy metals, paraben compounds, phthalates, and phenoxyethanol are all found in this product .

Shampoos: A shampoo is a hair care product that is used to clean hair and is usually in the form of a viscous liquid. Shampoo is often sold in the form of a bar, similar to soap. Applying the shampoo to damp hair, massaging it into the scalp, and then rinsing it out is how it is done. Shampoos and conditioners have very little time in touch with the skin; they are only applied to the hair and such, resulting in less side effects. If they come to an encounter with the eyes while washing the hair, the issue occurs. The most typical side impact of shampoo causes scalp hair matting., also known as hair entanglement . The pH of the shampoo is another thing to remember. The majority of shampoos have an alkaline pH, which promotes enlargement of the hair shaft swelling and potential damage. Permanent dyed or wavy hair that has been chemically treated, a shampoo with a neutral pH is the best option. When confirmed data on the prevalence of contact allergies to shampoo were analyzed, it revealed that they pose a low risk. Hydrogen peroxide solutions and ammonium persulfate, which are active ingredients in hair bleaching products, can trigger Types I and IV allergic contact reactions 1. Sodium lauryl sulfate (SLS) is the lathering agent in shampoos, but it is also the deviant culprit or source of many hair loss problems. It is commonly used because it is a low-cost ingredient and we enjoy the foamy bubbles it produces in our hair and bodies. SLS is the main ingredient of almost all shampoos, and it serves as a surfactant foundation. When you use a shampoo with SLS as the main ingredient, however, you are saturating your hair with a harsh detergent that is one of the most irritating surfactants linked to skin dryness and redness.

Black henna: Black henna is a mixture of red henna and p-phenylenediamine (PPD), which is used to create temporary black henna tattoos. Because of the presence of p-phenylenediamine (PPD), which is available in the shape of industrial hair dye combined with henna paste, black henna tattoos are a chemical stain. PPD is applied to henna to accelerate the dyeing and drying procedure which strengthens and darkens the color, improves the tattoo's design pattern, and extends the tattoo's life. Blisters, surface oozing, swelling, and erythematous rashes on the skin are all side effects of PPD. Studies and reports on the acute allergic reactions to henna dyes have been conducted. Instead of a skin response, sneezing, a runny nose, coughing, and shortness of breaths have all been reported.

Sunscreens: Modern sun screening compounds have the potential to induce irritating, allergic, phototoxic, or photoallergic responses. Benzophenones are the most popular sensitizers. Fragrances may reach the body via the skin, lungs, airways, or consumption causing headaches, dizziness, nausea, eye, nose, and throat irritation, forgetfulness, as well as other symptoms. Coumarins, methyl eugenol, and other fragrance ingredients are potential carcinogens, whereas phthalates are suspected hormone disruptors.

Skin lightening agents: Skin lightening substances, such as hydroquinone (HQ), have been identified as one of the most dangerous chemicals. Reports of ochronotic and possible mutagenicity have been discovered. Hydroquinone is a hydroxyphenyl compound that inhibits the tyrosinase enzyme, which prevents melanin synthesis. It can also inhibit the synthesis of DNA and RNA in melanocytes via interfering with melanosome production or degradation. While hydroquinone is currently the most widely used depigmenting agent, it has been discovered to be highly cytotoxic to melanocytes and potentially mutagenic to mammalian cells. Ochronotic can cause skin elasticity loss and slow wound healing, which is why it is illegal to buy it over the counter in the United States and many other countries. It was only permitted for small areas of skin and for the treatment of age spots and sunspots.

Health Risks Associated with Heavy Metals in Cosmetics: -

Cosmetic goods also include elements like iron, copper, chromium, and cobalt. Metals in cosmetics may be retained and function directly on the skin, or they may be sucked up into the body via the skin bloodstream, accumulate in the body, and cause toxicity in different organs. Several reports of topical and systemic effects have been identified as a result of metal exposure found in cosmetics. The literature has studied the adverse effects of heavy metals in different beauty items such as facial makeup. Contact dermatitis, brittle hair, and hair loss are also possible side effects. Some heavy metals interfere with hormones, while others are respiratory pollutants. Ingestion or absorption by damaged skin are also ways they can reach the body.

1. ***Cadmium –*** Cadmium is a naturally occurring element. Cadmium in lotions for the body and hair is accumulated into the body by dermal contact and retained within the kidneys and the liver, despite the fact that it can be contained throughout all adult tissues. It is grouped as carcinogenic to humans by the International Agency for Cancer Research (IARC), as well as its constituents are classified as recognized Carcinogens in humans by the US Department of Health and Human Services. It can cause extreme stomach pain, vomiting, and diarrhea if consumed in high doses, whereas long-term contact to lower doses can cause kidney damage and bone deformity.

2. ***PEG's:*** (polyethylene glycols) are chemicals derived from petroleum commonly utilized as thickening agents, evaporators, softening agents, and wetness transporters in creams. PEGs can get infected with detectable levels of 1,4-dioxane during the manufacturing process. This 1,4- dioxane has been discovered to cause cancer. It takes a long time to degrade and can linger in the environment following being washed down the drain in the shower.

3. ***Nickel:*** Nickel is abundant in the wild, and everyone is at risk to minor quantities by food, air, transportable water, dirt, dust in the home, and skin contact with infected items such as cosmetics. Although certain forms of nickel are toxic due to their carcinogenic properties, others are not. Metallic nickel and alloys have been identified as having the potential to cause cancer in humans. The first reported instance of nickel aversion triggered by eye shadow has been outlined; even 1 ppm of nickel can activate an allergy that already exists.

4. ***Siloxanes:*** Siloxanes are silicone-based substances that are used as a softening agent and smooth various cosmetic products. They increase the spreadability of deodorant creams and help hair products dry faster. Cyclotetrasiloxane is a disruptor of the endocrine system that hinder with growth leptin action and, as generative toxicants, can reduce human fecundity.

5. ***Perfume:*** Fragrance is a combination of essential oils or aromatic substances and solvents that formerly impart a pleasing fragrance to the human body, animals, food, things, and living spaces. It is commonly present in liquid form and is used to offer an individual's body a sweet fragrance. Many fragrance ingredients that are specified on the label are irritating substances that trigger allergic reactions, extreme headaches, and asthma indications. Fragrances can aggravate asthma in children and even lead to its growth. It is the second leading origin of allergic responses in persons.

Conclusion

Although the various systems for the law and good management of cosmetics around the globe are fairly complex and comprehensive, they should be more stringent in the inclusion of new materials with poisonous capacity within the cosmetics system to avoid harm to human health.

In comparison to pollutants cosmetics may be found in the air, land, and water appear to many environmental fitness and consumer advocacy organizations to be a minor concern. However, there are numerous similarities toxins that damage our environment, such as dioxins and agrochemicals can be discovered in the beauty materials that humans use day by day. Since try out is entirely optional and regulated by the suppliers, many components in beauty products are not tested in any way. 89 percent of the 10,500 personal care items contain components that have not been tested for CIR or anyone else safety. According to the Environmental operating group's pores and skin-deep study, 99.6% of the 7,500 products tested include one or more components that were not evaluated for capacity fitness effects. The lack of executive supervision for this company results in companies mechanically advertising and selling merchandise with components that have been poorly studied, or worse, have been identified as posing unquestionably extreme fitness dangers such as cancer, birth defects, and reproductive anomalies. There is a revival of medicinal beauty at gift. One example is the recent approval of topical pharmaceuticals to cause vasoconstriction, thus preventing the unsightly facial redness associated with rosacea. These transient products are pills that serve a vital beauty function. The over-the-counter market is brimming with beauty facial foundations that contain salicylic acid to aid in the prevention and treatment of pimples while also camouflaging the underlying diseased skin. Indeed, we are still at a fork in the road where cosmetics are considered beauty drugs.

References

1. *Khan, A., and M. Alam. "COSMETICS AND THEIR ASSOCIATED ADVERSE EFFECTS: A REVIEW". Journal of Applied Pharmaceutical Sciences and Research, Vol. 2, no. 1, Apr. 2019, pp. 1-6*

2. *Draelos ZD. Cosmetics: The Medicine of Beauty. Journal of Cosmetic Dermatology;14 (2):91*

3. *Textbook on Cosmetics Technology: Birla Publishers India*

4. *Angeloglou, M. (1970). History of make-up. New York: Macmillan.*

5. *(Wargala, E.; S³awska, M.; Zalewska, A.; Toporowska, M. Health Effects of Dyes, Minerals, and Vitamins Used in Cosmetics. Women 2021, 1, 223-237.*

   https://doi.org/10.3390/women1040020)

6. *Guerra-Tapia A, Gonzalez-Guerra E. Hair cosmetics: dyes. Acta's Dermosifiliogr. 2014 Nov;105(9):833-9. English, Spanish. Doi:*

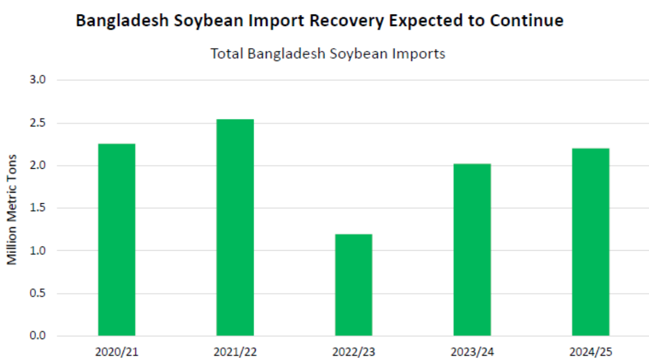
10.1016/j.ad.2014.02.004. Epub 2014 Mar 20. PMID: 24656996.

7. *Dorman, Jacob S.; Skin bleach and civilization: the racial formation of blackness in 1920s Harlem.; Journal of Pan African Studies, vol. 4, no. 4, 2011, p. 47+. Accessed 2 May 2021.*
8. *Drugs and Cosmetics Act – 1964*
9. *Wilson CL, Ferguson DJ, Dawber RP. Matting of scalp hair during shampooing: A new look, Clinical and Experimental Dermatology, 1990; 15(2):139– 142.*
10. *Draelos ZD. Shampoos, conditioners, and camouflage techniques. Dermatologic Clinics. 2013; 31(1):173–178.*
11. *Adams RM, Maibach HI. A five-year study of cosmetic reactions. Journal of the American Academy of Dermatology. 1985; 13(6):1062-1069.*
12. *Nigam PK, Saxena AK. Allergic contact dermatitis from henna. Contact Dermatitis, 1988; 18(1):55-56.*
13. *Mohammad Bilal, Hafiz M.N. Iqbal. An Insight into Toxicity and Human Health-related adverse Consequence of cosmeceuticals. Volume 670; 20 June 2019; pages 555-568.*
14. *Johansen JD, Rastogi SC, Menne T, Threshold responses in cinnamic-aldehyde- sensitive subjects: Results and methodological aspects, Contact Dermatitis. 1996;4(3):165-171.*
15. *Bridges B. Fragrance: emerging health and environmental concerns. Flavor Fragrances Journal. 2002; 17(5):361–371.*
16. *Donsing P, Viyoch J. Thai Breadfruit Heartwood Extract: A New Approach to Skin Whitening. Srinakharinwirot Science Journal. 2008; 24 (1): 9-23.*
17. *Gabriel J. Hydroquinone: Cancer-Causing Skin Bleach, 2008. [Online]. Available: http:// thegreenbeautyguide. com. Accessed: February 20, 2018.*
18. *Sylwia Borowska Ma³gorzata M. Brzóska Metals in cosmetics: implications for human health. 23 march 2013; volume 35, issue 6.*
19. *Ramakant S, Poornima S, Sapina J, Mathur HB, Agarwal HC. Heavy metal in cosmetics, Centre for Science and Environment. 2014; (45): 3-28.*
20. *Horii Y, Kannan K. Archives of Environmental Contamination and Toxicology. 2008; 55(4): 701-710.*
21. *Al-Dayel O, Hefne J, Al- Ajyan T. Human Exposure to Heavy Metals from Cosmetics. Oriental Journal of Chemistry. 2011; 27(1): 1-11.*
22. *Ababneh FA, Abu-Sbeih KA, Al-Momani IF. Evaluation of Allergenic Metals and Other Trace Elements in Personal Care Products. Jordan Journal of Chemistry. 2013; 8(3): 179-190.*
23. *Zakaria, A, Ho YB. Heavy metals contamination in lipsticks and their associated health risks to lipstick consumers. Regulatory Toxicology and Pharmacology. 2015; 73(1): 191–195.*
24. *Curtis J, Colas A. Medical applications of silicones, in: B.D. Ratner, A.S. Hoffman, F.J. Schoen, and J. E. Lemons, eds., Biomaterials Science. New York: Elsevier/Academic Press, New York, USA, 2004, pp. 698-707.*
25. *Park ME, Zippin JH. Allergic contact dermatitis to cosmetics. Dermatologic Clinics.2014; 32 (1):1–11.*
26. *'Sheikh Afaq Gowhar. Harmful effects of beauty care products on human health. Int J Med Sci Public Health. 2018; 7(1): 1-8.*

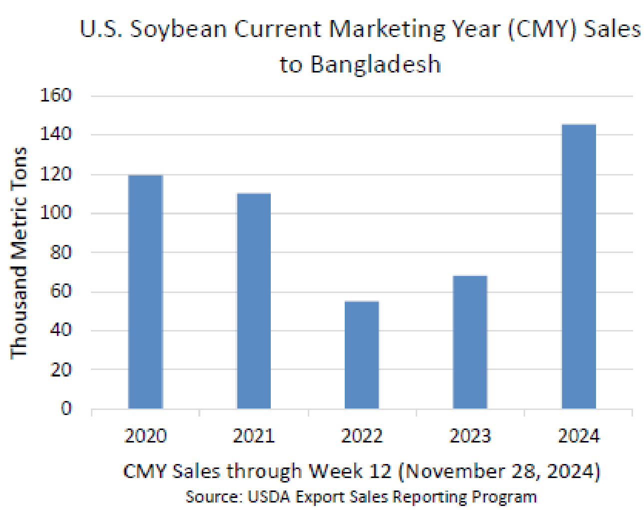
TRADE NEWS

Bangladesh Soybean Import Recovery Expected to Continue

2024/25 Bangladesh soybean imports are expected to continue to recover on strong demand from the domestic feed sector and economic stabilization. This recovery marks a positive turn for the Bangladesh economy after a high inflation- and currency-driven slowdown in 2022. Importers struggled to receive letters of credit due to a domestic currency crisis and shortage of U.S. dollars.

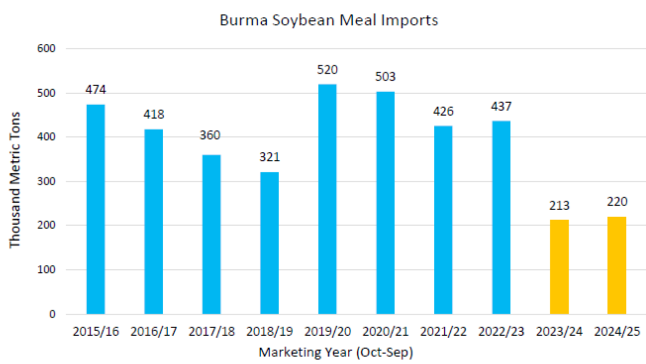


Bangladesh real Gross Domestic Product is expected to grow by 4.5 percent in 2025 according to the International Monetary Fund. FAS Dhaka reports that the animal feed sector will grow in the coming years. A recent report states that livestock feed production was 6.6 million tons in 2022 and is likely to hit 10.0 million tons by 2030. At the same time, the industry is reporting the opening of new crush facilities. In the coming years, Bangladesh import dependence will grow as their domestic soybean consumption increases. U.S. soybean exports to Bangladesh are expected to grow alongside and continue to play a role in the expansion of the Bangladesh feed and crush sector. Based on current export commitments, U.S. soybean exports to Bangladesh are well-positioned for 2024/25. As of November 28, Export Sales reported the highest volume of outstanding sales for the same week in the past 5 years.



Courtesy: *Foreign Agricultural Service / USDA*

Decreased Feed Demand Halves Burma Soybean Meal Imports



Burma hit a 10-year low in imports of soybean meal during the 2023/24 (October-September) marketing year, totaling 213,000 tons. For 2024/25, Burma imports of soybean meal were lowered this month to 220,000 tons on expectations of lower feed demand this year. This shift follows reductions in the livestock sector between 2020 and 2023 due to political instability, foreign currency controls, and natural disasters. Domestic production of livestock is not expected to recover this year as production

costs remain high and purchasing power among consumers declines, lowering meet demand. Leading into 2023/24, livestock producers in Burma faced increasing input costs. Between 2021 and 2023, production costs rose 75 percent for eggs, 18 percent for swine, and 40 percent for broilers.

Higher input costs were partially due to foreign currency controls and some import restrictions which led to lower imports and higher costs for buyers.

In 2023/24, Burma's livestock sector is estimated to have shrunk 40 percent and imports of soybean meal decreased over 50 percent. Cyclone Mocha hit the westward state of Rakhine in May 2023, damaging livestock operations and transportation. During the third quarter of 2024, a major poultry feed manufacturer and hatchery in the Mandalay region suspended operations, citing rising input costs and labor shortages. During this time, Burma saw an increase of citizens relocating from their farms and

homes due to conflict. The unstable security environment in these regions also impacted transportation. Closures of major roads and waterways in November 2023 exacerbated domestic supply shortages, further increasing cost of production inputs.

Courtesy*: Foreign Agricultural Service / USDA.*

BCL Industries receives letter of acceptance for supplying 60 lakh liters of ENA from Bathinda distillery

BCL Industries Limited has received a letter of acceptance from M/s. Rajasthan State Ganganagar Sugar Mills Limited (RSGSM) for supplying 60 lakh liters of Extra Neutral Alcohol (ENA), from its Bathinda (Punjab) distillery, over a period of next 6 months with a possibility of supplying additional 50 per cent of the said order at the option of the buyer.

BCL Industries, in the normal course of its business, had participated in a tender floated by RSGSM to supply ENA.

The previous order for supplying 53 lakh liters of ENA was received on 12th February 2024, and by 30th November 2024, the company will be completing the supply of approx. 80 lakh liters to RSGSM.

BCL Industries Limited is one of India's largest agro-processing manufacturing companies with diverse businesses and vertical integrations. Established in 1976, BCL has rapidly expanded and engaged its businesses in edible oils, rice milling, ethanol production, grain-based distillery and real estate.

Courtesy: *Chini Mandi.*

4.4 Fragrances segment grows at 12% in Jan-Sept, nearly double the expansion in personal care, as demand jumps and cos hike reach: Report

Robust sales of fragrance products for the first half of this financial year, and, according to market research Nielsen IQ, growth rate in the segment was nearly double that of overall personal care products this year.

The fragrance segment grew 12% year-on-year this calendar year till September, according to the latest Nielsen IQ data shared exclusively with ET, driven by roll-on deodorants, which recorded a 26% increase. The personal care segment saw a 6.2% growth, while the overall FMCG industry expanded by 5.7%, according to the researcher.

The fragrance industry in India is valued at '4,771 crore, it said. A rapid expansion in distribution and increased interest in personal grooming led to the surge in sales of roll-on deodorants, said Roosevelt Dsouza, head of commercial, India, at Nielsen IQ.

This is amid an overall subdued demand scenario and significantly higher than the 10% sales growth of beauty products.

Expansion of the distribution in rural areas. and launching of new portfolio of fragrance products, expanding from deodorants to eau de toilette perfumes for urban consumers, and will sell them initially in ecommerce, said its vice-chairman, Mohan Goenka.

The fragrance segment was the last to recover from the pandemic, when consumers started shopping for new apparel and beauty products in 2022 as people started going to office and on vacations. Market watchers say.

"Fragrance still has some gas left in the tanks since it has always been underdeveloped," a social commentator and brand expert.

"It is a late bloomer, catching up with the rest of the beauty portfolio, whose sales have gone up in the last couple of years. There is a lot of headroom for growth, as it is showing now. Otherwise, there has been no real category innovation nor any entry of a big player that could suggest this high growth rate."

Courtesy: *ET Bureau*

MPOC and OTAI forge collaboration to promote Malaysian palm oil in India

The partnership will focus on consumer education, industry engagement, and scientific research to strengthen palm oil's position as a key ingredient in India's food and non-food sectors

The Malaysian Palm Oil Council (MPOC) and the Oil Technologists' Association of India (OTAI) have formalised a collaboration to enhance awareness of Malaysian palm oil's nutritional benefits and health attributes in the Indian market and to foster sustainable trade growth between the two countries.

Recognising India as a crucial market for Malaysian palm oil, this agreement paves the way for targeted awareness campaigns to address misconceptions and highlight palm oil's role in health, nutrition, and industrial applications. The partnership will focus on consumer education, industry engagement, and scientific research to strengthen palm oil's position as a key ingredient in India's food and non-food sectors.

Speaking on the significance of this collaboration, Belvinder Sron, CEO of MPOC, emphasised that "India remains one of the most important markets for Malaysian palm oil, and fostering greater awareness through science-backed initiatives is key to reinforcing its acceptance. Through this partnership with OTAI, we aim to provide factual, research-driven insights into palm oil's benefits and its role in the Indian food industry."

Sron further highlighted the importance of industry partnerships, saying, "Collaborations with organisations like OTAI allow us to draw on their expertise and network to effectively engage with key stakeholders. By working together, we can dispel misinformation, drive consumer confidence, and ensure that the positive attributes of Malaysian palm oil are widely recognised."

IMPORTANT FIGURES

Table 1: India Oilseeds and Products Supply and Distribution

Thousand Metric Tons

	2021/22	2022/23	2023/24	Jun 2024/25	Jul 2024/25
Production					
Oilseed, Cottonseed	10,316	11,166	11,123	10,614	10,614
Oilseed, Peanut	8,700	6,300	6,000	7,100	7,100
Oilseed, Rapeseed	11,100	11,200	11,600	12,100	12,100
Oilseed, Soybean	11,889	12,411	11,875	12,200	12,200
Oilseed, Sunflowerseed	140	215	112	113	113
Other	1,021	1,022	1,021	1,021	1,021
Total	43,166	42,314	41,731	43,148	43,148
Domestic Consumption					
Meal, Cottonseed	4,238	4,443	4,405	4,298	4,298
Meal, Rapeseed	4,375	4,350	4,550	4,925	4,875
Meal, Soybean	6,273	6,625	7,190	7,625	7,625
Other	2,348	2,176	2,115	2,284	2,284
Total	17,234	17,594	18,260	19,132	19,082
SME					
Meal, Cottonseed	3,434	3,600	3,569	3,483	3,483
Meal, Rapeseed	3,113	3,095	3,237	3,504	3,469
Meal, Soybean	5,873	6,225	6,740	7,150	7,150
Other	2,177	2,021	1,923	2,102	2,102
Total	14,597	14,941	15,470	16,239	16,203
Food Use Dom. Cons.					
Oil, Cottonseed	1,250	1,315	1,290	1,310	1,310
Oil, Palm	7,800	8,300	8,700	9,200	9,350
Oil, Peanut	1,185	1,050	1,040	1,115	1,115
Oil, Rapeseed	3,700	3,600	3,900	4,100	4,000
Oil, Soybean	5,825	5,400	5,150	5,600	5,600
Oil, Sunflowerseed	1,900	2,700	3,000	2,550	2,400
Other	375	400	416	415	415
Total	22,035	22,765	23,496	24,290	24,190
Domestic Consumption					
Oil, Cottonseed	1,295	1,361	1,345	1,350	1,350
Oil, Palm	8,150	8,900	9,350	9,850	10,000
Oil, Peanut	1,195	1,060	1,050	1,125	1,125
Oil, Rapeseed	3,780	3,680	3,980	4,180	4,080
Oil, Soybean	5,825	5,400	5,150	5,600	5,600
Oil, Sunflowerseed	1,900	2,700	3,000	2,550	2,400
Other	674	710	736	740	740
Total	22,819	23,811	24,611	25,395	25,295
Imports					
Oil, Cottonseed	4	1	3	5	5
Oil, Palm	8,004	10,045	9,000	9,200	9,400
Oil, Peanut	0	0	0	0	0
Oil, Rapeseed	34	6	5	5	5
Oil, Soybean	4,231	3,968	2,950	3,500	3,500
Oil, Sunflowerseed	1,956	2,988	3,100	2,200	2,050
Other	80	111	135	140	140
Total	14,309	17,119	15,193	15,050	15,100

SME - 44 Percent Protein Soybean Meal Equivalent

Table 02: Major Oilseeds: World Supply and Distribution (Commodity View)

Million Metric Tons

	2021/22	2022/23	2023/24	Jun 2024/25	Jul 2024/25
Production					
Oilseed, Copra	6.03	6.00	6.21	5.81	5.81
Oilseed, Cottonseed	41.27	42.42	41.56	43.21	43.47
Oilseed, Palm Kernel	19.16	20.06	20.72	20.72	20.73
Oilseed, Peanut	51.97	49.41	49.40	51.32	51.53
Oilseed, Rapeseed	75.83	88.75	88.76	87.07	87.88
Oilseed, Soybean	360.46	378.37	395.41	422.26	421.85
Oilseed, Sunflowerseed	56.86	52.78	55.14	55.43	54.82
Total	611.57	637.79	657.21	685.81	686.09
Imports					
Oilseed, Copra	0.10	0.08	0.09	0.09	0.09
Oilseed, Cottonseed	0.98	1.36	1.16	1.15	1.15
Oilseed, Palm Kernel	0.15	0.15	0.16	0.15	0.15
Oilseed, Peanut	4.05	4.27	4.06	4.26	4.31
Oilseed, Rapeseed	13.92	20.05	16.51	16.47	16.87
Oilseed, Soybean	154.47	167.86	172.86	176.40	176.40
Oilseed, Sunflowerseed	3.83	3.78	2.73	2.41	2.41
Total	177.50	197.55	197.56	200.93	201.38
Exports					
Oilseed, Copra	0.10	0.10	0.10	0.09	0.09
Oilseed, Cottonseed	1.27	1.07	1.43	1.48	1.48
Oilseed, Palm Kernel	0.05	0.05	0.04	0.04	0.04
Oilseed, Peanut	4.43	4.83	4.74	4.82	4.91
Oilseed, Rapeseed	15.35	19.55	17.10	16.89	17.29
Oilseed, Soybean	154.44	171.76	175.13	180.20	180.20
Oilseed, Sunflowerseed	3.95	4.02	2.89	2.58	2.58
Total	179.57	201.37	201.44	206.10	206.59
Crush					
Oilseed, Copra	5.96	5.91	5.98	5.78	5.78
Oilseed, Cottonseed	31.98	32.59	32.91	33.88	33.74
Oilseed, Palm Kernel	19.01	20.08	20.62	20.82	20.82
Oilseed, Peanut	19.83	19.15	18.67	19.28	19.28
Oilseed, Rapeseed	72.06	81.11	84.00	82.95	83.57
Oilseed, Soybean	316.66	315.44	329.18	345.78	345.68
Oilseed, Sunflowerseed	46.72	51.41	51.80	51.47	50.89
Total	512.22	525.69	543.17	559.96	559.77
Ending Stocks					
Oilseed, Copra	0.06	0.05	0.04	0.04	0.04
Oilseed, Cottonseed	1.49	1.45	1.51	1.58	1.59
Oilseed, Palm Kernel	0.33	0.29	0.32	0.28	0.31
Oilseed, Peanut	4.85	4.12	3.80	4.11	4.23
Oilseed, Rapeseed	4.60	8.48	8.46	7.50	7.76
Oilseed, Soybean	92.58	100.61	111.25	127.90	127.76
Oilseed, Sunflowerseed	7.85	4.15	2.91	2.49	2.60
Total	111.75	119.14	128.29	143.88	144.28

Totals may not add due to rounding

Table 03: Major Protein Meals: World Supply and Distribution (Commodity View)

Million Metric Tons

	2021/22	2022/23	2023/24	Jun 2024/25	Jul 2024/25
Production					
Meal, Copra	1.97	1.96	1.98	1.92	1.92
Meal, Cottonseed	14.69	14.96	15.14	15.60	15.54
Meal, Fish	4.97	4.51	4.91	5.14	5.14
Meal, Palm Kernel	9.86	10.44	10.74	10.87	10.87
Meal, Peanut	7.91	7.64	7.47	7.71	7.71
Meal, Rapeseed	41.93	47.22	48.79	48.15	48.52
Meal, Soybean	248.26	247.83	258.30	271.24	271.16
Meal, Sunflowerseed	21.23	23.07	23.10	22.99	22.77
Total	350.81	357.63	370.42	383.62	383.63
Imports					
Meal, Copra	0.69	0.62	0.63	0.63	0.63
Meal, Cottonseed	0.27	0.19	0.24	0.21	0.21
Meal, Fish	3.59	3.35	3.41	3.62	3.62
Meal, Palm Kernel	7.34	7.74	7.73	7.77	7.77
Meal, Peanut	0.13	0.12	0.09	0.09	0.09
Meal, Rapeseed	7.67	9.29	10.02	10.13	10.04
Meal, Soybean	67.12	63.00	69.04	70.94	70.84
Meal, Sunflowerseed	7.35	8.57	9.77	9.20	9.00
Total	94.16	92.87	100.93	102.58	102.20
Exports					
Meal, Copra	0.75	0.62	0.69	0.67	0.67
Meal, Cottonseed	0.45	0.28	0.34	0.35	0.35
Meal, Fish	2.84	2.50	2.85	3.04	3.04
Meal, Palm Kernel	7.90	8.13	8.25	8.28	8.28
Meal, Peanut	0.18	0.18	0.16	0.17	0.17
Meal, Rapeseed	7.76	9.78	10.10	10.28	10.28
Meal, Soybean	68.82	67.07	72.45	74.60	74.50
Meal, Sunflowerseed	7.84	9.16	10.18	9.78	9.61
Total	96.54	97.71	105.01	107.16	106.89
Domestic Consumption					
Meal, Copra	1.90	1.96	1.92	1.88	1.88
Meal, Cottonseed	14.52	14.86	15.05	15.46	15.39
Meal, Fish	5.64	5.39	5.50	5.69	5.69
Meal, Palm Kernel	9.46	10.20	10.25	10.31	10.31
Meal, Peanut	7.85	7.59	7.40	7.64	7.64
Meal, Rapeseed	41.63	46.97	48.47	48.09	48.32
Meal, Soybean	246.08	246.79	254.43	265.65	265.63
Meal, Sunflowerseed	20.98	21.84	22.72	22.41	22.25
Total	348.06	355.60	365.72	377.12	377.11
Ending Stocks					
Meal, Copra	0.04	0.04	0.04	0.03	0.03
Meal, Cottonseed	0.10	0.11	0.10	0.11	0.11
Meal, Fish	0.27	0.23	0.21	0.23	0.23
Meal, Palm Kernel	0.67	0.52	0.50	0.61	0.54
Meal, Peanut	0.03	0.03	0.03	0.03	0.03
Meal, Rapeseed	1.49	1.25	1.49	1.52	1.46
Meal, Soybean	16.23	13.20	13.66	16.21	15.53
Meal, Sunflowerseed	1.08	1.72	1.70	1.68	1.62
Total	19.90	17.10	17.71	20.42	19.55

Totals may not add due to rounding

Table 04: Major Vegetable Oils: World Supply and Distribution (Commodity View)

Million Metric Tons

	2021/22	2022/23	2023/24	Jun 2024/25	Jul 2024/25
Production					
Oil, Coconut	3.73	3.72	3.77	3.65	3.65
Oil, Cottonseed	4.82	4.91	4.97	5.11	5.09
Oil, Olive	3.30	2.45	2.39	2.92	2.92
Oil, Palm	73.08	77.96	79.53	79.99	80.19
Oil, Palm Kernel	8.36	8.88	9.10	9.17	9.17
Oil, Peanut	6.44	6.22	6.06	6.26	6.26
Oil, Rapeseed	29.17	32.86	34.09	33.68	33.92
Oil, Soybean	60.03	59.62	62.24	65.37	65.36
Oil, Sunflowerseed	19.69	21.73	21.88	21.74	21.49
Total	208.62	218.34	224.04	227.89	228.05
Imports					
Oil, Coconut	2.24	1.94	1.92	1.84	1.89
Oil, Cottonseed	0.12	0.08	0.08	0.08	0.08
Oil, Olive	1.28	1.09	0.94	1.00	1.02
Oil, Palm	41.60	47.12	45.65	46.62	46.82
Oil, Palm Kernel	2.55	2.68	2.77	2.89	2.90
Oil, Peanut	0.29	0.39	0.32	0.34	0.34
Oil, Rapeseed	5.13	6.89	7.66	7.33	7.33
Oil, Soybean	11.34	10.88	10.38	11.24	11.19
Oil, Sunflowerseed	9.68	12.62	12.97	11.80	11.50
Total	74.23	83.70	82.69	83.15	83.08
Exports					
Oil, Coconut	2.24	2.18	2.02	1.99	1.99
Oil, Cottonseed	0.13	0.10	0.08	0.10	0.10
Oil, Olive	1.42	1.21	1.04	1.09	1.11
Oil, Palm	43.90	49.52	47.64	48.54	48.74
Oil, Palm Kernel	2.78	2.97	3.00	3.12	3.12
Oil, Peanut	0.35	0.35	0.42	0.40	0.40
Oil, Rapeseed	5.21	6.55	7.73	7.49	7.56
Oil, Soybean	12.44	11.73	11.00	12.05	11.94
Oil, Sunflowerseed	11.22	14.33	14.45	13.38	13.09
Total	79.69	88.93	87.38	88.15	88.04
Domestic Consumption					
Oil, Coconut	3.60	3.55	3.68	3.64	3.68
Oil, Cottonseed	4.84	4.90	4.94	5.07	5.05
Oil, Olive	3.04	2.58	2.39	2.70	2.72
Oil, Palm	69.38	74.33	77.22	79.08	79.28
Oil, Palm Kernel	8.17	8.60	8.91	9.05	9.06
Oil, Peanut	6.34	6.22	6.07	6.18	6.18
Oil, Rapeseed	30.16	32.68	33.64	34.16	34.19
Oil, Soybean	59.75	58.87	61.41	64.60	64.61
Oil, Sunflowerseed	17.56	19.51	20.69	20.36	20.15
Total	202.83	211.23	218.95	224.84	224.91
Ending Stocks					
Oil, Coconut	0.91	0.85	0.85	0.74	0.72
Oil, Cottonseed	0.16	0.16	0.19	0.20	0.20
Oil, Olive	0.72	0.47	0.37	0.48	0.48
Oil, Palm	16.49	17.73	18.05	16.68	17.04
Oil, Palm Kernel	0.96	0.95	0.92	0.81	0.81
Oil, Peanut	0.34	0.38	0.26	0.32	0.29
Oil, Rapeseed	2.59	3.11	3.49	2.81	2.99
Oil, Soybean	5.10	5.01	5.21	5.25	5.21
Oil, Sunflowerseed	2.65	3.15	2.86	2.50	2.62
Total	29.91	31.80	32.20	29.80	30.37

Totals may not add due to rounding

Table 05: Major Oilseeds: World Supply and Distribution (Country View)

Million Metric Tons

	2021/22	2022/23	2023/24	Jun 2024/25	Jul 2024/25
Production					
Brazil	135.18	166.92	158.82	175.69	175.69
United States	131.32	125.75	122.24	131.16	131.46
China	62.07	67.92	69.14	67.48	67.83
Argentina	49.88	31.45	55.57	56.76	56.76
India	43.17	42.31	41.73	43.15	43.15
Other	189.95	203.44	209.71	211.57	211.21
Total	611.57	637.79	657.21	685.81	686.09
Imports					
China	93.19	111.71	113.12	113.65	114.15
European Union	22.82	22.36	20.91	22.02	22.02
Mexico	7.20	8.13	7.93	8.23	8.23
Japan	5.78	5.49	5.56	5.51	5.51
Argentina	3.84	9.06	6.70	5.50	5.50
Thailand	3.33	3.34	3.81	4.11	4.11
Turkey	3.68	4.02	3.87	4.03	4.03
Egypt	4.61	2.01	2.84	3.34	3.34
Indonesia	2.80	2.72	2.90	3.23	3.28
Iran	1.89	2.90	2.86	3.17	3.17
Other	28.36	25.82	27.06	28.16	28.06
Total	177.50	197.55	197.56	200.93	201.38
Exports					
Brazil	79.45	95.92	103.40	105.47	105.47
United States	59.55	54.78	47.51	50.83	50.92
Canada	9.58	12.22	11.10	11.40	11.78
Ukraine	5.71	8.37	7.13	7.08	7.08
Paraguay	2.28	6.50	6.85	6.81	6.81
Argentina	3.99	5.12	6.76	6.63	6.63
Australia	6.66	6.70	5.70	5.30	5.30
Other	12.35	11.75	12.99	12.57	12.59
Total	179.57	201.37	201.44	206.10	206.59
Crush					
China	127.05	135.20	138.20	140.70	141.35
United States	63.87	64.16	66.43	70.32	70.46
Brazil	54.87	57.54	59.05	59.67	59.67
European Union	47.91	48.25	48.29	49.34	49.44
Argentina	42.79	34.59	39.74	43.70	43.70
India	32.20	34.78	35.43	35.88	35.78
Russia	21.20	24.50	25.75	26.13	25.53
Ukraine	12.50	15.68	17.40	16.35	16.15
Indonesia	12.79	13.56	13.74	13.88	13.88
Canada	10.40	11.75	12.75	13.45	13.45
Mexico	7.46	8.17	7.76	7.96	7.96
Turkey	5.34	6.03	5.05	5.49	5.49
Malaysia	4.91	5.09	5.29	5.32	5.32
Pakistan	5.60	3.85	4.57	5.05	4.85
Japan	4.79	4.63	4.50	4.54	4.54
Other	58.57	57.93	59.23	62.19	62.20
Total	512.22	525.69	543.17	559.96	559.77
Ending Stocks					
China	26.26	35.15	42.21	41.41	44.89
Brazil	27.50	37.03	29.93	36.93	36.08
Argentina	24.83	18.38	25.97	30.70	29.39
United States	9.14	8.85	11.05	14.04	13.70
European Union	3.01	3.43	3.58	3.62	3.57
Other	21.01	16.30	15.55	17.20	16.66
Total	111.75	119.14	128.29	143.88	144.28

Major Oilseeds includes Copra, Cottonseed, Palm Kernel, Peanut, Rapeseed, Soybeans and Sunflowerseeds.

Table 06: Major Protein Meals: World Supply and Distribution (Country View)

Million Metric Tons

	2021/22	2022/23	2023/24	Jun 2024/25	Jul 2024/25
Production					
China	90.10	96.07	98.62	100.94	101.32
United States	49.23	49.94	51.37	54.25	54.32
Brazil	41.03	43.09	43.98	44.27	44.27
Argentina	32.03	25.56	29.59	32.86	32.86
European Union	30.75	30.74	30.82	31.55	31.61
Other	107.67	112.24	116.06	119.75	119.26
Total	350.81	357.63	370.42	383.62	383.63
Imports					
European Union	21.44	21.58	21.89	21.30	21.30
China	7.18	8.39	9.70	10.20	10.00
Vietnam	6.52	5.92	6.51	6.71	6.71
Indonesia	5.73	5.67	5.97	6.22	6.22
United States	3.57	4.31	4.23	4.28	4.28
Thailand	3.51	4.01	3.83	4.11	3.92
Korea, South	3.52	3.43	3.52	3.60	3.60
Other	42.69	39.56	45.28	46.16	46.17
Total	94.16	92.87	100.93	102.58	102.20
Exports					
Argentina	27.60	21.91	25.58	28.28	28.28
Brazil	20.21	21.33	21.80	20.50	20.50
United States	12.48	13.39	14.71	16.08	16.08
Canada	4.93	5.69	6.03	6.42	6.42
Indonesia	5.85	5.87	5.87	6.03	6.03
Ukraine	3.92	4.60	5.88	5.18	5.11
Russia	3.07	3.82	4.29	3.99	3.84
Other	18.50	21.10	20.86	20.69	20.65
Total	96.54	97.71	105.01	107.16	106.89
Domestic Consumption					
China	97.02	103.41	106.99	109.95	110.32
European Union	49.26	49.71	49.91	49.85	49.85
United States	40.36	40.79	40.86	42.40	42.48
Brazil	21.64	22.26	22.89	23.89	23.69
India	17.23	17.59	18.26	19.13	19.08
Russia	8.49	8.93	9.36	9.93	9.83
Mexico	7.61	7.84	7.95	8.22	8.22
Vietnam	7.55	7.25	7.76	8.20	8.20
Indonesia	6.53	6.77	6.94	7.16	7.16
Thailand	5.97	6.26	6.33	6.80	6.59
Other	86.40	84.79	88.49	91.60	91.69
Total	348.06	355.60	365.72	377.12	377.11
SME					
China	91.17	96.47	99.70	102.76	103.09
European Union	42.35	42.31	42.42	42.56	42.56
United States	39.19	39.36	39.41	40.93	40.99
Brazil	21.28	21.88	22.43	23.39	23.19
India	14.60	14.94	15.47	16.24	16.20
Russia	6.91	7.26	7.62	8.07	8.01
Mexico	7.38	7.55	7.69	7.97	7.97
Other	96.52	94.67	98.98	103.39	103.28
Total	319.40	324.43	333.73	345.32	345.30
Ending Stocks					
Argentina	3.04	2.61	2.45	2.78	2.78
Brazil	3.67	3.17	2.47	2.95	2.56
European Union	1.36	1.26	1.47	1.52	1.51
China	0.71	0.94	0.95	1.22	0.92
Indonesia	0.71	0.57	0.67	0.72	0.72
Other	10.42	8.56	9.71	11.23	11.07
Total	19.90	17.10	17.71	20.42	19.55

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

Table 07: Major Vegetable Oils: World Supply and Distribution (Country View)

Million Metric Tons

	2021/22	2022/23	2023/24	Jun 2024/25	Jul 2024/25
Production					
Indonesia	47.90	52.73	53.32	53.88	53.88
China	27.56	29.30	30.06	30.20	30.45
Malaysia	20.22	20.59	21.52	21.27	21.47
European Union	18.80	18.33	18.44	19.02	19.06
United States	13.05	13.18	13.55	14.29	14.33
Brazil	11.50	11.94	12.32	12.46	12.46
India	8.74	9.27	9.40	9.62	9.58
Other	60.85	63.00	65.43	67.16	66.82
Total	208.62	218.34	224.04	227.89	228.05
Imports					
India	14.31	17.12	15.19	15.05	15.10
China	7.13	11.40	10.38	10.76	10.61
European Union	9.82	9.15	9.25	8.62	8.62
United States	5.26	6.27	6.91	7.10	7.18
Pakistan	3.08	3.92	3.77	3.99	3.99
Turkey	2.42	2.75	2.48	2.36	2.36
Bangladesh	2.03	2.29	2.18	2.25	2.25
Egypt	1.71	1.65	1.88	1.95	1.95
Iran	1.51	1.45	1.67	1.79	1.79
Malaysia	1.99	1.50	1.03	1.37	1.36
Other	24.97	26.20	27.96	27.91	27.87
Total	74.23	83.70	82.69	83.15	83.08
Exports					
Indonesia	24.27	30.25	28.14	28.75	28.75
Malaysia	16.82	16.64	17.09	17.27	17.46
Argentina	5.85	5.33	5.91	6.35	6.35
Russia	4.79	6.06	6.55	6.44	6.22
Ukraine	4.87	6.05	6.53	6.18	6.09
Canada	2.74	3.16	3.91	4.16	4.16
European Union	3.28	3.65	3.09	3.25	3.22
Other	17.09	17.79	16.16	15.76	15.80
Total	79.69	88.93	87.38	88.15	88.04
Domestic Consumption					
China	37.15	39.17	40.06	41.28	41.19
Indonesia	21.59	23.40	25.22	25.86	26.05
India	22.82	23.81	24.61	25.40	25.30
European Union	24.48	24.40	24.38	24.38	24.38
United States	17.27	19.27	20.07	20.88	20.98
Brazil	9.60	10.22	11.19	11.54	11.64
Malaysia	4.63	5.43	5.59	5.59	5.59
Pakistan	4.62	4.85	4.87	5.15	5.10
Russia	3.70	3.78	3.85	3.94	3.94
Thailand	2.97	3.08	3.25	3.40	3.37
Bangladesh	3.11	3.13	3.10	3.30	3.22
Mexico	3.05	3.11	3.15	3.20	3.20
Argentina	3.29	2.75	2.96	3.07	3.07
Turkey	2.51	2.66	2.77	2.84	2.89
Nigeria	2.56	2.65	2.76	2.88	2.88
Other	39.50	39.52	41.13	42.15	42.14
Total	202.83	211.23	218.95	224.84	224.91
Ending Stocks					
Indonesia	7.93	7.07	7.15	6.08	6.36
India	2.02	4.42	4.19	3.32	3.42
China	1.65	3.01	3.23	2.98	2.94
European Union	2.78	2.22	2.44	2.41	2.53
Malaysia	2.84	2.87	2.74	2.52	2.52
Other	12.70	12.21	12.45	12.50	12.61
Total	29.91	31.80	32.20	29.80	30.37

Major Vegetable Oils includes Coconut, Cottonseed, Olive, Palm, Palm Kernel, Peanut, Rapeseed, Soybean, and Sunflowerseed oil.

Table 08: Soybean Oil: World Supply and Distribution

Thousand Metric Tons

	2021/22	2022/23	2023/24	Jun 2024/25	Jul 2024/25
Production					
China	16,128	17,203	17,741	18,458	18,458
United States	11,864	11,897	12,227	12,934	12,934
Brazil	10,153	10,579	10,800	10,800	10,800
Argentina	7,664	5,991	7,011	7,900	7,900
European Union	2,926	2,717	2,755	2,888	2,888
India	1,530	1,854	1,998	1,980	1,980
Mexico	1,171	1,227	1,196	1,227	1,227
Other	8,597	8,147	8,507	9,187	9,169
Total	60,033	59,615	62,235	65,374	65,356
Imports					
India	4,231	3,968	2,950	3,500	3,500
Bangladesh	689	681	575	650	650
Peru	471	535	575	590	590
Morocco	529	525	550	560	560
European Union	459	623	500	525	525
Algeria	460	490	500	450	450
China	291	395	400	400	400
Iran	375	395	275	375	375
Korea, South	392	353	400	350	350
Colombia	317	242	350	345	345
Other	3,127	2,675	3,301	3,497	3,447
Total	11,341	10,882	10,376	11,242	11,192
Exports					
Argentina	4,873	4,137	4,800	5,500	5,500
Brazil	2,409	2,686	1,400	1,400	1,400
European Union	970	922	750	1,050	950
Russia	665	750	760	750	730
Paraguay	371	523	640	580	580
Bolivia	523	620	430	480	480
Turkey	289	289	300	330	330
Other	2,337	1,801	1,919	1,956	1,966
Total	12,437	11,728	10,999	12,046	11,936
Domestic Consumption					
China	17,100	17,000	18,100	18,800	18,800
United States	11,262	12,070	12,248	12,791	12,791
Brazil	7,725	8,375	9,150	9,425	9,525
India	5,825	5,400	5,150	5,600	5,600
European Union	2,305	2,405	2,455	2,480	2,480
Argentina	2,650	2,060	2,250	2,360	2,360
Mexico	1,300	1,305	1,320	1,360	1,360
Bangladesh	1,100	985	935	1,045	1,015
Iran	850	900	850	940	940
Algeria	750	750	750	780	780
Egypt	960	560	570	710	695
Peru	555	540	550	575	575
Korea, South	590	545	540	535	545
Morocco	525	525	535	540	540
Japan	533	525	480	505	505
Other	5,721	4,920	5,525	6,157	6,097
Total	59,751	58,865	61,408	64,603	64,608
Ending Stocks					
United States	903	729	731	829	806
China	387	874	815	973	773
Brazil	945	492	807	597	722
European Union	550	563	613	522	596
Argentina	526	320	281	321	321
Other	1,791	2,028	1,963	2,004	1,996
Total	5,102	5,006	5,210	5,246	5,214

Most countries are on an October/September Marketing Year (MY). Mexico is on a September/August MY. Paraguay and Peru are on an January/December MY and Bolivia is on a March/February MY.

Table 09: Palm Oil: World Supply and Distribution

Thousand Metric Tons

	2021/22	2022/23	2023/24	Jun 2024/25	Jul 2024/25
Production					
Indonesia	42,000	46,500	47,000	47,500	47,500
Malaysia	18,152	18,389	19,250	19,000	19,200
Thailand	3,376	3,328	3,280	3,360	3,360
Colombia	1,762	1,800	1,900	1,950	1,950
Nigeria	1,400	1,400	1,500	1,500	1,500
Other	6,385	6,545	6,604	6,684	6,684
Total	73,075	77,962	79,534	79,994	80,194
Imports					
India	8,004	10,045	9,000	9,200	9,400
China	4,387	6,190	5,400	6,000	6,000
European Union	5,015	4,548	4,400	4,200	4,200
Pakistan	2,824	3,685	3,600	3,700	3,700
United States	1,588	1,888	1,900	1,900	1,900
Bangladesh	1,339	1,610	1,600	1,600	1,600
Egypt	1,154	1,052	1,175	1,200	1,200
Vietnam	995	1,050	1,100	1,100	1,100
Kenya	789	848	1,000	1,075	1,075
Philippines	1,177	892	1,100	1,000	1,000
Other	14,323	15,316	15,373	15,647	15,647
Total	41,595	47,124	45,648	46,622	46,822
Exports					
Indonesia	22,321	28,077	26,000	26,600	26,600
Malaysia	15,527	15,355	15,800	15,900	16,100
Guatemala	792	883	900	945	945
Papua New Guinea	834	813	800	820	820
Colombia	449	425	625	625	625
Other	3,978	3,969	3,516	3,649	3,649
Total	43,901	49,522	47,641	48,539	48,739
Domestic Consumption					
Indonesia	17,430	19,190	20,900	21,460	21,660
India	8,150	8,900	9,350	9,850	10,000
China	5,100	5,600	5,600	5,900	5,800
European Union	4,850	4,400	4,210	4,100	4,100
Malaysia	3,300	3,971	4,040	4,045	4,045
Pakistan	3,145	3,595	3,620	3,735	3,715
Thailand	2,335	2,585	2,685	2,785	2,770
Nigeria	1,715	1,790	1,865	1,950	1,950
United States	1,561	1,876	1,882	1,890	1,890
Colombia	1,380	1,487	1,545	1,565	1,565
Bangladesh	1,470	1,600	1,600	1,595	1,545
Egypt	1,175	1,060	1,160	1,170	1,170
Philippines	1,270	1,020	1,110	1,120	1,120
Vietnam	927	947	1,007	1,025	1,025
Mexico	760	820	860	880	880
Other	14,810	15,486	15,790	16,011	16,046
Total	69,378	74,327	77,224	79,081	79,281
Ending Stocks					
Indonesia	7,304	6,537	6,637	5,577	5,877
Malaysia	2,318	2,316	2,276	2,131	2,131
India	972	2,419	2,371	2,023	2,073
China	420	981	751	921	921
Colombia	836	826	741	681	681
Other	4,643	4,651	5,271	5,350	5,360
Total	16,493	17,730	18,047	16,683	17,043

Table 10: Rapeseed and Products: World Supply and Distribution

Thousand Metric Tons

		Meal, Rapeseed			Oil, Rapeseed			Oiseed, Rapeseed		
	Marketing Year	**2022/ 23**	**2023/ 24**	**2024/ 25**	**2022/ 23**	**2023/ 24**	**2024/ 25**	**2022/ 23**	**2023/ 24**	**2024/ 25**
Production										
China	(Oct-Sep)	10,917	11,448	11,035	7,215	7,566	7,293	15,531	16,321	15,600
India	(Oct-Sep)	6,015	6,219	6,368	3,840	3,975	4,070	11,200	11,600	12,100
Canada	(Aug-Jul)	5,810	6,333	6,793	4,151	4,670	5,007	18,695	18,800	20,000
Japan	(Oct-Sep)	1,146	1,174	1,112	853	875	839	4	4	4
European Union	(Jul-Jun)	13,794	13,908	13,794	10,164	10,248	10,164	19,613	20,000	18,900
Other		9,541	9,704	9,422	6,636	6,758	6,549	23,709	22,039	21,278
World Total		47,223	48,786	48,524	32,859	34,092	33,922	88,752	88,764	87,882
Imports										
China	(Oct-Sep)	2,030	2,800	2,900	1,998	2,150	1,700	5,335	3,700	3,700
India	(Oct-Sep)	2	10	2	6	5	5	0	0	0
Canada	(Aug-Jul)	6	10	10	26	20	20	151	300	100
Japan	(Oct-Sep)	20	5	10	13	20	15	1,976	2,050	1,950
European Union	(Jul-Jun)	843	950	700	402	425	300	6,841	5,500	6,300
Other		6,388	6,240	6,420	4,447	5,037	5,294	5,742	4,957	4,820
World Total		9,289	10,015	10,042	6,892	7,657	7,334	20,045	16,507	16,870
Exports										
China	(Oct-Sep)	24	10	10	4	5	5	0	0	0
India	(Oct-Sep)	1,920	1,600	1,500	11	10	10	0	0	0
Canada	(Aug-Jul)	5,308	5,700	6,200	3,017	3,750	4,000	7,951	6,400	7,450
Japan	(Oct-Sep)	0	0	0	5	5	5	0	0	0
European Union	(Jul-Jun)	795	780	750	671	725	650	549	550	500
Other		1,730	2,009	1,815	2,840	3,238	2,891	11,053	10,150	9,338
World Total Domestic Consumption		9,777	10,099	10,275	6,548	7,733	7,561	19,553	17,100	17,288
China	(Oct-Sep)	12,923	14,238	13,925	8,900	9,200	9,400	19,125	20,100	19,400
India	(Oct-Sep)	4,350	4,550	4,875	3,680	3,980	4,080	11,300	11,650	12,025
Canada	(Aug-Jul)	525	600	605	1,055	1,050	1,070	10,717	12,000	12,900
Japan	(Oct-Sep)	1,168	1,178	1,125	890	880	860	2,005	2,055	1,955
European Union	(Jul-Jun)	13,800	14,000	13,800	9,925	9,900	9,850	24,850	25,050	24,850
Other		14,208	13,899	13,987	8,227	8,634	8,926	17,367	17,330	17,037
World Total		46,974	48,465	48,317	32,677	33,644	34,186	85,364	88,185	88,167
Ending Stocks										
China	(Oct-Sep)	0	0	0	1,150	1,661	1,249	2,609	2,530	2,430
India	(Oct-Sep)	197	276	271	402	392	377	619	569	644
Canada	(Aug-Jul)	134	177	175	630	520	477	1,506	2,206	1,956
Japan	(Oct-Sep)	16	17	14	17	27	16	182	181	180
European Union	(Jul-Jun)	429	507	451	343	391	355	1,822	1,722	1,572
Other		476	512	552	571	494	520	1,739	1,255	978
World Total		1,252	1,489	1,463	3,113	3,485	2,994	8,477	8,463	7,760

Table 11: Rapeseed and Products: World Supply and Distribution

Thousand Metric Tons

		Meal, Rapeseed			Oil, Rapeseed			Oilseed, Rapeseed		
	Marketing Year	**2022/23**	**2023/24**	**2024/25**	**2022/23**	**2023/24**	**2024/25**	**2022/23**	**2023/24**	**2024/25**
Production										
China	(Oct-Sep)	10,917	11,448	11,035	7,215	7,566	7,293	15,531	16,321	15,600
India	(Oct-Sep)	6,015	6,219	6,368	3,840	3,975	4,070	11,200	11,600	12,100
Canada	(Aug-Jul)	5,810	6,333	6,793	4,151	4,670	5,007	18,695	18,800	20,000
Japan	(Oct-Sep)	1,146	1,174	1,112	853	875	839	4	4	4
European Union	(Jul-Jun)	13,794	13,908	13,794	10,164	10,248	10,164	19,613	20,000	18,900
Other		9,541	9,704	9,422	6,636	6,758	6,549	23,709	22,039	21,278
World Total		47,223	48,786	48,524	32,859	34,092	33,922	88,752	88,764	87,882
Imports										
China	(Oct-Sep)	2,030	2,800	2,900	1,998	2,150	1,700	5,335	3,700	3,700
India	(Oct-Sep)	2	10	2	6	5	5	0	0	0
Canada	(Aug-Jul)	6	10	10	26	20	20	151	300	100
Japan	(Oct-Sep)	20	5	10	13	20	15	1,976	2,050	1,950
European Union	(Jul-Jun)	843	950	700	402	425	300	6,841	5,500	6,300
Other		6,388	6,240	6,420	4,447	5,037	5,294	5,742	4,957	4,820
World Total		9,289	10,015	10,042	6,892	7,657	7,334	20,045	16,507	16,870
Exports										
China	(Oct-Sep)	24	10	10	4	5	5	0	0	0
India	(Oct-Sep)	1,920	1,600	1,500	11	10	10	0	0	0
Canada	(Aug-Jul)	5,308	5,700	6,200	3,017	3,750	4,000	7,951	6,400	7,450
Japan	(Oct-Sep)	0	0	0	5	5	5	0	0	0
European Union	(Jul-Jun)	795	780	750	671	725	650	549	550	500
Other		1,730	2,009	1,815	2,840	3,238	2,891	11,053	10,150	9,338
World Total Domestic Consumption		9,777	10,099	10,275	6,548	7,733	7,561	19,553	17,100	17,288
China	(Oct-Sep)	12,923	14,238	13,925	8,900	9,200	9,400	19,125	20,100	19,400
India	(Oct-Sep)	4,350	4,550	4,875	3,680	3,980	4,080	11,300	11,650	12,025
Canada	(Aug-Jul)	525	600	605	1,055	1,050	1,070	10,717	12,000	12,900
Japan	(Oct-Sep)	1,168	1,178	1,125	890	880	860	2,005	2,055	1,955
European Union	(Jul-Jun)	13,800	14,000	13,800	9,925	9,900	9,850	24,850	25,050	24,850
Other		14,208	13,899	13,987	8,227	8,634	8,926	17,367	17,330	17,037
World Total		46,974	48,465	48,317	32,677	33,644	34,186	85,364	88,185	88,167
Ending Stocks										
China	(Oct-Sep)	0	0	0	1,150	1,661	1,249	2,609	2,530	2,430
India	(Oct-Sep)	197	276	271	402	392	377	619	569	644
Canada	(Aug-Jul)	134	177	175	630	520	477	1,506	2,206	1,956
Japan	(Oct-Sep)	16	17	14	17	27	16	182	181	180
European Union	(Jul-Jun)	429	507	451	343	391	355	1,822	1,722	1,572
Other		476	512	552	571	494	520	1,739	1,255	978
World Total		1,252	1,489	1,463	3,113	3,485	2,994	8,477	8,463	7,760

Table 12: Sunflowerseed and Products: World Supply and Distribution

Thousand Metric Tons

		Oilseed, Sunflowerseed			Meal, Sunflowerseed			Oil, Sunflowerseed		
	Marketing Year	2022/23	2023/24	2024/25	2022/23	2023/24	2024/25	2022/23	2023/24	2024/25
Production										
Argentina	(Mar-Feb)	5,019	4,100	3,800	1,789	1,713	1,469	1,752	1,675	1,436
Russia	(Sep-Aug)	16,254	17,100	16,500	6,453	6,780	6,657	6,484	6,815	6,691
Turkey	(Sep-Aug)	1,900	1,550	1,675	1,334	1,035	1,035	1,066	827	827
Ukraine	(Sep-Aug)	12,200	14,500	14,500	5,782	6,071	5,823	6,020	6,321	6,064
European Union	(Oct-Sep)	9,385	10,000	10,900	5,135	4,973	5,297	4,014	3,887	4,141
Other		8,021	7,893	7,441	2,577	2,530	2,492	2,389	2,357	2,334
World Total		52,779	55,143	54,816	23,070	23,102	22,773	21,725	21,882	21,493
Imports										
Argentina	(Mar-Feb)	1	0	0	0	0	0	0	0	0
Russia	(Sep-Aug)	75	50	50	5	5	5	1	1	1
Turkey	(Sep-Aug)	941	600	550	879	1,150	950	1,711	1,475	1,300
Ukraine	(Sep-Aug)	31	30	30	13	10	10	1	0	0
European Union	(Oct-Sep)	1,460	700	500	2,756	2,900	2,500	2,103	2,450	2,100
Other		1,271	1,347	1,281	4,913	5,707	5,538	8,806	9,047	8,103
World Total		3,779	2,727	2,411	8,566	9,772	9,003	12,622	12,973	11,504
Exports										
Argentina	(Mar-Feb)	94	180	150	1,128	1,150	950	1,115	1,000	750
Russia	(Sep-Aug)	260	450	350	2,250	2,650	2,350	4,000	4,400	4,150
Turkey	(Sep-Aug)	102	100	125	78	15	20	1,102	1,175	600
Ukraine	(Sep-Aug)	1,856	325	260	3,973	4,750	4,425	5,683	5,800	5,630
European Union	(Oct-Sep)	595	450	450	1,001	900	1,150	1,221	900	850
Other		1,110	1,380	1,243	725	717	711	1,213	1,177	1,111
World Total		4,017	2,885	2,578	9,155	10,182	9,606	14,334	14,452	13,091
Domestic Consumption										
Argentina	(Mar-Feb)	4,553	4,225	3,650	600	550	550	652	672	672
Russia	(Sep-Aug)	16,180	16,980	16,520	3,900	4,125	4,350	2,425	2,525	2,575
Turkey	(Sep-Aug)	2,672	2,102	2,102	2,025	2,175	2,025	1,290	1,515	1,540
Ukraine	(Sep-Aug)	14,175	14,875	14,275	1,700	1,350	1,400	405	420	430
European Union	(Oct-Sep)	10,535	10,235	10,855	6,860	6,960	6,610	5,213	5,413	5,263
Other		8,127	7,800	7,566	6,750	7,557	7,314	9,525	10,142	9,670
World Total		56,242	56,217	54,968	21,835	22,717	22,249	19,510	20,687	20,150
Ending Stocks										
Argentina	(Mar-Feb)	1,084	779	779	292	305	274	329	332	346
Russia	(Sep-Aug)	907	627	307	397	407	369	346	237	204
Turkey	(Sep-Aug)	168	116	114	223	218	158	611	223	210
Ukraine	(Sep-Aug)	845	175	170	247	228	236	27	128	132
European Union	(Oct-Sep)	406	421	516	320	333	370	328	352	480
Other		736	796	709	242	205	210	1,507	1,592	1,248
World Total		4,146	2,914	2,595	1,721	1,696	1,617	3,148	2,864	2,620

Table 13: Minor Vegetable Oils: World Supply and Distribution

Thousand Metric Tons

		Oilseed, Sunflowerseed			Meal, Sunflowerseed			Oil, Sunflowerseed		
	Marketing Year	2022/23	2023/24	2024/25	2022/23	2023/24	2024/25	2022/23	2023/24	2024/25
Production										
China	(Oct-Sep)	3,136	3,136	3,104	1,484	1,353	1,353	8	8	8
India	(Oct-Sep)	1,221	1,123	1,256	1,369	1,355	1,326	nr	nr	nr
Turkey	(Nov-Oct)	7	7	7	290	191	238	380	190	350
United States	(Aug-Jul)	120	96	131	166	170	195	9	12	10
European Union	(Oct-Sep)	13	13	13	33	23	31	1,392	1,515	1,825
Other		1,722	1,683	1,751	1,566	1,878	1,944	657	665	727
World Total		6,219	6,058	6,262	4,908	4,970	5,087	2,446	2,390	2,920
Imports										
China	(Oct-Sep)	292	225	225	0	0	0	35	30	30
India	(Oct-Sep)	0	0	0	1	3	5	nr	nr	nr
Turkey	(Nov-Oct)	0	0	0	1	2	2	65	40	40
United States	(Aug-Jul)	28	16	27	7	2	2	371	370	410
European Union	(Oct-Sep)	44	52	55	2	5	5	193	175	185
Other		28	29	29	72	66	63	425	325	354
World Total		392	322	336	83	78	77	1,089	940	1,019
Exports										
China	(Oct-Sep)	10	10	10	7	5	5	0	0	0
India	(Oct-Sep)	125	150	100	0	0	0	nr	nr	nr
Turkey	(Nov-Oct)	0	0	0	8	5	5	187	140	180
United States	(Aug-Jul)	6	6	11	32	11	23	6	10	10
European Union	(Oct-Sep)	6	6	6	1	1	1	659	545	600
Other		199	250	270	53	55	63	355	343	324
World Total		346	422	397	101	77	97	1,207	1,038	1,114
Domestic Consumption										
China	(Oct-Sep)	3,418	3,351	3,319	1,477	1,348	1,348	43	38	38
India	(Oct-Sep)	1,060	1,050	1,125	1,361	1,345	1,350	nr	nr	nr
Turkey	(Nov-Oct)	7	7	7	280	190	230	190	150	170
United States	(Aug-Jul)	141	111	147	141	161	174	374	372	410
European Union	(Oct-Sep)	53	57	62	34	27	35	1,165	1,115	1,360
Other		1,545	1,498	1,515	1,604	1,869	1,914	805	712	740
World Total		6,224	6,074	6,175	4,897	4,940	5,051	2,577	2,387	2,718
Ending Stocks										
China	(Oct-Sep)	0	0	0	0	0	0	0	0	0
India	(Oct-Sep)	264	187	218	37	50	31	nr	nr	nr
Turkey	(Nov-Oct)	0	0	0	16	14	19	81	21	61
United States	(Aug-Jul)	16	11	11	23	23	23	0	0	0
European Union	(Oct-Sep)	3	5	5	0	0	0	213	243	293
Other		95	59	54	79	99	129	172	107	124
World Total		378	262	288	155	186	202	466	371	478

EXTENDED PRODUCER RESPONSIBILITY (EPR) IN INDIA

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History of Waste Management in India

To prepare a document for the UN Stockholm Conference in on Human Environment 1972 an ad hoc committee i.e. The National Committee on Environmental Planning and Coordination (NCEPC) within the Department of Science and Technology (DST) was constituted. At that time the main legislations for environmental protection in India were Water (Prevention and Control of Pollution) Act 1974, Water Cess Act 197, Air (Prevention and Control of Pollution) Act 1981.Environment (Protection) Act 1986 headed by Shri N.D. Tiwari headed a high-powered commission constituted by the Government of India to look at the legislative and administrative aspects of environmental protection. The committee submitted a report in 1980. On this high-level commission's recommendation, the Department of Environment at the center was established (now the Ministry of Environment and Forests). Followed by establishing a Central Board for Environmental Protection under the Department of Environment together with State Pollution Control Boards, Minimal National Standards (MINAS) were formulated. The Government of India, by Sections 6, 8 and 25 of the Environment (Protection) Act 1986, notified various rules to improve the environment by prescribing norms and rules for healthiness, waste management under the notification called Bio- medical Waste (Management and Handling) Rules 1998.These rules were further amended in March and June 2000 and September 2003, 2011& 2016.

The Government of India also notifies the various waste management rules and amendments from times to time as follows. E Waste Management Rule 2011 ,2016, E-Waste (Management) Amendment Rules, 2018.Municipal Solid Waste (Management and Handling) Rules, 2000 ,2016, 2018.Plastic Waste (Management & Handling) Rules, 2011,2016, Plastic Waste (Management) Amendment 2018, 2022, 2023 & amp; 2024.

Definitions

In these rules, unless the context otherwise requires. –

a. "Act" means the Environment (Protection) Act, 1986 (29 of 1986); ab. "alternate use" means use of material for a purpose other than for which it was conceived, which is beneficial because it promotes resource efficiency;

b. "brand owner" means a person or company who sells any commodity under a registered brand label;

c. "carry bags" men bags made from plastic material or compostable plastic material, used for the purpose of carrying or dispensing commodities which have a self-carrying feature but do not include bags that constitute or form an integral part of the packaging in which goods are sealed prior to use;

d. commodity means tangible item that may be bought or sold and includes all marketable goods or wares;

e. "compostable plastics" mean plastic that undergoes degradation by biological processes during composting to yield CO_2, water, inorganic compounds and biomass at a rate consistent with other known compostable materials, excluding conventional petroleum-based plastics, and does not leave visible, distinguishable or toxic residue;

f. "consent means the consent to establish and operate from the concerned State Pollution Control Board or Pollution Control Committee granted under the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974), and the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981);

g. "disintegration" means the physical breakdown of a material into very small fragments; ga. "energy recovery" means energy recovery from waste that is conversion of waste material into usable heat, electricity or fuel through a variety of processes including combustion, gasification, pyritization, anaerobic digestion landfill gas recovery";

h. "extended producer's responsibility" means the responsibility of a producer for the environmentally sound management of the product until the end of its life.

i. "food-stuffs" means ready to eat food products, fast food, processed or cooked food in liquid, powder, solid or semi-solid form.

j. "facility" means the premises used for collection, Storage, recycling, processing and disposal of plastic waste;

k. "importer" means a person who imports or intends to import and holds an Importer - Exporter Code number, unless otherwise specifically exempted.

l. "institutional waste generator" means and includes occupier of the institutional buildings such as buildings occupied by Central Government Departments, State Government Departments, public or private sector companies, hospitals, schools, colleges, universities or other places of education, organization, academy, hotels, restaurants, malls and shopping complexes.

m. "local body" means urban local body with different nomenclature such as municipal corporation, municipality, Nagar Palika, Nagar Nigam, Nagar panchayat, municipal council including notified area committee (NAC) and not limited to or any other local body constituted under the relevant statutes such as gram panchayat, where the management of plastic waste is entrusted to such agency;

n. "manufacturer" means and include a person or unit or agency engaged in production of plastic raw material to be used as raw material by the producer.

o. "multi-layered packaging" means any material used or to be used for packaging and having at least one layer of plastic as the main ingredients in combination with one or more layers of materials such as paper, paper board, polymeric materials, metalized layers or aluminium foil, either in the form of a laminate or co-extruded structure;

p. "plastic" means material which contains as an essential ingredient a high polymer such as polyethylene terephthalate, high density polyethylene, Vinyl, low density polyethylene, polypropylene, polystyrene resins, multi-materials like acrylonitrile butadiene styrene, polyphenylene oxide, polycarbonate, Polybutylene terephthalate;

q. "plastic sheet" means Plastic sheet is the sheet made of plastic;

r. "plastic waste" means any plastic discarded after use or after their intended use is over;

s. "prescribed authority" means the authorities specified in rule 12;

t. "producer" means persons engaged in manufacture or import of carry bags or multilayered packaging or plastic sheets or like, and includes industries or individuals using plastic sheets or like or covers made of plastic sheets or multi-layered packaging for packaging or wrapping the commodity;

u. recycling means the process of transforming segregated plastic waste into a new product or raw material for producing new products;

v. registration" means registration with the State Pollution Control Board or Pollution Control Committee concerned, as the case may be;

w. "street vendor" shall have the same meaning as assigned to it in clause (l) of subsection (1) of Section 2 of the Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014 (7 of 2014);

x. "virgin plastic" means plastic material which has not been subjected to use earlier and has also not been blended with scrap or waste;

y. "waste generator" means and includes every person or group of persons or institution, residential and commercial establishments including Indian Railways, Airport, Port and Harbor and Defense establishments which generate plastic waste;

z. "waste management" means the collection, storage, transportation reduction, re-use, recovery, recycling, composting or disposal of plastic waste in an environmentally safe manner;

aa. "waste pickers" mean individuals or agencies, groups of individuals voluntarily engaged or authorized for picking of recyclable plastic waste.

Each recycled carry bag shall bear a label or a mark "recycled" as shown below and shall conform to the Indian Standard: IS 14534: 1998 titled as "Guidelines for Recycling of Plastics", as amended from time to time; NOTE: PET-Polyethylene terephthalate, HDPE-High density polyethylene, V-Vinyl (PVC), LDPE- Low density polyethylene, PP-Polypropylene, PS-Polystyrene and Other means all other resins and multi-materials like ABS (Acrylonitrile butadiene styrene), PPO (Polyphenylene oxide), PC (Polycarbonate), PBT (Polybutylene terephthalate) etc. Each carry bag made from compostable plastics shall bear a label "compostable" and shall conform to the Indian Standard: IS or ISO 17088:2008 titled as Specifications for "Compostable Plastics".

Plastic Waste Management Rule 2016 as amended till 14th March 2024(Please follow Color code for dates of amendments)16th February 2022, 06th July 2022, 27th April 2023, 30th Oct 23, 14th March 2024.

Notification Ministry of Environment, Forest and Climate Change

New Delhi, the16th February, 2022 G.S.R. 133(E).—In exercise of the powers conferred by sections 3, 6, and 25 of the Environment (Protection) Act 1986 (29 of 1986), the Central Government hereby makes the following rules further to amend the Plastic Waste Management Rules, 2016, namely:

(1) These rules may be called the Plastic Waste Management (Amendment) Rules, 2022.

(2) They shall come into force on the date of their publication in the Official Gazette.

In the Plastic Waste Management Rules, 2016 (hereinafter referred to as the said rules), in rule 9, in sub- rule (1), for the words ¯as per guidelines issued under these rules from time to time, the words ¯as per g guidelines specified in SCHEDULE – III shall be substituted.

In the said rules, after SCHEDULE – I, the following Schedule shall be inserted namely: -SCHEDULE-II [See Rule 9 (1)] "Guidelines on Extended Producer Responsibility for Plastic Packaging and commodities made from compostable plastics and biodegradable plastics".

Background:

The Ministry of Environment, Forest and Climate Change (MOEFCC), (hereinafter referred to as The Ministry), notified the Plastic Waste Management Rules, 2016 on 18th March, 2016. The Ministry also notified the Solid Waste Management Rules, 2016 on 8th April, 2016. As plastic waste is part of solid waste, therefore, both the rules apply to managing plastic waste in the country ....

Obligated Entities: The following entities shall be covered under the Extended Producer Responsibility obligations and provisions of these guidelines namely: - Producer (P) of plastic packaging; other than micro and small enterprises as defined under the Micro, Small and Medium Enterprises Development Act, 2006 (27 of 2006) Importer (I) of all imported plastic packaging including intermediate material used for manufacturing plastic packaging such as films and preforms and plastic packaging of imported products;

Brand Owners (BO) including online platforms/ marketplaces and supermarkets/retail chains other than those, which are micro and small enterprises as defined under the Micro, Small and Medium Enterprises Development Act, 2006 (27 of 2006)

Plastic Waste Processors: Manufacturers and importers of plastic raw material; Manufacturers of items, made from compostable plastics or biodegradable plastics.

Registration:

1. a. The following entities shall register on the centralized portal developed by Central Pollution Control Board namely: Producer (P) micro and small enterprises as defined under the Micro, Small and Medium Enterprises Development Act, 2006 (27 of 2006)

   Importer (I); Brand owner (BO); Plastic Waste Processor engaged in (a) recycling, (b) waste to energy, (c) waste to oil, and industrial composting,

   Manufacturers of items made from compostable plastics or biodegradable plastics;

   b. Registration of Producers, Importers & Brand-Owners (operating in one or two states) and Plastic Waste processors shall be done by State Pollution Control Board or Pollution Control Committee through the centralized Extended Producer Responsibility portal developed by the Central Pollution Control Board.

   c. After these guidelines have come into effect, with respect to entities starting their business in a particular year and placing their products in market in that year, they shall have Extended Producer Responsibility target obligations from the next year.

6.2 The entities covered under clause 6.1 shall not carry any business without registration obtained through on- line centralized portal developed by Central Pollution Control Board.

6.3 The entities covered obligated to register under clause (6.1) shall not deal with any unregistered entity having obligation to register under clause (6.1) through on-line centralized portal developed by the Central Pollution Control Board" not registered through on-line centralized portal developed by Central Pollution Control Board.

6.4 In case, it is found or determined that any entity registered on the on-line portal has provided false information or has willfully concealed information or there is any irregularity or deviation from the conditions stipulated while obtaining registration under Extended Producer Responsibility guidelines, then the registration of such an entity would be revoked for a one - year period after giving an opportunity to be heard. The entities whose registration has been revoked shall not be able to register afresh for the period of revocation.

6.5 In case any entity falls in more than one sub-category mentioned in the clause (6.1) then the entity shall register under each of those sub-categories separately. Further, in cases, where the entity has units in different states, in a particular sub-category mentioned in clause 6.1, then these units shall also be registered separately. However, Only one registration under a subcategory in a state would be needed, even if more than one unit is located in a state. The registration shall be as per Standard Operating Procedure laid down by Central Pollution Control Board for the purpose, as per these Guidelines.

6.6 While registering, the entities shall have to provide PAN Number, GST Number, CIN Number in case of company, and the entities may provide the company and Aadhar Number and PAN Number of authorized person or representative and any other necessary information as required.

Plastic Packaging Pre-consumer plastic packaging waste" means plastic packaging waste generated in the form of reject or discard at the stage of manufacturing of plastic packaging and plastic packaging waste generated during the packaging of products including reject, discard, before the plastic packaging reaches the end- use consumer "post-consumer plastic packaging waste" means plastic packaging waste generated by the end-use consumer after the intended use of packaging is completed and is no longer being used for its intended purpose of the product. Any entity collects plastic waste; need to register as PWP? Only entities engaged in plastic waste processing (recycling, co-processing, waste to energy, waste to oil) have to be registered as PWP.

Following plastic packaging categories are covered under Extended Producer Responsibility (EPR)

Category 1 Rigid plastic
Category 2 Flexible plastic
Category 3 Multilayer plastic packaging
Category 4 compostable plastics
Category 5 Biodegradable plastics

What material is to be considered for EPR in case of MLP (at least one layer of plastic and at least one layer of material other than plastic)?

Weight of the plastic layer is to be considered for EPR in case of MLP

(Category-III)

What is the EPR liability associated with a third-party manufacturer of products? If the third party does not have a brand name associated with them, the EPR liabilities are to be taken by the concerned Brand Owners/Producers to whom the product is being sold.

Effort to reduce the waste as an Engineer: At the initial stage you think about the disposal at the end of life of the product. Maximum recycled content while designing. Compatible closure uses, Single recycling material package, Compatible label recycling, Recyclability labelling

Efforts by companies to increase recycled material uses in their packaging:

Fiji water is targeting to use 100% recycled material by 2025.

PepsiCo, Loreal & Nestle is targeting to use 50% recycled material by 2025

Colgate Palmolive, Reckitt Unilever is targeting to use 25% recycled material by 2025

Henkel is targeting to use 30% recycled material by 2025

Comprehensive Direction to manufacturers by CPCB

“Not to supply plastic raw materials directly to producers engaged in manufacture of plastic packaging not having a valid registration certificate from the concerned State Pollution Control Board or Pollution Control Committee or CPCB through the centralized EPR Portal.”

“Not to supply plastic raw materials directly to banned SUP producers. The list of banned items to include items listed in MOEF CC Notification dated August 12, 2021, plastic sheets less than 50-micron thickness, plastic carry bags less than 75-micron thickness w.e.f. 30.09.21 and 120-micron w.e.f 31.12.2022 and non-woven bags less than 60 GSM”

“To ensure that Registration No., as issued on the centralized EPR portal to the plastic packaging producer, is henceforth incorporated in all invoices issued for sale of plastic raw material to such producers”

“To ensure that first buyer and every subsequent buyer of plastic raw materials shall maintain record of transactions of plastic raw material in electronic form, till such time the raw material is sold for making Products”

“To provide sales details of plastic raw materials on quarterly basis to CPCB w.e.f July o1,2022 in the prescribed format”

Guideline on Environmental Compensation -

Environmental Compensation on failure of EPR compliance - Producer

Closure of unit EC to be levied @ Rs.5000/- per ton of plastic bags manufactured from the date of inception of the unit or date of notification of PWM Rules (March 18, 2016) whichever is later EC to be levied @ Rs.10000/- per ton for 2nd violation and @ Rs.20000/- per ton for 3rd violation Penalty as per Section 15(1) of EPA 1986.

On selling plastic raw material to EPR unregistered customer - Manufacturers EC to be levied @ Rs.2500/- per ton of plastic raw material sold to unregistered producers from the date of notification of PWM Rules (March 18, 2016) whichever is later (EC to be levied @ Rs.5000/- per ton for 2nd violation and @ Rs.10000/- per ton for 3rd violation & Closure of unit thereafter)

HEALTH NEWS

Breastfeeding after COVID-19 vaccination is safe, with minimal changes to milk composition

Background

Human milk is the gold standard for infant nutrition, offering essential nutrients, immune cells, and immunomodulatory components that protect infants with immature immune systems. While it reduces infections, it can transmit certain pathogens such as human immunodeficiency virus (HIV) and Ebola virus.

Initial concerns about SARS-CoV-2 transmission via human milk disrupted breastfeeding practices despite later evidence showing no transmission and clear immune responses in milk after infection. However, limited data exist on how SARS-CoV-2 infection and COVID-19 vaccination impact milk composition.

Further research is needed to comprehensively understand these effects, primarily through multi-omics approaches, to inform evidence-based guidelines for breastfeeding mothers during pandemics.

About the study

Participants in this study were lactating individuals aged 18 years or older who either tested positive for SARS-CoV-2 or received a COVID-19 vaccine. Milk samples from vaccinated participants were included if they had no history of SARS-CoV-2 infection and were scheduled to receive the Pfizer, Moderna, or Johnson and Johnson (J&J) vaccines.

Milk was self-collected at specific intervals before and after vaccination using clean containers, with collection procedures approved by the Mount Sinai Hospital Institutional Review Board (IRB). For participants with SARS-CoV-2 infection, milk samples were collected within seven days of a confirmed positive test, with collection procedures approved by the University of Idaho IRB.

Milk samples were frozen immediately after collection, stored at -80°C, and analyzed using multi-omics approaches to examine proteins, metabolites, and lipids. The analysis employed advanced statistical methodologies, such as repeated measures analysis of variance (RANOVA) and pathway enrichment analyses, to identify significant changes in milk composition.

Protein, metabolite, and lipid extraction (MPLEX) procedures were employed to inactivate any pathogens and isolate biomolecules. Proteins were digested and labeled using tandem mass tag (TMT) isobaric labeling for proteomics analysis, while lipids and metabolites were analyzed using liquid chromatography-mass spectrometry (LC-MS/MS).

Study results

Study participants ranged from 26 to 41 years old, with a mean age of 32 years, and were between less than one month to 30 months postpartum, with a mean of 8 months postpartum.

Milk samples were analyzed using multi-omics approaches, including proteomics, metabolomics, and lipidomic, after extraction via the MPLEX method. Significant compositional changes in milk proteins, metabolites, and lipids were identified in association with SARS-CoV-2 infection and compared to baseline control values. However, for COVID-19 vaccination, samples were compared with prevaccine milk from the same participants, as no pre-infection samples were available for those with SARS-CoV-2 infection.

SARS-CoV-2 infection was associated with significant alterations in 67 milk proteins within seven days of infection. These changes included 43 proteins with increased expression and 24 with decreased expression, primarily related to systemic inflammatory pathways. Specific pathways included NOD-like receptor signaling, JAK-STAT signaling, and responses to hepatitis C and influenza infections. Changes were also noted in lipid composition, with 385 lipid molecular species exhibiting differences.

Proinflammatory lipids, such as ceramides, were elevated, while anti-inflammatory lipids, like fatty acid esters of hydroxy fatty acids, were reduced. Metabolomic analysis revealed 13 significantly altered metabolites, including ascorbic acid and its derivatives, and the anti-inflammatory drug acetaminophen.

In contrast, COVID-19 vaccination resulted in minimal changes to milk composition. No significant alterations were observed in milk lipidomic or metabolomics across any of the vaccine types evaluated. Proteomic changes varied by vaccine and timing.

The Moderna vaccine led to changes in eight proteins at 1-6 hours post-vaccination, while the J&J vaccine showed only one protein change in the same period. By day three, the J&J vaccine exhibited changes in 13 proteins, compared to two and four proteins for Moderna and Pfizer, respectively.

The J&J vaccine uniquely activated pathways such as NF-kappa B signaling and RIG-I-like receptor signaling, reflecting its design as an adenovirus-vectored vaccine. Proteomic pathway analysis revealed an overlap between the J&J vaccine and SARS-CoV-2 infection, primarily involving systemic inflammatory pathways, but vaccine-induced changes were less extensive than those from infection.

Investigations into the presence of vaccine components in milk found no detectable synthetic lipids or adenoviral proteins in any samples, indicating that vaccine components do not enter human milk.

Conclusions

To summarize, there is a global consensus that the risk of contracting COVID-19 via human milk feeding is negligible, while the benefits of breastfeeding during and after infection or vaccination are substantial. Vaccination effects on lactating individuals are mild, with no evidence of harm to infants consuming milk from vaccinated mothers. While trace amounts of vaccine messenger Ribonucleic acid (mRNA) have been detected in some milk samples, their physiological significance is unclear.

This study demonstrated significant milk composition changes following SARS-CoV-2 infection, including >65 altered proteins, 395 lipids, and 13 metabolites. In comparison, vaccination-induced changes in d”13 proteins were predominantly transient and vaccine-specific, with no alterations in lipids or metabolites. No vaccine components were detected in milk, underscoring vaccine safety for lactating individuals.

These findings emphasize the importance of vaccination for protecting lactating individuals and their infants during pandemics.

Journal reference:

1. Couvillion, S. P., Nakayasu, E. S., Webb-Robertson, B. M., Yang, I. H., Eder, J. G., Nicora, C. D., Bramer, L. M., Gao, Y., Fox, A., DeCarlo, C., Yang, X., Zhou, M., Pace, R. M., Williams, J. E., McGuire, M. A., McGuire, M. K., Metz, T. O., & Powell, R. L. (2024). Associations between SARS-CoV-2 Infection or COVID-19 Vaccination and Milk Composition: A Multi-Omics Approach. *The Journal of Nutrition*, *154*(12), 3566-3574. DOI: 0.1016/j.tjnut.2024.09.032, https://www.sciencedirect.com/science/article/pii/S0022316624010678

Tea, apples, and chocolate proven to support liver health

Introduction

In a recent study published in *The American Journal of Clinical Nutrition*, researchers assessed associations between a flavonoid-rich diet and non-alcoholic fatty liver disease (NAFLD) incidence and biomarkers.

NAFLD is the accumulation of lipids in the liver without excessive alcohol intake or other causes. It can progress to inflammatory non-alcoholic steatohepatitis, cirrhosis, and fibrosis, leading to the loss of viable hepatic tissue and, eventually, liver failure. Its global prevalence has increased by over 50% in the past three decades. Principal treatment options include cardiovascular disease risk reduction, primarily through weight loss; however, this might not be appropriate for all individuals.

Therefore, prophylactic and therapeutic approaches should focus on lifestyle and nutritional interventions. A

plant-based diet characterized by a high intake of whole grains, fruits, and vegetables is beneficial for several cardiometabolic outcomes. Plant foods contain high levels of flavonoids. Flavonoids are bioactive compounds that can reduce inflammation, improve insulin sensitivity, and modulate lipid metabolism. Higher intake of flavonoids has been associated with augmented cardiometabolic health. However, there is limited research on flavonoids regarding NAFLD.

About the study

In the present study, researchers assessed associations of flavonoid-rich diets with NAFLD incidence and imaging biomarkers of steatosis and liver fat in the United Kingdom (UK) Biobank cohort. More than 500,000 individuals aged 40–69 years were recruited from 2006 to 2010 in England, Wales, and Scotland. Baseline assessments were performed; additional data were obtained during 2009-12 through Oxford Web Q 24-hour dietary assessments.

Additional biomarkers were measured at follow-up, including magnetic resonance imaging (MRI)-based body composition biomarkers. The researchers investigated associations of flavonoid intake indices with incident NAFLD and imaging-derived NAFLD biomarkers. Flavonoid intake indices were flavodiet score (FDS), flavonoid subclasses, and flavonoid-rich foods. FDS, a measure of flavonoid consumption, included servings of tea, apples, berries, grapes, onions, and dark chocolate, among other foods. All dietary data were sourced from the Oxford d**ietary assessments.**

Incident NAFLD was determined from the International Classification of Diseases, Tenth Edition (ICD-10) data linked to inpatient records. Participants were followed up until NAFLD diagnosis, other competing diagnoses, or death. Liver fat was measured as proton density fat fraction. Liver-corrected T1 (cT1) values, a marker for steatosis, were also derived. Cox proportional hazard regression models were used to assess hazard ratios of NAFLD risk. Multivariable linear regression was used for analyses of flavonoid exposures and imaging-derived biomarkers.

Findings

Overall, the study included 121,064 adults aged 59 years, on average. Most participants were female (56%) and had a high educational status (63%). The average body mass index (BMI) was 26.7 kg/m2. When stratified into FDS quartiles, participants in the lowest quartile were younger, more likely to be smokers, and had lower education than those in the highest quartile.

In total, 1,081 NAFLD cases were identified over an average of 10 years of follow-up. The FDS was inversely associated with the risk of NAFLD; the highest FDS quartile was significantly associated with a 19% lower risk of NAFLD compared to the lowest quartile (hazard ratio: 0.81, 95% confidence interval: 0.67–0.97). In food-based analyses, higher consumption of apples and tea was associated with 22% and 14% reduced NAFLD risk, respectively, compared to lower consumption levels.

Based on flavonoid subclasses, the highest quartile of theaflavin and the arubigin, proanthocyanidin, flavan-3-ol, and flavanol was associated with a lower NAFLD risk than the lowest quartile. Participants in the highest FDS quartile had a significantly lower percentage of liver fat (–5.28%) than the lowest quartile participants. Consistently, individuals with high intakes of apples and tea had a lower liver fat content than those with low intakes.

Participants in the highest FDS quartile showed significantly lower cT1 values (–1.73%) than those in the lowest quartile. A high red wine and tea consumption was inversely associated with cT1 values. However, higher grape intake was linked to elevated cT1 values, potentially due to its sugar content. Further, a high intake of dark chocolate was associated with lower liver fat, but a high intake of grapes and onions was associated with higher liver fat content.

Conclusions

The findings reveal that a higher FDS and intake of specific flavonoid-rich foods were associated with a reduced risk of NAFLD and lower imaging-derived cT1 values and liver fat. Further, there were unexpected positive associations between grapes, onions, anthocyanins, and liver fat, albeit weak in magnitude. These findings may reflect confounding dietary factors, such as the sugar content in grapes and the high-fat meals often paired with onions.

Overall, the study contributes to the growing literature suggesting possible protective effects of flavonoids on NAFLD and its progression. Further research is warranted to explore mechanistic pathways and confirm these findings across diverse populations.

Journal reference:

Bell W, Jennings A, Thompson AS, et al. A flavonoid-rich diet is associated with lower risk and improved imaging biomarkers of nonalcoholic fatty liver disease: a prospective cohort study. *The American Journal of Clinical Nutrition*, 2024, DOI: 10.1016/j.ajcnut.2024.09.022, https://www.sciencedirect.com/science/article/pii/S0002916524007913

Courtesy: News Medical Life Sciences.

Protein lipidation in health and disease: molecular basis, physiological function and pathological implication

Abstract

Posttranslational modifications increase the complexity and functional diversity of proteins in response to complex external stimuli and internal changes. Among these, protein lipidations which refer to lipid attachment to proteins are prominent, which primarily encompassing five types including S-palmitoylation, N-myristylation, S-prenylation, glycosylphosphatidylinositol (GPI) anchor and cholesteryl Tion. Lipid attachment to proteins plays an essential role in the regulation of protein trafficking, localization, stability, conformation, interactions and signal transduction by enhancing hydrophobicity. Accumulating evidence from genetic, structural, and biomedical studies has consistently shown that protein lipidation is pivotal in the regulation of broad physiological functions and is inextricably linked to a variety of diseases. Decades of dedicated research have driven the development of a wide range of drugs targeting protein lipidation, and several agents have been developed and tested in preclinical and clinical studies, some of which, such as asciminib and lonafarnib are

FDA-approved for therapeutic use, indicating that targeting protein lipidations represents a promising therapeutic strategy. Here, we comprehensively review the known regulatory enzymes and catalytic mechanisms of various protein lipidation types, outline the impact of protein lipidations on physiology and disease, and highlight potential therapeutic targets and clinical research progress, aiming to provide a comprehensive reference for future protein lipidation research.

Courtesy: *Signal Transduction and Targeted Therapy* volume 9.

Lipid imbalances hold the key to chronic inflammation in colon cancer

Background

Colorectal cancer is among the most prevalent cancers globally and a leading cause of cancer-related mortality. Chronic inflammation is a recognized factor in colorectal cancer progression and is often attributed to an imbalance between pro-inflammatory and inflammation-resolving or pro-resolving processes.

In normal wound healing, a process known as lipid mediator class switching results in inflammation transitioning to resolution, which also involves molecules such as lipoxins and resolvins. However, colorectal cancer appears to exhibit impaired class switching, resulting in sustained inflammation. Furthermore, lipids play critical roles in cell signaling, energy storage, and structural functions, and dysregulated lipid metabolism can significantly influence tumor progression.

Previous studies have highlighted the unique lipidomic profiles seen in colorectal cancer, noting their correlation with both disease stage and outcomes. The impact of dietary factors, such as omega-6 and omega-3 fatty acids, on colorectal cancer further emphasizes its metabolic complexity. However, the understanding of the molecular mechanisms linking lipid metabolism to the tumor microenvironment in colorectal cancer remains limited.

About the Study

In the current study, the team employed a multi-modal approach to examine lipid metabolism in colorectal cancer using 81 paired tumor and normal tissue samples. The untargeted lipidomic analysis focused on 40 paired samples, while the targeted lipidomic assessed arachidonic acid (AA) pathway-related mediators. Liquid chromatography-tandem mass spectrometry (LC-MS/MS) was utilized for both untargeted and targeted lipidomic analyses.

Untargeted lipid profiling was used to analyze 40 sample pairs and identify the major differences in lipid species, while the targeted analyses measured specific lipid mediators associated with the arachidonic acid (AA) pathway, which has been linked to cancer progression.

The study also included spatial transcriptomics to map the gene expression of lipid metabolism-related enzymes in colorectal cancer tissues. Additionally, the researchers used quantitative reverse transcription polymerase chain reaction (QRT-PCR) and publicly available single-cell ribonucleic acid (RNA) sequencing datasets to support the findings.

Furthermore, specific enzymes involved in lipid class switching, such as arachidonate 5-lipoxygenase (ALOX5) and arachidonate 15-lipoxygenase (ALOX15), were analyzed for their expression and co-localization. The study also used spatial analysis to identify tumor-associated macrophages (TAMs), which were shown to be the primary producers of pro-inflammatory lipid mediators.

The tumor and normal tissues were matched and collected from diverse colorectal cancer stages and locations, and immunohistochemical analyses were conducted to verify that no malignancy was present in the normal tissue samples.

Furthermore, the researchers used advanced statistical tools to interpret lipidomic and transcriptomic data, including heatmaps and Spearman correlation analysis, to identify the patterns linked to pro-inflammatory and resolving lipid mediators. The findings were then cross-validated using large-scale gene expression datasets from independent colorectal cancer cohorts.

Major Findings

The study found that colorectal cancer tissues exhibit a significant pro-inflammatory lipid profile compared to normal tissues. The quantitative lipidomic analysis identified elevated levels of AA-derived mediators, including leukotrienes and 5-hydroxyeicosatetraenoic acid (5-HETE), associated with the enzyme ALOX5. Conversely, pro-resolving mediators such as lipoxins were markedly deficient, indicating defects in lipid mediator class switching.

Gene expression analysis also revealed the overexpression of pro-inflammatory genes in colorectal cancer tissues, such as ALOX5, ALOX5 activating protein (ALOX5AP), and leukotriene-A4 hydrolase (LTA4H). These genes correlated strongly with inflammatory biomarkers and macrophage markers, emphasizing the role of TAMs in sustaining inflammation. Furthermore, the spatial transcriptomics results highlighted the co-localization of pro-inflammatory enzymes in high leukotriene-producing tumors.

The researchers observed the reduced expression of enzymes responsible for synthesizing resolving mediators, including ALOX12 and ALOX15, across all samples. Prostaglandin levels—prostaglandin E2 (PGE2) and prostaglandin I2 (PGI2)—were found to be significantly lower in most colorectal cancer tumors, which the study attributed to low expression of their synthesizing enzymes.

Additionally, the lipidomic profiling revealed specific structural lipid changes, including the enrichment of phospholipids containing linoleic acid and AA. These alterations also correlated with chronic inflammation and tumor progression, indicating metabolic disruptions in the tumor microenvironment.

Importantly, the researchers found that colorectal cancer tumors displayed immune subtypes characterized by distinct lipid mediator patterns. Pro-inflammatory lipid dominance was especially prominent in tumors with immune activation or inflammation, linking lipid metabolism to immune status. These findings provided evidence that colorectal cancer progression is driven by a persistent inflammatory state arising from disrupted lipid metabolism.

Conclusions

Overall, the findings emphasized the pivotal role of lipid metabolism in sustaining inflammation within colorectal cancer. A marked imbalance between pro-inflammatory and inflammation-resolving mediators was found to underlie the persistent inflammatory state in colorectal cancer. By identifying these key molecular and cellular mechanisms, the study offered insights into potential therapeutic strategies that could focus on restoring lipid class switching through endogenous or exogenous pro-resolving mediators.

Journal reference:

Soundararajan, R., Maurin, M. M., Rodriguez-Silva, J., Upadhyay, G., Alden, A. J., Gowda, S. B., Schell, M. J., Yang, M., Levine, N. J., Gowda, D., Sundaraswamy, P. M., Hui, S., Pflieger, L., Wang, H., Marcet, J., Martinez, C., Bennett, R. D., Chudzinski, A., Karachristos, A., & Nywening, T. M. (2024). Integration of lipidomic with targeted, single-cell, and spatial transcriptomics defines an unresolved pro-inflammatory state in colon cancer. Gut, gutjnl2024332535. DOI:10.1136/gutjnl2024332535 https://gut.bmj.com/content/early/2024/11/26/gutjnl-2024-332535

Courtesy: News Medical Life Sciences.

Are Runny Egg Yolks Safe to Eat

It’s hard to beat a yolk-soaked breakfast sandwich. But undercooking your eggs carries real health risks.

Sunny side-up, over easy, lightly scrambled, soft-boiled, poached: Americans love eating eggs when they’re still runny, despite the general understanding that raw or undercooked eggs aren’t good for you.

When you cook an egg, the heat that solidifies its whites and yolks kills pathogens like salmonella and bird flu. That’s why food safety officials recommend cooking eggs until both parts are firm.

But how unsafe are runny yolks really?

That depends on how much risk you're willing to accept, said Felicia Wu, a professor of food safety, toxicology and risk assessment at Michigan State University.

"If you look at the eggs typically purchased in the United States, most of them are perfectly safe to eat in a runny state," she said. "It's just that we don't know when there's an individual egg that contains some risk."

Salmonella is a real concern.

Eggs can carry harmful bacteria, including E. coli and campylobacter. But salmonella — the leading cause of food poisoning-related deaths nationwide — is by far the biggest hazard, said Dr. John Leong, a professor of molecular biology and microbiology at Tufts University.

Image.

Recent data on salmonella-infected eggs is hard to find. One widely cited study from 2000 suggested that one in every 20,000 eggs carries the bacteria. This might not sound like a lot, but given how many eggs Americans eat — about 250 per person on average in 2023 — that risk can add up.

Salmonella can cause fevers, stomach cramping, diarrhea, vomiting and in rare cases, lingering joint pain.

And while most recover on their own or with antibiotics, around 26,500 people with salmonella are hospitalized and about 420 die of their infections each year. Salmonella is especially dangerous for older people, young children and those who are pregnant or immunocompromised. Public health officials are growing more concerned about antibiotic-resistant salmonella strains, Dr. Leong said.

t's hard to determine the exact likelihood that a given egg would carry salmonella, because not every egg that ends up on your plate gets tested for the bacteria, said Julie Garden-Robinson, a professor and food and nutrition expert at North Dakota State University.

Hens lay eggs and pass feces through a single opening, which can leave bacteria on eggshells. The federal government requires most sellers with 3,000 or more laying hens to sanitize the outside of eggs before they're sold. This lowers — but doesn't completely eliminate — the risk of salmonella ending up on an eggshell. Smaller farms and those that sell their eggs directly to consumers don't have to follow the federal washing rules, although they might follow state and local requirements.

But even sanitized eggs may carry salmonella since the bacteria can also get into the egg yolk and white, Dr. Garden-Robinson said. There isn't data to show whether most egg-related salmonella infections come from bacteria inside the egg or on its surface, Dr. Wu said.

Bird flu is less of a concern.

Although the recent bird flu outbreak is killing millions of hens and sending egg prices surging, experts say the evidence currently suggests that the virus is unlikely to end up in an egg you're eating.

That's mainly because infected hens die of bird flu before they can lay eggs, said Dr. John Swartzberg, an emeritus professor of infectious diseases and vaccinology at the University of California, Berkeley.

By Caroline Hopkins Legaspi

More than 900 Californians, including 15 children, have died from the flu this season

More than 900 people have died from influenza since the beginning of October in California, more than have died at this point in any of the last six respiratory virus seasons, according to a report released Friday by the California Department of Public Health.

A quarter of those deaths have been among people under 65 years old. Older folks tend to be the most at risk, with about 700 people 65 and older dying so far this year from the common virus. But at least 15 children have also succumbed to the flu, including four teenagers in San Diego County, raising concerns.

When compared to the data reported over the course of previous flu seasons, the toll this year has already exploded past the totals from the last several flu seasons.

At this point of the season, Week 7, there were about 500 deaths last season, and 600 the year before, but in both of those seasons the deaths had already started to plateau by mid-February. This year, the number of deaths has yet to show signs of slowing.

“It’s a surprise” said Dr. Peter Chin-Hong, a UC San Francisco professor of medicine who specializes in infectious diseases. He said it was projected to be an average season, but it is turning out to be anything but. And with test positivity rates still high, there are at least a few weeks left of the virus’s sending people to the hospital before it retreats for its annual hibernation, which usually begins as spring turns to summer.

“It is surprising, first of all that we didn’t see much COVID, and secondly that we saw a lot of flu,” Chin-Hong said. “And not just flu — bad flu which is making people seriously ill.”

He said it is important for people to know that despite its being late in the typical virus season, it is not too late to get vaccinated against influenza, whether they have had one strain already or not. Chin-Hong also wants to remind people of the antivirals available to combat the worst outcomes

Tamiflu, an antiviral used to treat the flu, can also be used prophylactically to prevent the spread of the virus within a household, and Chin-Hong would recommend those who are living with elderly or at-risk family members to ask their doctor about it.

“The last really bad flu season was in 2009, for swine flu,” Chin-Hong said, “since then it has kind of been regular flu seasons, until this year.”.

Coursty- Harriet Blair Rowan, Bay Area News Group

ESSENTIAL OIL

IRIS

Introduction:

Iris essential oils are extracted from the iris plant, which has been used for its medicinal and ornamental properties for centuries. The oils are used in cosmetics, pharmaceuticals, and food. Iris essential oil is made from the rhizomes, or roots, of the iris plant. The rhizomes are carefully cultivated for several years before the oil is extracted.

The family is nearly worldwide in distribution, but it is most abundant and diversified in Africa. Most species are native to temperate, subtropical, and tropical regions. Nearly all species are found in temperate Northern Hemisphere zones, from Europe to Asia and across North America. Although diverse in ecology, Iris is predominantly found in dry, semi-desert, or colder rocky mountainous areas. Other habitats include grassy slopes, meadowlands, woodland, bogs and riverbanks. Dutch iris can be grown in cold, temperate, and subtropical climates. In India these bulbs can be grown at North Indian plains, Hyderabad during winters, Hills of North and south India, Valley of Kashmir (during summer).

Botanical Name:

Iridaceae. Iridaceae, the iris family of flowering plants (*order Asparagales*), comprising 66 genera and around 2,200 species.

Cultivation:

Planting: Dig a shallow hole, add a ridge of soil down the middle, and place the rhizome on the ridge.

Spacing: Space the rhizomes 1–2 feet apart, depending on the size.

Watering: In hot climates, plant the rhizome just below the soil surface.

Propagation: Rhizome transplanting is a traditional method, but micropropagation using somatic embryogenesis may be more effective.

Maturation: Leave the rhizomes in the field for 3–5 years to develop the bulbs.

Drying: Dry the root bulbs for 3–6 years.

Harvesting:

Irises are usually harvested in the summer, between June and September. The rhizomes are carefully dug up and left in the field for 4–5 years to develop bulbs.

Drying

- The bulbs are then sun dried and protected from moisture and mildew.
- The drying process can take at least three years.
- During drying, the bulbs develop an "irone" molecule that gives them their characteristic aroma.
- Clean and peel the root.
- Chop into large pieces and let air dry for a few days.
- Chop more finely in a food processor.
- Dry completely.

Extraction:

Iris essential oil is produced by extracting the scented oils from the bulbous root of the iris plant, also known as orris. The process involves aging the roots, then extracting the oils using either steam distillation or solvent extraction.

Solvent extraction: The roots are coated with a solvent, like petroleum or benzene, which dissolves the oils. The waxy material is then dissolved in alcohol, and the alcohol is distilled off to produce the perfume oil.

Steam distillation: The roots are ground and steam distilled to produce an essential oil. The quality of iris essential oil is determined by the amount of á-irone and trans-2,6-ã-irone it contains. The iris essential oil is used in perfumes to create high-quality fragrances.

The roots of Iris plants are carefully kept on the field for 4 to 5 years or more to develop the bulbs and then it takes another 3 to 6 years to dry the root bulbs before the actual distillation process.

Chemical Composition of Iris Essential Oil:

The essential oil was obtained by a steam distillation method, generally used, from the dried leaves of Iris germanica L., Iris versicolor L., Iris graminea L., and Iris halophila Pall. (Iridaceae) and was investigated by a gas chromatography-mass spectrometry (GC/MS) method. In I. germanica, I. versicolor, I. graminea, and I. halophila were determined 0.06%, 0.10%, 0.06%, and 0.02% of oil yields, with a total of 28, 31, 25, and 23 compounds, respectively. In leaves are predominant essential oil triterpenoids, fatty acids, their esters, aliphatic hydrocarbons, and their derivatives. The highest content of á-irone and trans-2,6-ã-irone was obtained in the oil of I. graminea leaves with 2.71% and 1.00%, respectively. Contents of á-irone and ã-irone are accepted as the most significant commercial quality criteria of Iris essential oil. Such compounds as â-damascenone (1.11, 0.50% in I. versicolor and I. germanica, respectively), phytol (only in I. versicolor, 22.40%), and squalene (in all species, 5.95–22.84%) were identified in Iris genus plants. This is the report about the isolation and identification of oil from Iris leaves by GC-MS.

Common of Iris leaves was 2-methoxy-4-vinylphenol (0.34–1.62%), geranyl acetone, -ionone-5,6-epoxide, -ionone, hexahydro farnesyl acetone, farnesyl acetone, squalene, and some saturated hydrocarbons. In the chemical composition of the essential oils from Iris leaves, Tricosane, tetracosane, pentacosane, hexacosane, and other alkanes were found, the presence of which is due to the fact that they are a part of the wax of the cuticle covering the leaves of the plant and are also the volatile compounds and fly with terpenoids in the analysis.

Benefits of iris essential oils:

- Antimicrobial: Iris essential oils have antibacterial and antifungal properties.
- Antioxidant: Iris essential oils have antioxidant properties.
- Anti-inflammatory: Iris extracts have anti-inflammatory properties.
- Hepatoprotective: Iris extracts have hepatoprotective properties.
- Neuroprotective: Iris extracts have neuroprotective properties.
- Food: Iris extracts can be used as flavoring agents and to extend the shelf life of food.
- Cosmetics: Iris is used in cosmetics.
- Perfume: Iris is used in perfumes.

Precautions:

Iris essential oil, also known as orris oil, is a potent oil that can be harmful if used incorrectly. Here are some precautions to take when using iris essential oil:

Dilute: Always dilute the oil before applying it to your skin.

Avoid eyes: Keep the oil away from your eyes and mucous membranes.

Avoid skin reactions: Test the oil on your skin before using it regularly. Apply a few drops to your inner elbow and wait 48 hours.

Do not take iris essential oil orally unless you have advanced aromatherapy training.

Avoid pregnant people: Use caution when treating pregnant or potentially pregnant people.

Avoid flames: Keep the oil away from direct contact with flames, such as candles, matches, and gas cookers.

Ensure ventilation: Make sure the area where you're using the oil is well ventilated. *Seek medical attention:* If you swallow the oil, call a poison center or doctor immediately.

Compiled by Dr. S. Adhikari

LAUGH AND LOUD

Q. What is a physicist's favourite food?

A. Fission chips.

****

Q. Did you hear about the girl who got cooled to absolute zero?

A. She is 0K now

****

A little girl told her mother, "Mommy, today in school I was punished for something that I didn't do."

The mother said in anger, "But that's right! I'm going to have a talk with your teacher about this …

By the way, what was it that you didn't do?" The little girl replied, "My homework.

****

A photon checks into a hotel. When asked if they need help with their bags,

It responds, no, I am travelling light".

****

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

A. Designer genes

****

Q. What type of fish is made out of 2 sodium atoms?

A. 2 Na

****

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

A. I lava you

****

Q. What do you call a fly that lands on the butter?

A. butterfly

****

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

A. You guys have no life.

****

Q. How do you know that Saturn has been married multiple times?

A. Because she has a lot of rings!

****

Q. How do astronauts organize a successful surprise party?

A. They planet.

****

MEMBERS' PAGE

LET IT GLOW AND RADIANT

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

A glowing skin is one of the most visible features of your personality and is also considered one of the signs of good health. In many studies of romantic and sexual attraction, radiant skin is cited as a parameter. So it's no wonder that a good complexion is something that most women desire.

Before going into the foods that can make your skin glow, here are some reasons why you may have dull or bad skin.

1. If you **scrimp on sleep**, you are likely to end up with bags under your eyes, dark circles, and early wrinkling.
2. **Lack of sun exposure** and too much sun exposure can both spoil your skin. The sun's rays provide vitamin D and therefore, you need some amount of it for the health of your skin. However, you should not expose your face to the sun. Cover your face with a high SPF cream, and expose your limbs to the sun instead. Even so, make sure none of your skin is exposed during peak sunlight hours. Enjoy the Sun only in the early morning.

3. **Alcohol and cigarettes** are the top skin spoilers as they cause dehydration. In addition, smoking results in the shrinking of capillary blood supply to the delicate areas of facial skin, leading to early wrinkling.
4. **Over consumption of tea or coffee** is likely to cause acidity and dehydration, leading to early wrinkling. However, two caps a day of either beverage should be all right.
5. If you **use too much make - up**, foundation and so on, and do not remove it diligently before going to sleep, the skin does not get time to breathe. Clogged pores are likely to lead to skin problems.

6 **Anxiety plus a genetic tendency** towards hyper-allergic states leads to skin allergies.

7. The **use of strong creams and fragrances** during periods of high anxiety or during the pollen and windy season can cause skin problems.

Now that you know what can spoil your complexion, here is what can make it glow as suggested by *Dr. Shikha Sharma* are given below.

1. **Apples** are good because of their vitamins and pectin. Pectin helps absorb unhealthy oils and toxins from the skin and also helps the liver to neutralize skin - damaging toxins.
2. **Fruits like pomegranates, oranges, lemons and Keanu** have vitamin C that helps to fight the aging of your skin. Vitamins build the elasticity that is essential for soft, supple, non- wrinkled skin.
3. **Broccoli, spinach, green leafy vegetables and salads** provide several vitamins including precursors for vitamin A, which is essential for skin repair.
4. **Carrots, tomatoes and red vegetables** - the pigment lycopene found in these vegetables is essential for skin repair.
5. **Almonds, sunflower seeds and flaxseeds** contain vital oils required for nourishing the skin.
6. **A juice that contains tomato, carrot, ginger, mint and bottle gourd** combines several vital vitamins and also has antioxidants that fight skin - damaging free radicals.

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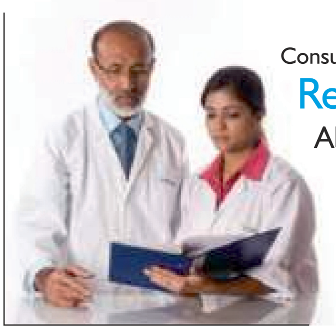

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