

OIL TECHNOLOGISTS' ASSOCIATION OF INDIA

JUNE 2018 - DECEMBER 2018

EASTERN REGION



FOR LIMITED CIRCULATION



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From the Editor's Desk

There has been an attempt to improve the quality of "Life" by improving "Health" and prescribing a diet that fits into it. Dietary fats for such diet has also an important role.

We have thought of "ATKIN'S DIET" the best remedy sometime back but opinions varied. The latest research has come out with "Ketogenic Diet". The high fat (As high as 70-85%) adequate protein, and very low carbohydrate way of eating known as the ketogenic diet (KD) has reported to have a therapeutic role in case of Alzheimer's disease, diabetes, certain cancers and C.V.D. This Diet has some similiarity with Atkin's Diet.

Question is in India, where consumption of Fat is below average of about 15kg per anum how relevant the proposition is?

The chinese researchers do not agree with the recommendation of KD and wants to follow the a pattern which is almost similiar to Mediterranean Diet.

I am placing below the details of Mediterranean Diet and the benefits of such diet.

MEDITERRANEAN DIET

U.S. New & World Report a noted authority on both ranking tings and consumer advice, has named the Mediterranean diet the best diet for 2019, and for good reason.

In this age of restrictive eating regimens like keto and paleo, the the Mediterranean diet offers a long-term plan that you may actually be able to sustain. Unlike diets that seem to eliminate more ingredients than they allow, the Mediterranean diet serves more as a list of what you should eat than what you shouldn't.

And its benefits aren't limited to weight loss studies have proven that it can help you live a longer, healthier life. Doctors have prescribed the Mediterranean diet for people suffering from heart disease, depression and dementia.

Curious yet? Here's a rundown of everything you need to know.

The Big Idea

The Mediterranean diet is modelled after the collective lifestyles of inhabitants of Crete, Greece and southern Italy in the mid 20th century. At the time, they displayed low rates of

chronic disease and higher-than-average adult life expectancy despite having limited access to modern health care. Because of the wide geographical area it springs from, the diet comes in many forms. But the plan most people follow today is based on the 1993 Mediterranean Diet Pyramid, a guide created to familiarize people with the most common foods of that region.

These foods are largely plant-based, including whole grains, olive oil, fruits, vegetables, legumes, nuts, herbs and spices. The diet also includes fish, poultry and dairy in smaller amounts. Though the pyramid suggests the proportions of foods one should eat an unusual aspect of the Mediterranean diet as it's promulgated today is that portion sizes are not regulated, allowing each individual to decide how much they eat based on their own body type and size.

Food You Should Eat

As noted, the Mediterranean diet focuses heavily on plant-based foods. It encourages consumption of the following:

Fruits and vegetables, up to nine daily servings of antioxidant-rich produce
Healthy fats, including avocados, nuts and olive oil and other M.U.F.A rich oils like mustard / canola / rapeseed oil, rice bran oil etc.

Whole grains such as rice, pasta and bread (unrefined and served with olive oil etc.

Omega 3 rich fish around twice a week, including mackerel, sardines, albacore tuna and salmon. Other animal proteins such as poultry, eggs and dairy can be eaten in small portions either daily or a few times a week . Red meat shouldn't be eaten more than a few times per month.

Water as the primary beverage, but one to two glasses of wine a day are allowed for men and one glass a day for women. The plan also encourages daily physical activity.

Foods You should Avoid

While it's not generally a prohibitive diet, there are a few categories of food to avoid: added sugar, processed meal, refined grains and other highly processed foods.

Health Benefits

Research has consistently shown that the Mediterranean diet is effective in reducing the risk of cardiovascular diseases and overall mortality, and recent studies have even suggested it can help prevent depression. Defying the common notion that a healthy eating plan must be low in fat. It's rich in healthy fats coming from fatty fish, olive oil and nuts and has no fat or calorie restrictions. Studies have actually found that the

Mediterranean diet can reduce the rate of death by stroke by 30 percent and lower the risk of Type 2 diabetes.

Studies also show that the antioxidants found in the Mediterranean diet can help prevent dementia and other age related cognitive decline and that those who adhere to the diet may be 45 percent more likely to age healthfully (which is defined as living to 70 years or more with no major chronic diseases or impairments).

Health Risks

There are no significant damagers to following the Mediterranean diet, but because there aren't any restrictions on portion sizes, it is possible to overeat, which could lead to weight gain.

The Harvard School of Public Health warns that boosting your consumption of a single food from the Mediterranean diet won't give you the same results as eating the diet's collective foods : "It is the combination of these foods that appeal protective against disease, as the benefit is not as strong when looking at single foods or nutrients included in the Mediterranean diet. Therefore it is important to not simply add olive oil or nuts to one's current diet but to adopt the plan in its entirety".

Consult Your Doctor

As always, speak to your physician before significantly altering your diet and lifestyle to make sure any changes sync with your individual needs. But for many people. Harvard has deemed the Mediterranean diet to be "a healthy eating pattern for the prevention of cardiovascular diseases, increasing life span and healthy aging."

When used in conjunction with caloric restriction, the diet may also support healthy weight loss." Sounds like a plan worth considering." It may please be treated as a guideline.

Wish you all a Healthy New Year 2019

S. K. Roy

Editor

*Ack / courtesy

(a) Amazing Chronicle

Jan - 2019

(b) Inform 2015

Inform 2016

February



The Enigma of Trans Fats

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Naturally occurring edible oils and fats contain three types of fatty acids: Saturated fatty acids, monounsaturated fatty acids and polyunsaturated fatty acids. Trans fatty acids are isomers of monounsaturated and polyunsaturated fatty acids. Trans fats do not occur naturally. These are produced during the process of partial hydrogenation of naturally occurring vegetable oils to produce vanaspati, margarine, etc. Elaidic and linolelaidic acids are the major trans fatty acids found in partially hydrogenated vegetable oils. They are trans-isomers of the naturally occurring oleic and linoleic acids in vegetable oils and have comparatively high melting points.

The advantage of the trans fats to the food processing industry is that partial hydrogenation solidifies and stabilizes vegetable oils, which otherwise tend to turn rancid relatively quickly. Due to their high melting points, they exist in solid form instead of liquid form and therefore the trans fats can be used as substitutes for saturated fats in food products that are meant to have a long shelf life. Moreover, food items fried in saturated fats such as ghee and hydrogenated vegetable oils (vanaspati) are more palatable and tasty as compared to food items fried in naturally occurring edible oils

In recent years, the consumption of trans fats have increased manifold because they are used for the preparation of fast foods, bakery products, packaged snacks, and margarines. However, adverse health effects of the dietary trans fatty acids have been identified in lipid levels, metabolic functions, insulin resistance, oxidation, inflammation, and cardiac health. Recent research has revealed that the consumption of trans fats increases the risk of coronary heart disease by raising levels of LDL cholesterol (bad cholesterol) and lowering levels of HDL cholesterol.(good cholesterol). Trans fats also appear to interfere with the body's usage of omega-3 fatty acids, which are important for heart health. The association of dietary trans fatty acids with higher risk of cardiovascular disease is not only mediated by their metabolic effects, including increased incidence of Type-2 diabetes, increased insulin resistance, and worsened plasma lipid profile, but also by their effects on subclinical inflammation through changes in the prostaglandin balance.

In a survey conducted in the United States, a positive co-relation has been observed between dietary trans fatty acids and aggression or irritability in children as well as adults. It was found that greater intake of trans fatty acids were significantly associated with greater aggression, and were more consistently predictive of aggression and irritability, across the measures tested, than the other known aggression predictors that were assessed.

Trans-fatty acids are also known to be carcinogenic in nature. In a study conducted in Northern California, a positive co-relation has been found between consumption of trans-fatty acids and colon cancer. Women who were estrogen negative, i.e., postmenopausal not taking hormone replace therapy, had a twofold increase in risk of colon cancer from high levels of trans-fatty acids in the diet, while women who were estrogen positive did not experience an increased risk of colon cancer, regardless of level of trans-fatty acids consumed. Studies conducted to examine the role of higher trans-fatty acid consumption on prostate cancer risk reported a positive association between higher trans-fatty acid consumption and prostate cancer.

A study of nearly 700 postmenopausal European women found that those consuming high amounts of trans fats with consequent deposits high levels of trans fatty acids in their bodies were 40 percent more likely than those with the lowest levels to develop breast cancer. The greatest risk was seen among women with both the highest trans fatty acid levels and low levels of polyunsaturated fatty acids in their bodies.

Trans fats also influence the essential-fatty-acid metabolism by interfering with other steps in the synthesis of eicosanoids from essential-fatty-acid precursors, thereby affecting the thrombogenic (clotting) activity of the blood which may lead to cerebral strokes and hemorrhage.

Unsaturated vegetable oils from ricebran, mustard, groundnut, olive, linseed, corn, safflower and sunflower (as long as they have not been subjected to the process of hydrogenation) are considered as heart healthy. These oils contain monounsaturated and polyunsaturated fatty acids that can reduce total cholesterol and increase HDL cholesterol levels. These oils also contain the essential fatty acids such as omega-3 and omega-6 fatty acids which are necessary for life but which the body cannot make by itself. These fats can therefore be safely consumed in limited quantities as anything in excess is bad and may cause other physiological problems such as indigestion, obesity, etc. The recommended dietary reference intake (DRI) for fat in adults is 20 to 35 percent of total calories from fat which is about 44 grams to 77 grams of fat per day if the daily consumption is 2,000 calories.

The saturated fats, especially those containing the long chain saturated fatty acids and the trans fats are not considered good for health. However, it is found that the saturated fatty acids are the precursors of cholesterol (both LDL and HDL cholesterol) in our body and therefore their importance cannot be ignored. Hence, consumption of saturated fatty acids especially those containing the short chain saturated fatty acids such as butter, coconut, palm, etc may be desirable to a certain extent as they are also easily metabolized. On the contrary, the trans fats containing the trans fatty acids not only increase LDL cholesterol (bad cholesterol), they also decrease HDL cholesterol (good cholesterol) and therefore they must be totally avoided. It may again be reiterated here that the trans fatty acids do not occur naturally in food. They are formed when vegetable oils are partially hydrogenated to produce margarine and other solid vegetable cooking fats. Trans fatty acids are also added to some liquid vegetable oils to extend their shelf life, although this fact is not stated on the label. It is therefore suggested that people reduce their intake and consequently reduce their body burden of trans fatty acids by changing their diets. It would take about two years for a reduced intake of these fats to be reflected as a lower level in stored body fat.

Fortunately, nowadays it is relatively easy to identify foods that contain substantial amounts of trans fats. The easiest way is to check the food labels, since by law the food manufacturers must now disclose how much trans fats they are putting into their products. Also, there are certain types of foods that are very likely to contain trans fats. These include margarines of all types. The more solid the margarine, the more is the trans fatty acid content. Also, high-fat baked foods like doughnuts, cookies, cakes, chips and crackers contain trans fat as they contain margarine or partially hydrogenated vegetable oils as an essential ingredient in their production. In general, most deep-fried foods fried in partially hydrogenated vegetable oils for increasing their taste, palatability and storage stability contain trans fats.

From the above, it now becomes quite imperative for the general public to know the adverse health implications of trans fats. Therefore, for a healthier life, it would be prudent to avoid consuming food items cooked, fried or containing partially hydrogenated fats (vanaspati) such as margarines, cookies, crackers, snack foods, fried foods, cakes and pastries as also all those food items showing content of partially hydrogenated vegetable oils or trans fats on their labels. Further, while avoiding the consumption of trans fats, it would also be advisable to try to consume equal amounts of saturated, monounsaturated and polyunsaturated fatty acids in the diet as per the recommendations of the American Heart Association which is possible only by blending of different edible oils having different fatty acid compositions leading to improvement of the nutritive value of dietary fats.

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HEALTH AND DIETARY FATS

Professor M. M. Chakrabarty

Reprinted from earlier Journal 2003 Jan-April

Introduction

Health as defined by the World Health Organisation (WHO) is "the stage of complete physical, social and mental well-being and not merely absence of disease and infirmity". Health and nutrition are not synonymous but without good nutrition health cannot be maintained.

Functions of Fats and Oils

Oils and fats are important components of the human diet and it is essential that a minimum quantity of oils are consumed every day. Oils act as heat transfer medium. In cooking it also ensures development of high temperature at which the macro organisms present in food get destroyed and the food is disinfected. Oils and fats gelatinize starches in cereals, pulses and vegetables and help in releasing and solubilising flavours. For a human body the fat layer in the upper skin provides thermal insulation and also shape to the body and protects several delicate organs against physical shocks. They also taste. A feeling of satiety too is provided by oils and fats.

Apart from some of these non-nutritive benefits, oils and fats are essential source of nutrition. At 9 calories per gram, they provide the most concentrated source of energy amongst all foodstuffs as against about 4 calories from carbohydrates. Oils and fats also act as a vehicle for and storage of Vitamin 'A' and 'D' which are fat soluble. They also provide essential fatty acids, viz. linoleic and linolenic acids that the body cannot synthesise but which are very important for the health and well being of the individual as they play a vital part in cell membrane structure.

Sources of Fats

Dietary fats are derived from both plant and animal sources and are classified as "visible" or "invisible" types. The fats that are used as such on the table or for cooking (vegetable oils, vanaspati, butter and ghee) are termed as visible fats. Invisible or hidden fats are those which form an integral part of food and are therefore not visible. These include fats from plant sources like cereals, pulses, vegetables etc. as also fats from animal sources such as egg, fish, meat, etc.

Nuts and oilseeds have the highest invisible fat in them (around 40%), followed by condiments and spices (10-16%). The amount of invisible fat in cereals is only 2-3% but as they contribute bulk of our diets, they contribute significantly to overall fat intake. The fatty acid predominant in cereals is linoleic acid but pulses are rich in linolenic acid also. The daily per capita average of invisible fat in India is about 19g.

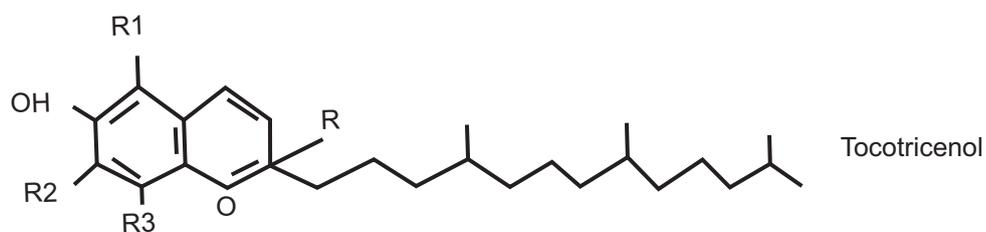
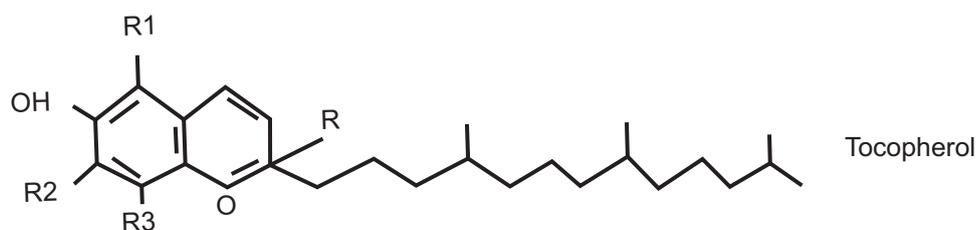
Chemical components of fats

Fatty acids are the building blocks of fats. Depending on the number of double bonds between carbon atoms, fatty acids have been classified as :-

- i) Saturated Fatty Acids (SFA) : e.g. stearic, butyric, palmitic, myristic and lauric acids. They do not have any double bonds between carbon atoms.
- ii) Mono-unsaturated Fatty Acids (MUFA) : e.g., oleic acid, palmitoleic acid etc. They have one double bond present in their structure.
- iii) Poly-unsaturated Fatty Acids (PUFA) : Fatty acids with more than one double bond are called polyunsaturated fatty acids. Two important fatty acids in this class are linoleic (having 2 double bonds) also known as w-6 fatty acid and linolenic (having 3 double bonds) also known as w-3 or n-3 fatty acid.

Fats contain about 1-3% of other fat soluble chemicals, collectively designated as non-glyceride fraction (NGF) which contribute to their nutritional and health effects. All vegetable oils contain tocopherols. Their levels are by and large related to the percentage of PUFA in the oil. Palm oil and rice bran oils have tocopherols. In addition to tocopherols rice bran oils contains oryzanol.

1(a)



Sesame oil contains lignan. Tocopherols and Teotrienols are antioxidants and protect the cell from free radical damage. Sesame oils has also antioxidant properties. Oryzanol and sesanium have hypocoloesterolemic effect. Vitamin A and D are present in ghee and butter.

Fat intake in India

Diet surveys by National Nutrition Monitoring Bureau (NNMB) in 10 States of India show that daily visible fat intake varies from 3-20 grams per day per person in rural India. In many States as much as a quarter of population may not have any visible fat at all in their diets. In urban areas middle and upper income groups have daily intake of visible fat ranges from 20-42 grams. These low intakes of fat reflect both the low availability of edible oils in the country and low purchasing power.

Per capita consumption of fats and oils :

Dietary fat consumption has strong correlation with income levels of the people. The higher the income level and higher the standard of living, the higher the per capita consumption of oils. This will be evident from the world comparisons of per capita consumption.

The estimates of per capita consumption of fats do not really give the true picture of the consumption by different classes. The National Nutrition Monitoring Bureau survey indicate that the fat consumption in our country is highly skewed. About 75% of our edible fats is consumed by about 25% of affluent population. The basic reason for this is the high prices of our edible oils, compared in relation to the income level of the people.

While the country is fortunate in having a wide range of sources of edible oils, the total production is not adequate to meet the growing demands of our population. The Government has, therefore, to resort to import of edible oils. In fact, import of all edible oils, baring coconut oil, palm kernel oil, RBD palm oil and RBD palm stearin, are allowed under Open General Licence (OGL) with a custom duty which had been progressively reduced to a modest level of 15%. However, recently it has been raised to 65%. RBD palmolein from Malaysia constitute the bulk of our import.

Guidelines on Human Nutrition

Present day guidelines on human nutrition suggest that dietary fat should have the following characteristics :-

- a) Of the total calorie requirements of a human being, energy from fat intake should not be less than 15% and not more than 30%.
- b) SFA, MUFA and PUFA should be present in approximately in equal proportion: and
- c) Ration of linoleic to linolenic acid in PUFA component be 5-10 while the ration of PUFA to SFA should be approximately 1:1.

A perusal of the fatty acid composition of vegetable oils will show that no single vegetable

oil has the optimal ratio of these various ingredients. However, by using variety of currently available vegetable oils, including palm oil/palmolein, the composition of intake of fat can be optimized. This is one of the considerations for Government allowing manufacture and marketing of blended vegetable oils.

In the upper and middle income groups, health education has to be given to inform the public that over-consumption of oils is harmful. Total of fat should not exceed 25-30% of overall energy consumption per day.

The quality parameters of edible oils are checked by various Government organisations and also they should conform to standards laid down by Prevention of Food Adulteration (PFA) act and Rules which are administered by Ministry of Health and Family Welfare. There are various Central Food Laboratories carrying out tests for imported oils.

Health implication of Different Fatty Acids

Fats are transported to the blood in combination with the proteins in the form of lipoprotein. The various lipoproteins are very low density lipoprotein (VLDL), low density lipoprotein (LDL), and high density lipoprotein (HDL).

LDL (bad cholesterol) transports cholesterol from liver and results in accumulation of lipids in cells. HDL (good cholesterol) scavenges excess cholesterol from the tissue to the liver for degradation. Fatty acids have different effect on health. Saturated fatty acids raise the level of total and LDL cholesterol and are therefore atherogenic. On the other hand, MUFA and PUFA reduce total and LDL cholesterol and hence are antiatherogenic. MUFA intake increases the HDL cholesterol.

(Despite what has been stated above, we have evidence to suggest that our forefathers who used to consume high quantity of saturated fats with a habit of physical exercises lived well with good health. Even now intake of ghee in Northern India, particularly in Punjab, is very high, but they are the healthiest people in the land. In our old days people like Surendra Nath Banerjee and Rabindra Nath Tagore must have taken quite a lot of saturated fats who appear to have lived well.)

Conclusion

Oil is not the perfect food and should not be removed from the diet entirely. What is important is that the consumption of dietary fats should be cut down to a moderate level in affluent community and increased to the minimum recommended intake level in respect of those who are consuming lesser quantity. To ensure optimal health benefits, use of more than one oil is recommended. Use of more than one oil gives the added advantage of providing a greater variety of minor components present in oils. The various combinations give the consumer the option to select oils according to their purchasing power and eating habits (Please see Annexure - I).

ANNEXURE - I

RECOMMENDED OIL COMBINATION FOR OPTIMAL HEALTH BENEFITS

Oils Advantage	Proportion	P/S	LA/ALNA	Additional
COMBINATIONS WITH MO (MUSTARD OIL)				
Safflower : PO : MO	1:1:1	1.0	11	Tocotrienols
Sunflower : PO : MO	2:1:1	0.9	14	Tocotrienols
Sesame : PO : MO	2:1:1	0.9	12	Tocotrienols
Lignans				
Groundnut : MO	3:1	0.9	12	Tocotrienols +
Ricebran Oil : MO	3:1	0.9	12	
Oryzanol				
COMBINATION WITH PO (PALM OIL)				
Safflower : PO	1:2	0.7	29	Tocotrienols
Sunflower : PO	1:1	0.7	33	Tocotrienols
Sesame : PO	1:1	0.7	26	Tocotrienols+
COMBINATION WITH PALM OIL				
SBO : PO	1:1	0.8	11	Tocotrienols
SBO : PO	1:2	1:1	17	
SBO : RBO	1:2	1.2	13	

PO - Palm Oil; MO - Mustard Oil; SBO - Soyabean Oil; RBO - Rice Bran Oil

Beauty From within

Laura Cassidy

Since ancient times, beauty and youthfulness have been inexorably linked. Yet the world's population is aging: According to predictions from the United Nations, by 2050 21% of the global population will be aged 60 years or older, compared with 10% in 2000 and 8% in 1950 (<https://tinyurl.com/UN-aging,2001>). Along with the more serious health concerns that often accompany older age, many people over 40 worry about changes in their appearance such as graying or thinning hair, wrinkles, and sagging skin. They may even resort to expensive and invasive procedures such as cosmetic surgery or the injection of botulinum toxin (BOTOX) or dermal fillers. But what if youthfulness could be restored simply by taking a daily dietary supplement or sipping a “beauty beverage”?

Such is the promise of the booming nutricosmetics industry, which seeks to restore “beauty from within” through a variety of ingestible skin, hair and nail-boosting supplements. The global market for nutria-consmetics reached US \$5.13 billion in 2016 and is expected to grow at a compound annual growth rate (CAGR) of 5% between 2017 and 2025 (Transparency Market Research, 2017). In addition to capsule and tablet forms, nutricosmetics are commonly available as powders that can be added to water, juice, or smoothies, and as confectionery items such as chocolate, bars, or gummies. Although conclusive scientific evidence for the efficacy of most nutricosmetics is lacking, promising in vitro, animal, and human data highlight the potential of beauty from within.

BEAUTY FOOD

Beauty from within is not a novel concept for the Asian market, where the movement has its origins. In Asia, and particularly in Japan, nutricosmetics such as collagen are commonly found in foods and beverages including tea, cookies, chocolate, coffee and water. The acceptance of nutricosmetics is generally higher in Asia than in Europe or the United States because many nutricosmetic ingredients, such as green tea and bone broth, are linked to traditional Asian medicine (Gunn, L and Creasy, P., <https://tinyri.com/nutrition-beauty,2017a>). In general, EU and US consumers tend to be more skeptical of the idea of “beauty foods” and are more likely to demand scientific backing for such claims (Gunn, L., and Creasy, P., <https://tinyuri.com/nutrition-collagen,2017b>).

Similar to Asia, the Latin American market is highly receptive to the concept of beauty from within. From 2012 to 2016, Latin America showed the fastest growth in new collagen product launches at 33% CAGR, followed by Asia at 23% (Innova Market Insights, 2017). In contrast, North America and Europe had much slower rates of growth

in product launches containing collagen, with CARGs of 16% and 11%, respectively.

Different markets have different priorities for beauty from within products. In Asia, the focus is often skin whitening, whereas in the United States and Europe, consumers desire UV protection and wrinkle-smoothing, products (Gunn, L., and Creasy, P., <https://tinyurl.com/nutrition-regional,2017c>). Although beauty beverages predominate in Asia, nutricosmetics in the form of tablets, soft-gels, or capsules are more popular in the United States and Europe.

AGING SKIN

Skin aging results from both intrinsic and extrinsic factors (Spiro, A., and Lockyer, S., <http://dx.doi.org/10.1111/nbu.12304,2018>). Intrinsic skin aging is genetically determined and is influenced by individual skin properties and changing hormone levels as a person ages. Extrinsic aging is caused by environmental factors such as sun exposure, pollution, smoking, and nutrition. Most aging-related changes in the skin can be traced to a lifetime of exposure to the sun. UV rays penetrate the skin and trigger the production of reactive oxygen species and matrix metalloproteinases that degrade collagen, the main structural protein in the extracellular matrix of connective tissues such as skin, cartilage, and bone. After age 30, collagen degrades at a rate of 1-2% per year (Shuster, S., et al., <https://doi.org/10.1111/j.1365-2133.1975.tb05113.x,1975>).

The breakdown of collagen and elastic fibers in the dermis contributes to thinning, sagging, wrinkling, and loss of elasticity in the skin (Fig. 1). In addition, UV radiation damages DNA in skin cells and accelerates the degradation of hyaluronic acid, a glycosaminoglycan important for retaining moisture in the skin.

Most topical cosmetic products cannot penetrate past the epidermis, the outermost layer of the skin. In contrast, if nutricosmetics are sufficiently bioavailable, they can circulate throughout the body, allowing them to reach the dermis where they can have more profound effects on skin structure. “Topical applications affect only the epidermis, and those results are generally more superficial and temporary,” says Lara Niemann, Marketing Director for the Americas at GELITA USA, a manufacturer of collagen peptides with US headquarters in Sergeant Bluff, Iowa. “When ingested orally, collagen peptides affect the dermal layer of the skin, so it really is beauty from within”.

TRENDING INGREDIENTS

For decades, physicians have recognized the value of micronutrients such as vitamin C, vitamin A, zinc and biotin for skin health because dietary deficiencies can cause skin conditions, among other problems. In addition, antioxidants, such as vitamins E and C, have long been recommended to mitigate oxidative damage in skin, although consistent

evidence for their efficacy is lacking. The current crop of popular nutricosmetics includes more complex ingredients harvested from natural sources, such as collagen peptides, astaxanthin, tomato and rosemary extracts, and resveratrol.

Collagen peptides

Collagen is the most abundant protein in humans, comprising about 30% of the protein in the body and 75% of the protein in skin. However, consuming bone broth or other products containing whole collagen is likely ineffective for boosting collagen in the skin. The digestive process breaks whole collagen into fragments of various sizes that are not specifically targeted to skin cells. Therefore, some companies have developed specific collagen peptides that they claim survive digestion and localize to the skin.

GELITA is a producer of gelatin, collagen, and collagen peptides, with worldwide headquarters in Eberbach, Germany (www.gelita.com). The company extracts collagen from bovine and porcine bone and skin, which are byproducts of the meat industry. The collagen is partially hydrolyzed to produce gelatin, a gelling agent used in marshmallows, gummies, and other foods. By treating the hydrolyzed collagen with proprietary enzymes, GELITA scientists produce specific collagen peptides with unique functions. They can then isolate particular peptides or mixtures of peptides. "GELITA has a comprehensive portfolio of bioactive collagen peptides, all of which have been optimized to target different cells of the body," says Niemann, "Our product VERISOL targets cells in the dermis for skin health. Other products target osteoblasts for bone health, or chondrocytes and the extracellular matrix of joint cartilage for joint health."

According to Niemann, the collagen peptides bind to specific receptors on the surfaces of cells. For example, the collagen peptides in VERISOL bind to receptors found only on dermal fibroblasts, targeting the peptides to the skin. The receptors recognize the collagen peptides as collagen degradation products. The binding of the collagen peptides to the receptors stimulates the cells to produce more collagen, as well as other extracellular matrix components, to counteract the perceived collagen degradation. The collagen peptides also provide cells with amino acid building blocks to produce more collagen.

Critics have argued that collagen peptides are degraded into individual amino acids upon digestion and therefore could not exert specific effects on skin cell receptors. An upcoming article in the June 2018 issue of *inform* will describe how researchers demonstrated that the ingestion of collagen hydrolysate increased blood plasma levels of bioactive collagen peptides, such as prolyl-hydroxyproline, in humans (original research in Iwai, K., et al., <https://doi.org/10.1021/jf050206p>, 2005).

Animal studies suggest that collagen peptides have beneficial biological effects on skin (reviewed in Proksch, E., et al., <https://doi.org/10.1159/000351376>,2014). In one study, ingested collagen peptides increased the size and density of dermal fibroblasts and increased the density of collagen fibers in pig skin. In rats, collagen peptides significantly increased collagen production and reduced the expression of matrix metalloproteinase-2, an enzyme that degrades collagen.

Several clinical trials of collagen peptides have been conducted in humans. In a double-blind, placebo-controlled trial of GELITA VERISOL, 69 women aged 35-55 years were randomized to receive 2.5g VERISOL, 5g of VERISOL, or a placebo once daily for 8 weeks (Proksch, E., et al., <https://doi.org/10.1159/000351376>,2014a). The women consumed VERISOL as a powder dissolved in water or another cold liquid. Relative to the placebo, both doses of VERISOL showed significant improvements in skin elasticity, which was measured by the extension of skin in response to a suction vacuum. After 8 weeks, the mean increase in skin elasticity was 7% for both of the VERISOL groups, with some women experiencing as much as 30% increased elasticity. There were no statistically significant changes from placebo in skin hydration, transepidermal water loss, or skin roughness. However, this study was conducted on skin of the inner forearm, which makes it difficult to extrapolate the results to facial skin.

The same researchers conducted another double-blind, placebo-controlled study of VERISOL in 114 women aged 45-65 years, this time examining wrinkles in the eye area ("crow's feet") (Proksch, E., et al., <https://doi.org/10.1159/000355523>,2014b). The women were randomized to receive either 2.5 g VERISOL or a placebo once daily for 8 weeks. After 8 weeks, the VERISOL group had a mean 20.1% reduced eye wrinkle volume compared with placebo. The maximum reduction in eye wrinkle volume was 49.9%. Four weeks after the last dose, the VERISOL group still showed a mean 11.5% reduction in eye wrinkle volume, suggesting that the effects were relatively long-lasting.

The researchers also examined the amounts of collagen, elastin, and fibrillin in the skin of a subset of the participants by inducing a blister on the forearm with suction and then collecting the fluid with a syringe. They found that the amount of procollagen type 1 (one of two types of collagen proteins that combine to make a collagen fibril) increased by 65% after 8 weeks in the VERISOL group compared with the placebo group. Elastin content increased 18% compared with placebo, whereas there was no significant difference between groups in the amount of fibrillin (another extracellular matrix protein found in skin).

A recent double-blind, placebo-controlled study examined the effects of collagen peptides from a different supplier, Nitta Felatin Inc. (Osaka, Japan), on facial skin (Inoue, N., et al., <https://doi.org/10.1002/jsfa.7606>,2016). Nitta's Wellnex collagen peptides are

enriched in two key dipeptides, prolyl-hydroxyproline (Pro-Hyp) and hydroxyprolyl-glycine (Hyp-Gly). In vitro studies have shown that these dipeptides enhance the proliferation of dermal fibroblasts. Pro-Hyp also chemically attracts dermal fibroblasts and increases their production of hyaluronic acid. The study included 85 Chinese women who consumed 5 g daily of Wellnex collagen peptides, which were ingested orally in hot milk, coffee, or other beverages, for 8 weeks. A mixture of collagen peptides containing a high ratio of pro-Hyp and Hyp-Gly significantly improved facial skin moisture, elasticity, wrinkles and roughness compared with the placebo.

In addition to possible benefits for facial skin, collagen peptides may help improve the appearance of cellulite – the skin dimpling of the thighs and buttocks that affects 85% of the global female adult population (Schunck, M., et al., [https://doi.org /10.1089 / jmf.2015.0022](https://doi.org/10.1089/jmf.2015.0022),2015). A double-blind, placebo-controlled study examined the effects of VERISOL collagen peptides on 105 normal and overweight women aged 24-50 years with moderate cellulite. The researchers found that a 2.5 g daily dose of VERISOL collagen peptides administered for 6 months significantly improved the cellulite score, reduced skin waviness on thighs, and increased dermal density compared with the placebo. The effects were more pronounced for normal-weight women: These women showed a mean reduction of 9% in cellulite score compared with placebo, versus a mean 4% reduction in cellulite score for overweight women. The researchers proposed that the improvements in cellulite appearance could result from increased synthesis of dermal connective tissue, which improved skin strength and elasticity.

A recent open-label clinical trial suggested that collagen peptides also improve the health and appearance of fingernails (Hexsel, D., et al., [https://doi.org /10.1111/ jocd.12393](https://doi.org/10.1111/jocd.12393),2017). Twenty-five participants took 2.5 g of VERISOL once daily for 24 weeks. At the end of the treatment period, nail growth rate had increased by 12% and the frequency of broken nails had decreased by 42%. Nail brittleness improved in 64% of participants, and 80% of participants said the treatment improved the appearance of their nails. However, this study must be repeated with larger numbers, blinding and a placebo group before definitive conclusions can be made.

Collagen peptides have properties that make them highly functional as ingredients for food and beverage formulations, says Niemann. “They are neutral in taste, neutral in color, highly dissolvable, and dispersible, so that lends them very well to any number of different applications,” she says. These “functional food” applications include beverages, dairy products such as yogurts and smoothies, bars, and gummies.

Astaxanthin

Another popular ingredient in the beauty from within category is astaxanthin, a carotenoid antioxidant. Astaxanthin (3,3'-dihydroxy--carotene-4,4'-dione) is the red-orange pigment that gives shrimp, lobster, and salmon their brilliant color. The richest natural source of astaxanthin is the microalga *Haemotococcus pluvialis*.

"Microalgae have been on the planet for billions of years and have managed to survive all kinds of climactic changes and disasters using very unique survival mechanisms," says Efrat Kat, Vice President of Marketing and Sales at Algatechnologies Ltd., in ketura, Israel (www.algatech.com). One of these survival mechanisms, which involve astaxanthin, allows microalgae to survive during bouts of intense sunlight. Under these conditions, *H. pluvialis* forms cysts, during which the cells produce high levels of astaxanthin to help cope with environmental stress. "The role of the astaxanthin is to protect the photosynthetic apparatus of the algae from sun radiation and other environmental stress," says Kat. "Exactly the same as astaxanthin protects the algae, it can protect our skin."

The chemical structure of astaxanthin allows the molecule to span cellular membranes. Hydrophilic head groups project into the cytoplasm and extracellular environment, whereas the nonpolar carbon chain resides amidst the fatty acid tails in the phospholipid bilayer. This structure facilitates electron transfer from free radicals along the conjugated double bonds of the molecule to an acceptor molecule, such as vitamin C. In human dermal fibroblasts, astaxanthin attenuates the UVA-induced increase in expression of two enzymes that break down the collagen and elastin networks in the dermis-matrix metalloproteinase-1 and skin fibroblaste elastase (Suranuma, K., et al., <https://doi.org/10.1016/j.jdermsci.2010.02.009>,2010).

Algatechnologies produces astaxanthin from *H. pluvialis* cultivated in about 600 km (373 miles) of closed tubular photobioreactors exposed to natural sunlight. The Algatechnologies production facility is located in the Arava Desert of southern Israel. "It's one of the most arid places on earth, and we have very high sun radiation year round," says kat. She notes that Algatechnologies has identified a species of *H. pluvialis*, named the "Arava species," that produces particularly high amounts of astaxanthin under these conditions. "If you take the same species and grow it in a different location or use a different technology, you will not get the same results," she says. "It's a combination of the species, the technology, and the location that gives us the best results." Algatechnologies scientists extract astaxanthin from the cells using supercritical carbon dioxide technology to ensure a highly pure, solvent-free product known as AstaPure.

Few high-quality clinical trials on the skin benefits of astaxanthin have been reported. In

a randomized, double-blind, placebo-controlled study of 36 healthy males aged 20-60 years, supplementation with 6 mg AstaREAL astaxanthin (Tokyo, Japan) for 6 weeks improved the area and volume of crow's feet wrinkles by about 16% and 15% respectively, compared with the placebo (Tominaga, K., et al., *Acta Biochim. Pol* 59, 43-47, 2012). In addition, skin elasticity improved by 5%, and transepidermal water loss decreased by almost 20% in the AstaREAL group compared with placebo.

In another study, researchers examined changes in systemic oxidative stress and residual skin surface components upon astaxanthin supplementation in 31 volunteers aged 40-80 years (Chalyk, N.E., et al., <https://doi.org/10.1916/j.nutres.2017.10.006>, 2017). The volunteers consumed 4 mg per day of astaxanthin (Lycotec Ltd., Cambridge, UK) for 4 weeks. Then researchers took blood samples and measured levels of plasma malondialdehyde (MDA), which is a bio-marker of systemic oxidative stress. They found that the mean MDA concentration in blood plasma decreased from baseline by 11.2% on day 15 and by 21.7% on day 29 of astaxanthin supplementation.

Residual skin surface components (RSSC) consist of a mixture of lipids produced by sebaceous glands and epidermal cells, desquamated corneocytes, and sweat. The researchers found that at the end of the study, participants had decreased levels of corneocyte desquamation and microbial stress – two characteristics that are associated with younger skin. These differences from baseline were more pronounced in obese subjects, possibly because a higher body mass index (BMI) has been associated with increased oxidative stress. Therefore, obese people may show a stronger response to the antioxidant effect of astaxanthin. This study was limited by a small sample size and no placebo group.

According to Kat, Algatechnologies offers a variety of different delivery forms of astaxanthin. “We can supply astaxanthin as a carotene oil form, powder, tablets, water-dispersible powder, or emulsion,” she says. “We try to offer all of the possible solutions so our customers can develop almost any type of product.” Kat notes that because astaxanthin is a dark red pigment, it is difficult to incorporate the high dosages found in oral supplements into topical creams. “To keep the cream at the desired color, you must use a very low dosage of astaxanthin,” she says.

Cambridge Chocolate Technologies (Cambridge, UK) has produced a dark chocolate bar that is enriched with astaxanthin. One bar contains about 11.4 mg astaxanthin – roughly the same amounts as 300 g salmon. In addition to astaxanthin, the cocoa flavanols in the chocolate act as antioxidants, the developers say.

Tomato/rosemary extracts

A synergistic effect between lycopene from tomatoes and carnosic acid from rosemary

underlies Lycoderm, Lycored's proprietary carotenoid blend for skin health. Lycored, with headquarters in Be'er Sheva, Israel, was established in 1995 “with a vision to bring the health benefits of the tomato to people around the world,” says Golan Raz, head of the Global Health Division at Lycored. “The company developed proprietary tomato breeds together with unique extraction and validation methods.” In addition to Lycoderm, Lycored offers supplements for heart health (Cardiomato), menopause (Lycofem), eye health (Lycoinvision), and prostate health (Lycopro).

Lycoderm's tomato extract contains the carot-enoids lycopene, phytoene, and phytofluene, which function as antioxidants. Carnosic acid from rosemary is also a potent antioxidant. In May 2017, Lycored was awarded the NutraIngredients Award for Best University Research for a study published in the British Journal of Dermatology. The placebo-controlled, double-blind, randomized, cross-over study examined the ability of Lycoderm, Lutein, or a placebo to dampen the expression of three genes that are induced by UV radiation: HO1 (an indicator of oxidative stress), ICAM1 (involved in skin inflammation), and MMP1 (involved in collagen breakdown) (Grether-Beck, S., et al., <https://doi.org/10.1111/bjd.15080>,2017).

In this study, 65 healthy volunteers aged 18-60 years were allocated to four treatment groups. Each group either started with the active treatment (Lycoderm or lutein) for 12 weeks and then switched to the placebo for 12 weeks, or vice versa. At the beginning and end of each treatment phase, the participants' skin was mildly irradiated with UV light, and 24 hours later, skin samples were taken for gene expression analysis by reverse transcriptase-polymerase chain reaction (RT-PCR).

Lycoderm inhibited the UV-induced upregulation of HO1, ICAM1, and MMP1, in either crossover sequence (before or after placebo). In contrast, lutein inhibited UV-induced gene expression if it was taken in the first sequence (before placebo), but worked less well in the second sequence (after placebo). The researchers do not currently know the mechanism behind this observation, but consistent with previous studies, the combined effects of tomato phytonutrients appear to be stronger than any one phytonutrient for protection from UV skin damage. UVA1 radiation is known to generate singlet oxygen, which initiates radiation-induced gene expression. Carotenoids, especially lycopene, can quench singlet oxygen.

Resveratrol

Resveratrol, a phenol found in grapes, berries, peanuts, and Japanese knot-weed, has antioxidant and anti-inflammatory properties. In pre-clinical studies, resveratrol was shown to inhibit the UV-induced activation of pro-inflammatory transcription factors and activate enzymes and transcription factors that combat reactive oxygen species (Farris,

P., et al., *J. Drugs Derm.* 12, 1389-1394, 2013). Resveratrol may also play a role in mitochondrial biogenesis. Some have proposed that resveratrol, famously found in red wine, underlies the so-called French paradox: the observation that despite eating a diet rich in saturated fats, French people have a low incidence of heart disease. “Although resveratrol is naturally found in red wine, it’s only in very small amounts,” says Clare Panchoo, sales director for Evolva (Reinach, Switzerland) in Europe, the Middle East, and Africa. “You’d have to drink around 75 glasses of wine in one day to get an effective dose of resveratrol.”

Although resveratrol is unlikely to explain the French paradox, the molecule has been studied widely for possible effects on heart disease, cancer, and life extension. Recently, researchers have begun to explore the use of resveratrol for skin health. Some small-scale studies have hinted at effects of topical resveratrol in anti-aging, skin whitening, acne, and psoriasis. Thus far, no studies have reported effects of ingested resveratrol by itself on skin health, although one study examined a dietary supplement containing both resveratrol and the polyphenol procyanidin (Buonocore, D., et al., <https://doi.org/10.2147/CCID.S36102>, 2012). The researchers found that the combined supplement decreased systemic oxidative stress, improved skin moisturization and elasticity, diminished skin roughness and depth of wrinkles, and decreased the intensity of age spots.

Evolva produces a food-grade form of resveratrol, called Veri-te, through a yeast fermentation process. The product is off-white, odorless, and colorless. “Today, resveratrol is mainly available in supplement form, but Evolva’s Veri-te brand is focused on helping expand the application possibilities,” says Panchoo. “Currently, it is challenging to incorporate resveratrol into functional beverages because it is not soluble. This spring, the Veri-te brand will launch an ingredient innovation that will enable cold-water dispersion of resveratrol.”

Thus far, the biggest challenge facing ingested resveratrol has been its poor in vivo bioavailability (Ndiaye, M., et al., <https://doi.org/10.1016/j.abb.2010.12.030>, 2011). In mammals, resveratrol is quickly metabolized in the liver, often within 30-60 minutes of ingestion. “More than 10,000 studies on resveratrol have been published, including 200 clinical trials, and many have identified the beneficial effects of oral resveratrol for indications ranging from cognitive and bone health to cardiovascular and skin health,” says Panchoo. “Therefore, resveratrol might have low bioavailability, but it has high bioactivity.”

THE FUTURE OF BEAUTY?

Although beauty foods, drinks, and supplements require more research to firmly establish their benefits, mechanisms, and possible risks, beauty from within is likely to be an attractive and intuitive concept for many consumers. An open question is whether people will be satisfied with or even notice the relatively modest improvements (usually on the order of 10-20%) demonstrated thus far for skin characteristics such as moisture, elasticity, and wrinkle depth. In any case, consumers should not expect miraculous or instantaneous transformations. “We know it takes a while for the skin's metabolism to slow and wrinkles to form, so it's only natural that supplementation to improve these things is going to take time, as well,” says Niemann. “It's not that you take VERISOL collagen peptides today, and your skin looks better tomorrow.”

Other ingredients not discussed in this article have shown promise as skin-boosting supplements in some studies, such as probiotics, prebiotics, coenzyme Q10, and hyaluronic acid. It is likely that a combination of ingredients, rather than any one, in both topical and supplement forms will provide the greatest benefits to skin health. “A nice trend we see developing is the combination of nutritional and topical products into one holistic approach,” says Raz. “This trend is well supported by a growing awareness among consumers of the importance of a multi-factorial approach when it comes to skin's health, longevity, and beauty. One aspect, no matter how sophisticated it is, will not provide the long-term foundation for lasting health and beauty.”

ACK : This article is from May 2018 issue of Inform Magazine of A.O.C.S. (aocs.org)

About Ourselves:

@ Prof Sunit Mukherjee, S.K.Roy, Kakali Bandyopadhyay and Pubali Ghosh participated in the National conference of the Nutrition Society of India , Calcutta Chapter held in the Auditorium of Institute of Chemical Engineers, Jadavpur University , in the Month of September 2018. It was a grand success.

@'International Conference of O.T.A.I. was held in Varanasi at the B.H.U. Campus in collaboration with , Chemical Technology Deptt of I.I.T... B.H.U., w.e.f. 21 to 23 Dec. '2018.

It was meticulously arranged with good participation of Scholars from various academic Institutions.

Director Prof P. K. Jain, I.I.T. inaugurated the Conference
The whole programme was organised under the Chairmanship of
Prof R. K. Trevedi, President & Mr. D. Mathur, Convenor.

@ Four members of O.T.A.I. (EZ) present actively participated in the Conference

B.P.Manchanda Hon Gen Secy,E.Z. , Co. Chaired a Technical Session on Vegetable Oils &Fats

Speakers were : Dr Saha, Dr Mangesh Kulkarni, and Dr Manoharan Tyagarajan

2. Souvik Bhattacharya Life Fellow Member , E.Z. Co Chaired a Technical Session
Session on Value Addition through adherence to ..Quality Assurance
Speaker was Dr S.P.Chaurasia.

3. S.K.Roy, Former President O.T.A.I. Chaired a Technical Session on " Fortification ,
Food,& Nutraceuticals"
Speaker was Dr K.D.Yadava.

** Welcome>

Dr sibabrata Mukherjee as Life Fellow Member of Eastern Zone, Calcutta

Membership No. EZ/LF/2019/1

Honours:

Dr Ms Subhasree Sengupta of E.Z. has received the Prestigious Dr S. Hussein Zaheer Award for the Year 2018

Dr Satyam reddy Yasa has bagged the Prestigious Dr Santinath Ghosh Award for the Year 2018.

@@@@@@ SAD DEMISE:: O.T.A.I (E.Z.) mourns the SAD DEMISE of our Executive Committee Member Sandip Das.

May His Soul rest in PEACE !!

PARLIAMENT NEWS

Lok Sabha Starred Question No. 3 Answered on 11th December 2018

Transfer of Agricultural Technology

Shri Prahlad Singh Patel :

Will the Minister of Agriculture & Farmers Welfare Be Pleased to State :

(a) Whether the Government has taken any step for effective transfer of the agricultural Technology, newly developed by the Indians well as foreign scientists, to the farmers of Madhya Pradesh so that they can be motivated to accept the improved crop production technology for the enhancement of their production and if so, the details thereof ;

(b) Whether the Government and agricultural universities are arranging field exhibitions in the State for imparting training to the farmers in this regard and if so, the details thereof, and

(c) the other measures being taken to increase productivity of foodgrains in Madhya Pradesh?

Answer

The Minister of Agriculture and Farmers Welfare Shri Radha Mohan Singh

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

Statement in Respect of Parts (a) to (c) of Lok Sabha Starred Question No. 3 Answered on 11th Dec. 2018 Regarding.

“Transfer of Agricultural Technology”

(a) Yes, Madam, The steps taken by the Government for effective transfer of newly developed agricultural technology to farmers are as follows :-

- The Indian Council of Agricultural Research has established 52 Krishi Vigyan Kendras (KVKs) covering all the districts of Madhya Pradesh.
- Fifty-One Agricultural Technology Management Agencies (ATMAs) have been set-up covering all districts of Madhya Pradesh with funding from Centrally Sponsored Scheme on Support to State Extension Programme for Extension Reforms.
- Facilitated establishment of 1205 Agri-clinic and Agri-business centres for providing input delivery and farm advisory services to farmers.
- Established Kisan Call Centre at Jadavpur for providing farm advisory to farmers.

These KVKs and ATMAs are motivating and encouraging farmers to adopt improved crop production technologies by organizing various programmes and activities including testing and demonstration of technologies in farmer's field; training of farmers; conducting farm schools and exposure visits of farmers.

(b) Apart from imparting regularly training to farmers, the Agricultural Universities, KVKs and ATMAs in the State are organizing exhibitions and various other extension activities like farmers fair, kisan ghosthis, field days, technology weeks, ex-trainees sammelans, celebration of important days, diagnostic visits, soil health camps and pre-Rabi & pre-Kharif campaigns for creating awareness on improved agricultural technologies.

(c) The farmers of Madhya Pradesh are supported to increase productivity and production of food-grains through different Schemes and programmes like soil health card based recommendations for use of fertilizers including Neem coated Urea; Pradhan Mantri Krishi Sinchayee Yojana (PMKSY); Parapragat Krishi Vikas Yojana (PKVY); National Food Security Mission (NFSM); National Mission on Agricultural Extension & Technology (NAMAET); Rashtriya Krishi Vikas Yojana (RKVY); tree plantation (Har Medh Par Ped) and Bee Keeping etc.

In addition, the Government of Madhya Pradesh is supporting farmers for enhancing production through a number of schemes like Mukhyamantri Khet Teerth Scheme; Yantradoot Village Scheme & Custom hiring centre and Balram Rhythm Scheme.

Lok Sabha Starred Question No. 15 Answered on 11th December 2018

Impact of Climate Change

Shri P. K. Kunhalikutty:
Shri Jyotiraditya M. Scindia:

Will the Minister of Agriculture & Farmers Welfare be pleased to State:

(a) whether an annual review by the Indian Council of Agricultural Research (ICAR) has recently revealed that crops, plantations and livestock in around 150 districts or slightly more than one-fifth of the total districts in the country are susceptible to the impact of climate change;

(b) if so, the details thereof and the reaction of the Government thereto;

(c) whether the annual agricultural income of farmers may fall in the range of 15-18 percent on average and upto 20-25 percent in un-irrigated areas; and

(d) if so, the details thereof and the steps taken by ICAR to make use of better scientific methods for increasing productivity in the farm sector?

Answer

The Minister of Agriculture and Farmers Welfare Shri Radha Mohan Singh

(a) to (d): A Statement in laid on the Table of the House.

Statement in Respect of Parts (a) to (d) of Lok Sabha Starred Question No. 15 Answered on 11/12/2018 Regarding

“IMPACT OF CLIMATE CHANGE”

(a) & (b): ICAR-Central Research Institute for Dryland Agriculture established in 1985 has assessed relative vulnerability of agriculture to climate change for 572 rural districts of India during 2011 under National Innovations in Climate Resilient Agriculture (NICRA) and revealed that 151 districts are highly vulnerable. Accordingly, climate resilient technologies are being demonstrated in those districts under NICRA to cope up with any extreme climatic aberrations.

(c) & (d): As per “Economic Survey 2018”, the climate change could reduce annual farm incomes in the range of 15-18 percent on average and up to 20-25 percent for unirrigated areas. In order to minimize the impact of climate variability, climate resilient technologies are being popularized through demonstrations. A number of climate resilient crop varieties have also been developed. In addition, institutional interventions like establishment of seed bank, fodder bank, custom hiring centres, commodity groups and introduction of climate literacy through setting up of village level automatic weather station have been made. The ICAR has also developed district agricultural contingency plans for 633 districts and providing real time agro-advisories to farmers to minimize risk.

MISUSE OF TRADE PROMOTION SCHEMES

Shri Raju Shetty

Will the Minister of Commerce & Industry be pleased to state :

- (a) the details of schemes being implemented for promotion of foreign trade and export in the country;
- (b) whether any cases of misuse of these schemes have come to the notice of the Government during the last three years;
- (c) the steps taken by the Government to put a check on such cases of misuse of these schemes and the outcome thereof?

Answer

The Minister of State in the Ministry of Commerce and industry.

Shri C.R. Chaudhary

(a) Madam, under the Foreign Trade Policy 2015-20, the Government of India has the following schemes for promotion of foreign trade export from the country.

i. Merchandise exports from India Scheme (MEIS) incentivizes exporters in terms of Duty Credit Scrips at the rate 2, 3, 4, 5, 7 and 10% of realized FOB value of exports. These scrips are transferable and can be used to pay certain Central Duties / taxes including customs duties, but not IGST / CGST / SGST. At present, the Scheme covers approx 8052 tariff lines at 8 digits level.

ii. Service Exports from India Scheme (SEIS) rewards service providers of notified services, on Net foreign exchange earnings, who are providing service form of Duty Credit scrips which are utilizable just like MEIS.

iii. Advance Authorization and related schemes, under which the importer of a raw material is provided the facility of importing raw materials without payment of duty, provided the imported material is used for manufacturing export products.

iv. Export promotion Capital Goods Scheme (EPCG), allows the exporters to import duty free capital goods, which can be used at pre-production, production and post production stages of the manufacture of export product and services provided, they commit to fulfill an export obligation equal to six times of the duty saved in six years.

v. The Foreign Trade Policy also has provisions for local supplies, to provide a levelplaying field to domestic manufacturers under "Deemed Exports", which refer to those transactions in which goods supplied do not leave country, and payment for such supplies is received either in Indian rupees or in free foreign exchange.

vi. Further, the Ministry implements a scheme namely Trade Infrastructure for Export Scheme (TIES). The scheme was launched during BE 2017-18, for 3years, with the objective to enhance export infrastructure, creating export focused infrastructure and inducing states to take up more export-oriented projects including those required for addressing quality and certification concerns.

(b) & (c) Yes Madam, instances of misuse of these schemes have come to the notice of the Government in the last three years. The misuse is related to improper avilment of EPCG

benefits, advance authorization scheme, claim of benefits under Focus Market Schemes/Focus Product Schemes based on fraudulent documents/shipping bills, avilment of DFIA

(Duty Free Import Authorization) scheme benefits on doubtful transactions, Evasion of Customs Duty by utilizing SFIS scrips obtained on ineligible remittances etc. A summary of state wise cases for the period is attached in the Annexure I.

(d) The Government takes note of any such misuse as reported by the Department of Revenue Intelligence (DRI) inputs, or during routine audit or scrutiny of applications. Under the provisions of the Rule 7 of the FT (Development and Regulation) Rules such IEC holders are immediately placed in the Denied Entity List and subsequent action under FT(D&R) Act is initiated with due procedure. The outcome of such actions is full recovery of undue benefits granted to such firms along with interest and penalty as imposed by the relevant Adjudication authority. The DGFT has an Enforcement Cum Adjudication (ECA) division through which this effort is co-ordinated with different agencies.

Annexure - I

Details of Cases of Misuse of Schemes in the period 2018-16 to 2017-18*

Sl. No.	Name of State	No. of Cases
1.	Gujarat	77
2.	Punjab	53
3.	Haryana	03
4.	Delhi	11
5.	Karnataka	01
6.	Tamilnadu	01
7.	Uttar Pradesh	01
8.	West Bengal	01
9.	Maharashtra	04
10.	Andhra Pradesh	01

* As reported by the agencies from which report was sought till the time of submitting reply. Information for other States is NIL, as yet.

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A REVIEW

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

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

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

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

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

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

Prof. D. K. Bhattacharyya

21-06-2003

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

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

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

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

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

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

(S. K. Roy)
Editor

Fatty acids composition of some edible oils. Percentage by weight.

Fat / Oil	SAFA	MUFA Oleic	PUFA		Total
			Linoleic	Linolenic	
Coconut Oil	87.9	7.8	0.8	-----	0.8
Palm Oil	47.9	37.9	9.0	---	9.0
Musta / rapseed	10.7	56.7	18.1	14.5	32.6
Sunflower Oil	10.7	17.7	78.5	-----	78.5
Soybean Oil	13.1	28.9	50.7	6.5	57.2
Sesame Oil	13.4	41.3	45.3	---	45.3
Sunflower Oil	9.1	25.1	66.2	----	66.2
Cottonseed Oil	25.9	22.9	47.8	----	47.8
Groundnut Oil	20.9	49.3	29.8	----	29.8
Rice Bran Oil	18.0	45.0	35.0	2.0	37.0
Olive Oil	9.0	75.0	16.0		

The edible fats and oils shown above are only divided into groups on the basis of their contents of different classes of fatty acids.

1. Fats rich in SAFA
2. Fats rich in MUFA
3. Fats highly rich in PUFA
4. Fats rich in PUFA
5. Fats more or less balanced

AHA - SAFA:MUFA:PUFA = 1:1:1

Japan Min of Health

SAFA:MUFA:PUFA = 1:1.5:1