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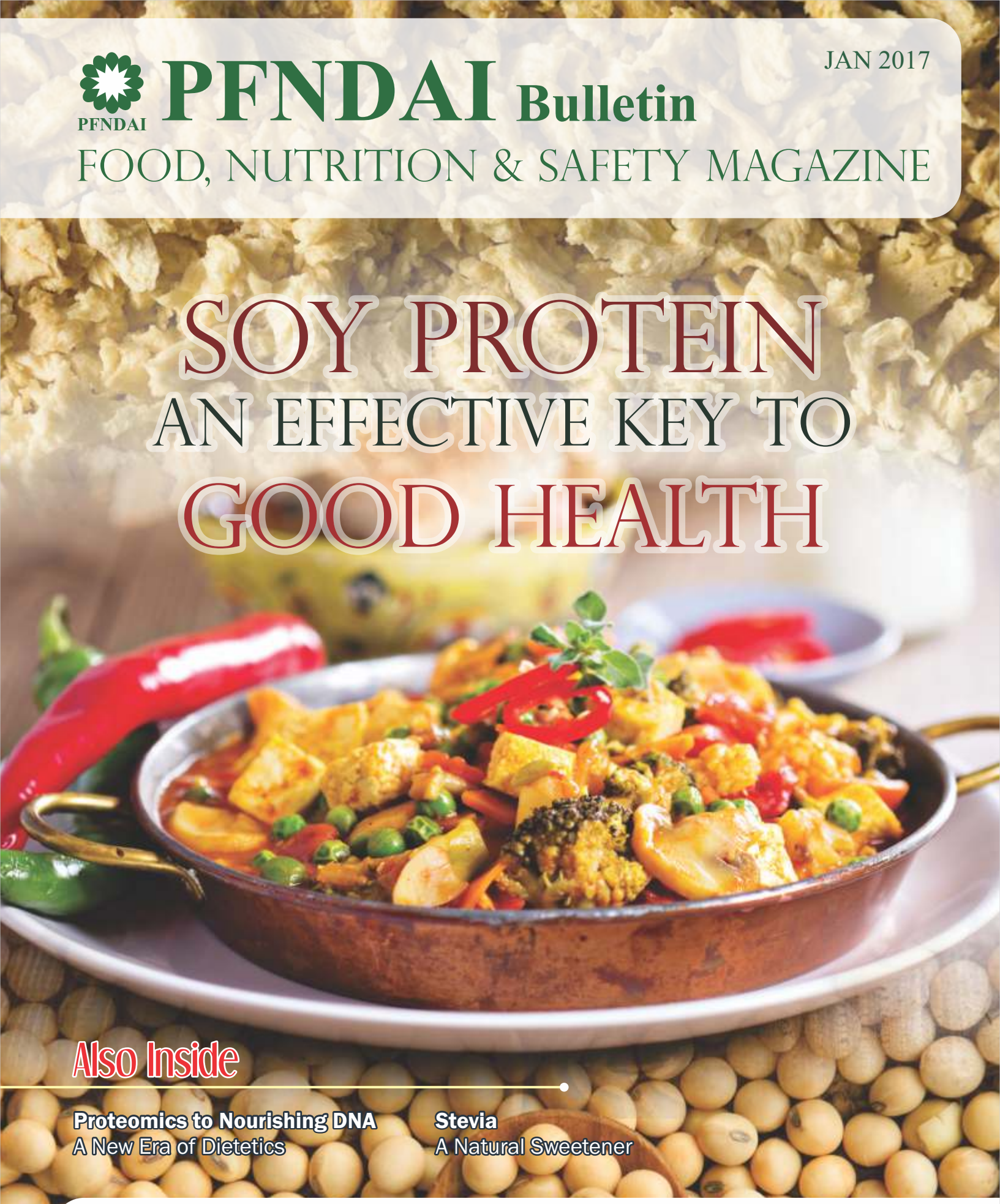
PFNDAI Bulletin

JAN 2017

FOOD, NUTRITION & SAFETY MAGAZINE

SOY PROTEIN
AN EFFECTIVE KEY TO
GOOD HEALTH



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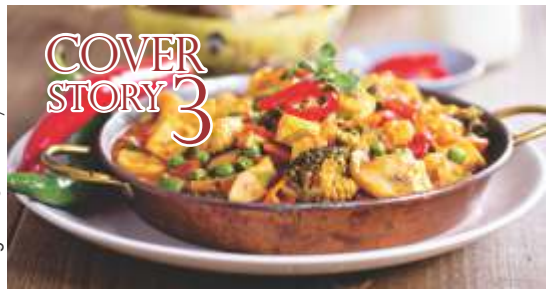

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EDITORIAL

A small change made in a large country can often lead to much bigger problem.

We needed to boost economy commensurate to lifestyle changes as well as it gave way to people to show off their riches. By letting foreign manufacturers make as well as import cars gave such a boost and gave a lot of credit to governments. This was the easiest thing to do for governments without the more difficult additional steps needed with that such as building more and bigger and better roads as well as improving mass transit system that was needed to ease the congestion that would be caused by too many cars. The latter needed a lot of efforts on part of governments which was not done and so we are not just having traffic jams but more importantly it is affecting our health due to pollution so much that courts have to step in to do the job of administration to curb some polluting vehicles.

Same could also be said of construction industry which was given green signal to build all kinds of buildings, malls and shopping centres which not only created its own problem but added to the above problem on health.

There is also a similar thing happening in agriculture. Many pulses and minor cereals are being produced less because farmers are going after cash crops as more incentives are available for producing sugarcane, wheat, maize, cotton, oil seeds and others. Farmers used to produce mainly crops which were consumed by them, by their animals and would sell the bulk excess in market. They would also produce a small amount of cash crops to also earn a little more.

When governments started to encourage cash crops which were mostly produced to be sold entirely without consumption by farmer's family or animals. Because of the better economics farmers started going for cash crops so they would have a better financial status and so many crops including pulses and minor cereals like jowar, bajra etc. started declining.

The pulses started costing a lot more and their consumption by population started decreasing. Adding to this change was increased consumption of wheat based foods both at homes and away. Poor dals were left behind as people started consuming animal products including meat, fish, eggs and milk. There were also increased consumptions of fats and sugars with concomitant decrease in physical activity. All these added up to our non-communicable diseases. Pulses with their higher proteins and dietary fibres would certainly help in this respect.

Now over the years we are finding it difficult to put pulses back in our diets for cost or other reasons. This year because farmers felt that due to high prices of pulses in market they would get better returns, but due to bumper crop prices dropped sharply and farmers are again not very happy. However, consumers are happy and hopefully we will have more of pulse based diet at least at homes without complaining about pulse prices.

Now many governments are going after meat markets. We will have to wait and see what effect it would have in the long run on our diets and health.

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SOY PROTEIN
AN EFFECTIVE KEY TO
GOOD HEALTH

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Protein is the basic chemical unit of living organisms & is essential for nutrition, growth & repair. Plant synthesises amino acids with the help of bacteria & other environmental resources of basic elements. Same is not the case with humans & hence their dependency on others mainly plant remains for protein requirements.

The protein in body is in a state of dynamic equilibrium undergoing continuous use (breakdown) & creation (synthesis). Rate of synthesis & breakdown varies widely in various tissues. Average daily intake of protein varies from 0.6g to 1.2g/kg body wt./day. However mear administration of protein rich foods does not guarantee the availability of it to body unless all the essential amino acids are available simultaneously in adequate amount. Protein in diet shall accompany with energy providing carbohydrates & fat in sufficient quantity to avoid any breakdown of protein for any energy requirements of body. This is termed as protein sparing effect.

Indian diet is by & large based on cereals (up to 70%) mainly wheat & rice. This is not adequate enough to deliver right quality protein in terms of its Biological value, protein quality & Net protein utilisation etc. Beside its calorific density is also low. Hence good amount of protein is utilised for energy production & same is not available for repair & growth of the body.

Latest available survey data conducted in India including cities like Mumbai, Delhi & Chennai indicates that almost 80% to 90% of average Indians are malnourished for protein. It implies that most Indians are not getting right amount of required high quality protein.

Protein deficiency has direct effect on our performance. It causes weakness, anaemia, swelling (edema) , delayed wound healing & decrease resistance to infection. It is also associated with high instances of toxaemia of pregnancy. Impact of protein deficiency is deep & consequences are running in to generations. It is detrimental to health of country as whole.

In current Indian scenario Soy based product can offer a very effective &workable solution.

The protein content of soybean has rich amino acids with a remarkably good balance. The protein quality is comparable to animal proteins like milk and beef. The high lysine content of soy protein is a good complement to cereal proteins, which are low in lysine. Recent studies also indicated that the lower amount of methionine in soybean proteins compared with casein may contribute to the selective retardation of tumors (rat was used). Soy protein mainly consists of β-conglycinin (7S globulin) and glycinin (11S globulin).

With the development of economy in the world, chronic diseases, such as osteoporosis, cardiovascular diseases are also on rise. Foods have an effective role to play in health management of osteoporosis (bone health), cardiovascular disorders (CVD), cancer & post-menopausal symptoms etc. Soy protein is a safe, viable and practical non-pharmacological approach towards it. The most interesting thing about the physiological function of soybean due to many minor components offering positive impact in prevention of various disease & disorders. These components

include isoflavones, saponins, trypsin inhibitors, phytic acid, etc. Among these, isoflavones (mainly genistein and daidzein) are becoming one of the hotspots of functional food research because soybean is the only significant dietary source of these compounds

Health Benefits of Soy Consumption: Although soy foods have been consumed for more than 1000 years, only in the past two to three decades have they made an in road into Indian cultures and diets. Today, the most notable attributes of soybeans is their health benefits linked to the prevention and treatment of many chronic diseases owing to their protein and Isoflavones & phytosterols activities. Regular consumption of soy products reduces one's risk for chronic diseases such as cancer, heart disease and stroke. Soy foods can provide the body beneficial agents including vitamins, minerals, fiber and flavonoids. Numerous clinical trials have investigated the potential of soy to protect against risk of chronic disease.

Heart Disease: Isoflavones may play a greater role in improving vascular functions than in reducing cholesterol by virtue of Phytosterols; Isoflavones resemble estradiol structurally but bind preferentially to estrogen receptors (ERs) that is present in the vasculature and may resemble the behavior of selective ERs modulators. Decreasing the susceptibility of LDL cholesterol to oxidation, lowering total and LDL cholesterol and increasing HDL cholesterol, possibly reducing the risk of coronary artery disease.

Cancer: Numerous studies have investigated the anti-carcinogenic properties of soy. It has been suggested that the isoflavones genistein and daidzein may decrease the amount and size of cancer tumors. Regular consumption of soy protein by healthy adult populations has been associated with a reduction in risk of both breast and prostate cancer. Clinical studies suggested that soy phytoestrogens stimulate epithelial cell proliferation in breasts of premenopausal women, a potential precursor of cancer. Furthermore, soy isoflavones have estrogenic, anti-androgenic and other activities that could prevent prostate cancer or slow its progression.

Osteoporosis: It causes bones to become overly porous and brittle from the loss of calcium and other minerals. It progresses without any symptoms, that is, until irreversible pain, loss of height and bone fractures occur. Soy foods may help prevent &manage osteoporosis. With soy the calcium is easily absorbed by the body. A study conducted by Erdman and Potter found that, after 6 months, consuming 40g of isolated soy protein / day significantly increased both mineral content &density in the lumbar spine.

Diabetes:Legumes, especially soybeans, have a very low glycemic index and are valuable foods to include in adiabetic diet. Regular consumption of soy protein may help to reduce symptoms associated with Type 2 Diabetes. Soy has been shown to decrease postprandial hyperglycemia, improve glucose tolerance and decrease amounts of glycosylated hemoglobin.

Obesity: Obesity is a disorder of energy balance and is associated with hyperinsulinemia, insulin resistance and abnormalities in lipid metabolism and it is one of the most important risk factors in the development of Type II diabetes, cardiovascular disease, atherosclerosis and certain cancers. Estrogen is a major regulator of adipocyte development and adipocyte number in females and males. As a result of isoflavones structural similarities to endogenous estrogens, isoflavones elicit weak estrogenic effects by 17β-estradiol for binding to the intra-nuclear ERs and exert estrogenic or anti-estrogenic effects in various tissues.

Protein Malnutrition:
The Protein Consumption in the Diet of Adult Indians Survey done by IMRB, found nine out of 10 Indians consumed less than adequate proteins daily. It added that 91% of the vegetarians and 85% of the non-vegetarians were protein deficient. Indicating there is a huge gap in the protein requirements and protein consumption for each individual," It was reported that Mumbai had the lowest protein gap of 68%, which was in contrast to Delhi's high gap of 99%.

Now every dish will be healthy.

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Nutrela Soya Rajma

Ingredients:

- 1 cup red kidney beans, 4 cup water,
  2 cups soaked Nutrela Soya Mini Chunks.
  (Soaked, boiled and squeezed dry),
  2 cup fresh tomato puree.
- 1 teaspoon cumin seeds, crushed black peppercorns, Kashmiri red chilli powder, garam masala powder and ½ teaspoon aamchur.
- 1 tablespoon coriander powder,
  2 tablespoon ginger garlic paste,
  3 tablespoon oil.
- chopped 2 green chillies,
  2 medium onions.
- 1 pcs tej patta, 1 inch ginger,
  cut into thin strips,
  Salt to taste.

Method:

- Soak red kidney beans overnight and boil them with water, salt and tej patta.
- Heat oil, add cumin seeds and let it splutter
- Add onions and saute` till onions become golden brown and start to caramelize.
- Add ginger paste, garlic paste, chopped green chilly and saute` it.
- Add tomato puree and sauté for 4-5 minutes.
- Add red chilli powder, turmeric powder, pepper powder coriander powder, amchur powder, garam masala powder and saute` for 2 minutes.
- Add Rajma, Nutrela Soya Mini Chunks, salt and mix well.
- Add the balance water in which the rajma was boiled, mash a few of the rajma into a paste to slightly to thicken the gravy and allow it to cook.
- Add the remaining garam masala powder and ginger strips and mix well
- Transfer into a serving bowl and serve hot

NFHS, data shows prevalence of stunting among under five is 48% and wasting is 19.8% and with an underweight prevalence of 42.5%. In rural areas and among poor section of the society, the gap is most prominent.Such huge differences between protein requirement and actual consumption lead to protein malnutrition.

In such alarming condition of chronic protein malnutrition soy can be an effective answer due to its excellent protein quality, easily availability, acceptability &affordability by common persons of the society.

It can be suitably consumed in the form of texturized Soy protein or a meat analogue.

Texturised Soy Protein:It is made wholly from either defatted soy meal flakes or soy protein concentrates. It is produced on extruder by HTST (High Temperature Short Time) process that helps in retaining all goodness of nutrients beside easy to cook & digest. It's water absorbing capacity gives it an ability to providing meat-like textural properties. It is widely used as ingredient in ground meat for patties, sausages and meal loaf and in vegetarian foods and stews.

It can be an ideal answer to malnutrition & can be effectively included in mid-day meal plan of any of Anganwadi activities managed by ICDS particularly for pregnant women & children.

Defatted Soy flour can now be fortified up to 10% in wheat flour or maida to enhance the nutritive value of wheat flour. It is termed as "Paushtik Atta" by FSSAI. Level is so well optimised that can offer good nourishing protein without affecting any of organoleptic attributes of Roti / Chapatti or any such traditional preparations.
In current Indian scenario wheat flour fortified with defatted Soy flour with can offer a very workable solution. It can hence be included in Public Distribution Systems (PDS). Need of the day is to make sure right supplementation of protein to all Indians especially to pregnant ladies & growing children for better healthy & safe tomorrow. Soy is an effective solution to ensure health of mankind & nation as a whole that is marching towards great prosperity.

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PROTEOMICS TO NOURISHING DNA: NEW ERA OF DIETETICS

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"What our parents and grandparents ate, how much exercise they did and what chemicals they were exposed to are all factors our bodys look and work". This theory makes us believe that "We are what we eat". This takes us back to the age old Hippocrates saying: "Let Food Be Thy Medicine and Medicine Be Thy Food". Dietetics is a branch of Nutrition with an evolving research and varied disciplines.

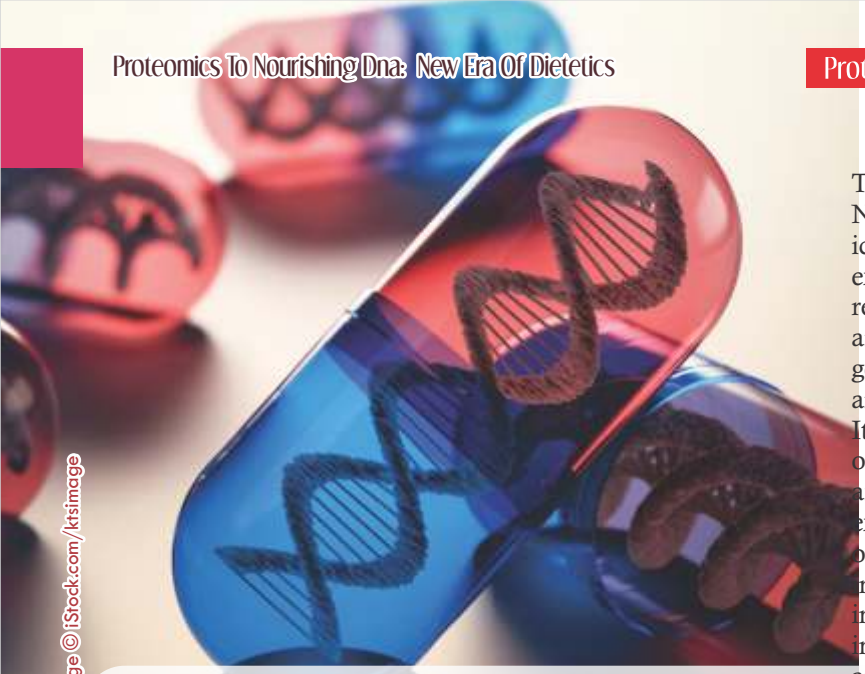
History of Dietetics:
The history of dietetics can be traced as far back as the writings of Homer, Plato and Hippocrates in ancient Greece. Although diet and nutrition continued to be judged important for health, dietetics did not progress much till the 19th century with the advances in chemistry. Early research focused focuses on vitamin deficiency diseases while later workers proposed daily requirements for protein, fat and carbohydrates.

Today, is post genomic era in which integration of three fields: biological, social and environmental, where scientific discoveries on nutritional patho-physiology and metabolism are included. Dietetic Professional has a great future in treating with bioactive food at a genomic level.

New world of Omics:
Omics is field of study in biology which aims at the collective characterization and quantification of pools of biological molecules that translate into the structure, function and dynamics of an organism.

Functional Genomics: DNA sequencing, genetic profiling, genetic mapping, structural and functional analysis of genome. A genome is an organism's complete set of DNA, including all of its genes. Each genome contains all of the information needed to build and maintain that organism. In humans, a copy of the entire genome—more than 3 billion DNA base pairs—is contained in all cells that have a nucleus.

A genome is the complete genetic sequence of an organism; the blueprint for the cellular proteome, which, in concert with the environment, determines the metabolic capabilities of the cell. The proteome is the full complement of proteins produced by a particular genome. Genome changes when mutations occur.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Proteins being produced by an organism continually change in response to external and internal events. These changes are gene expression. The initial product of genome expression is transcriptome, a collection of RNA molecules derived from those protein-coding genes whose biological information is required by the cell. Metabolites are substances required for, or produced by, the biochemical reactions of metabolism in living organisms. These are Metabolomes.

These variations underlie wide range of physical, biochemical and developmental difference seen among various cells and tissues and play a role in difference between health and disease. The external or environmental factors that turn gene on and off, and how cells interpret and express genetic code is Epigenetics. Epigenome can be dynamically altered by external environmental factors, where as underlying genome is not.

New Era of Personalised Nutrition:

New concept of "Personalised Nutrition" is based on the fact that nutrients (macro and micro) alter molecular processes (eg; DNA Structure, gene expression, metabolsim, etc) which in turn may alter the onset and progression of disease.

This is Nutrigenomics which examines relationships among genes, diet and health. It is a study of how food affect the expression of genetic information in an individual and how individuals genetic make up affects the metabolism and response to nutrients and other bioactive components I food: Nutrigenomics asks how dietary components influence gene expression, while Nutrigenetics asks how our genetic makeup makes us respond or not to dietary intervention. Nutrigenomics assesses dietary influence at gene and protein expression and metabolite level and derives omics profiles typical for a nutritional intervention or status.

Epigenetic processes have a strong influence on normal growth and development, and this process is deregulated in diseases such as cancer. Epigenetic silencing of gene that would normally protect against a disease, as a result , could make people more susceptible to developing that disease later in life.

Nutrigenomic techniques help researchers elucidate individual responses to nutritional interventions holistically and help with the design of personalized diets adapted to individual needs. Human genetics has revealed insights into health and disease susceptibility and can help differentiate responders from nonresponders in dietary interventions, but the predictive power of single-nucleotide polymorphisms in disease susceptibility genes has so far been limited in terms of helping to foresee a health trajectory.

Nutrigenomics as tool:

Nutrigenomics is research focusing on identifying and understanding molecular-level interaction between nutrients and other dietary bioactives with the genome. It aims to develop rational means to optimize nutrition with respect to the subjects genotype. Nutrients are seen as signals that cell a specific cell in the body about the diet. Nutrigenomics will promote an increased understanding of how nutrition influences metabolic pathways and homeostatic control, which will be then used to prevent the development of chronic diet related diseases such as obesity and type 2 diseases. It involves finding markers of the early phase of diet related disease, where intervention with nutrition can help patient in wellness and prevention.

Another aim of Nutrigenomics also includes demonstrate effect of bioactive food compounds on health which should lead to the development of functional foods that will keep people healthy according to individual needs.

Dietary Components and its interaction with Epigenetic Regulation:

Nutrients can reverse or change epigenetic phenomena such as DNA methylation and histone modifications, thereby modifying the expression of critical genes associated with physiologic and pathologic processes, including embryonic development, aging, and carcinogenesis. Nutrients and Bioactive food components can influence epigenetic phenomena either by directly inhibiting enzymes that catalyze DNA methylation or histone modification, or by altering the availability of substrates necessary for those enzymatic reaction.

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Research with the help of omics approach are connecting food components, food, the diet, the individual, the health, and the diseases. Foodomics is a new approach to food and nutrition that studies the food domain to reach to the main objective, the optimization of human health and well-being. Food can be used as information and the bioactive components of the food can be applied on human health for prevention and wellness. Integrating this food as information and its impact on gene expression can be considered as a personalized approach towards nutrition application.

Future of Nutrigenomics and Implications for Nutritional Recommendation and Dietetic Practice:

Genetic background, gender and life stage can have an impact on nutritional requirements isbecoming increasingly evident. Nutrigemonics and Nutrigenetics are taking a central stage in the investigation of the effect of nutrition on health outcomes. The impact of Nutrients can be evaluated comprehensively by a multitude of "omic" technologies and biomarkers The evidence- based approach is the only mechanism that can ensure that the knowledge generated by nutrigenetic/ nutrigenomic science is properly implemented and scrutinized.

Furthermore, as nutrition becomes increasingly integrated with preventive medicine, it is essential that dieticians and medical practitioners as well as genticists are properly educated in the field of nutrigentics/ nutrigenomics so that their principles and practice are properly utlised not abused. The development of a personalizing approach to nutrition of nutrient-gene prevention and therapy will require a much more comprehensive understanding of nutrient –gene interactions and their impact.

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STEVIA: THE NATURAL SWEETENER

By
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Historical use:

Stevia is the general name for the extract of the leaves of the plant Stevia rebaudiana. The leaves of stevia were used by indigenous peoples in Paraguay and Brazil since before recorded history.Stevia became more widely known outside central South America following the 1887 'discovery' of stevia by botanist, Antonio Bertoni.

Due to its sweetness, stevia has been given many names including honey leaf, sweet leaf of Paraguay, sweetleaf, sweet herb, candyleaf and honey yerba.

Stevia sweeteners are probably best known from their use in Japan. Used in place of saccharin after it was banned in the 1970s, stevia sweeteners have been consumed in Japan more widely than in any other country, although not as much as has been reported. Stevia leaves or extracts have been allowed for use as a dietary supplement in the US since the passage of the Dietary Supplement Health and Education Act (DSHEA) in 1994.

Composition of Stevia Leaf

Stevia extracts generally contain a high percentage of the glycoside diterpenes Stevioside (CAS no. 57817-89-7) and Rebaudioside A (CAS no. 58543-16-1), the principal sweetening compounds, and smaller amounts of other steviol glycosides. A combination of any the individual approved steviol glycosides can contribute to the 95% or more steviol glycoside content required to meet the JECFA specification The composition of the extracts depends on the composition of the leaves, influenced by soil and climate; and on the extraction and purification processes used. The impurities occurring in extracts of the Stevia leaves are typical plant materials, such as pigments and saccharides

The phytochemistry of S. rebaudiana has been studied intensely for decades now, and many sweet and non-sweet compounds have been identified. Six new, naturally occurring, sweet tasting steviol glycosides have been identified from S. rebaudiana, with stevioside being the most abundant, and rebaudioside A being the second most abundant. The remaining four glycosides, rebaudiosides C–E and dulcoside A, are present in lesser amounts.S. rebaudiana also elaborates a complex mixture of known sterols, triterpenoids, essential oils, flavonoids,and other compounds pigments chlorophylls A and B and β-carotene. Tartaric acid was the major organic acid in an extract of S. rebaudiana, with small quantities of citric, formic, lactic, malic, and succinic acids.

Manufacture of Stevia Extracts

Steviol glycosides preparations are white or slightly yellowish white crystalline odourless or having a slight characteristic odour, water soluble powders, which are 200 to 300 times sweeter than sucrose. The manufacturing process is as follows: (figure 1)

Process

1. Drying of leaves: Stevia leaves are harvestedand subsequently leaves and stem dissociated. The plant parts are dried and steeped in water
2. Extraction:leaves are extracted 2-3 times with water at 50-60°. The plant extract is further purified with water or food grade alcohol.
3. Flocculation: Calcium hydroxide and Aluminum sulphate are added to remove impurities in form of the soluble compounds such as plant

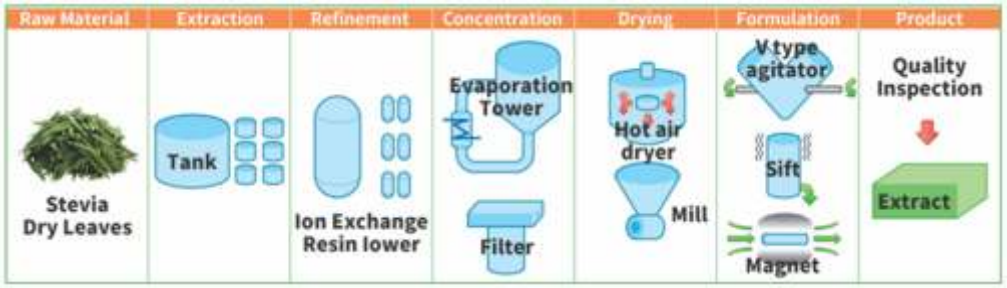

Figure 1: Stevia extraction process

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pigments, saponins, tannins, sterols, flavonoids, various phenolic compounds, heavy metals
4. Filtration: done using Filter press to remove flocculated impurities
5. Adsorption on resin: The steviol glycosides are adsorbed and then released with alcohol
6. Distillation: the extract is distilled for vaporization of alcohol
7. Ion exchange: Using cation and anion resin mix bed
8. Concentration: Vaporizing water under reduced pressure (vacuum)
9. Micro filter: through 1 μm filter
10. Spray drying: for drying into powder

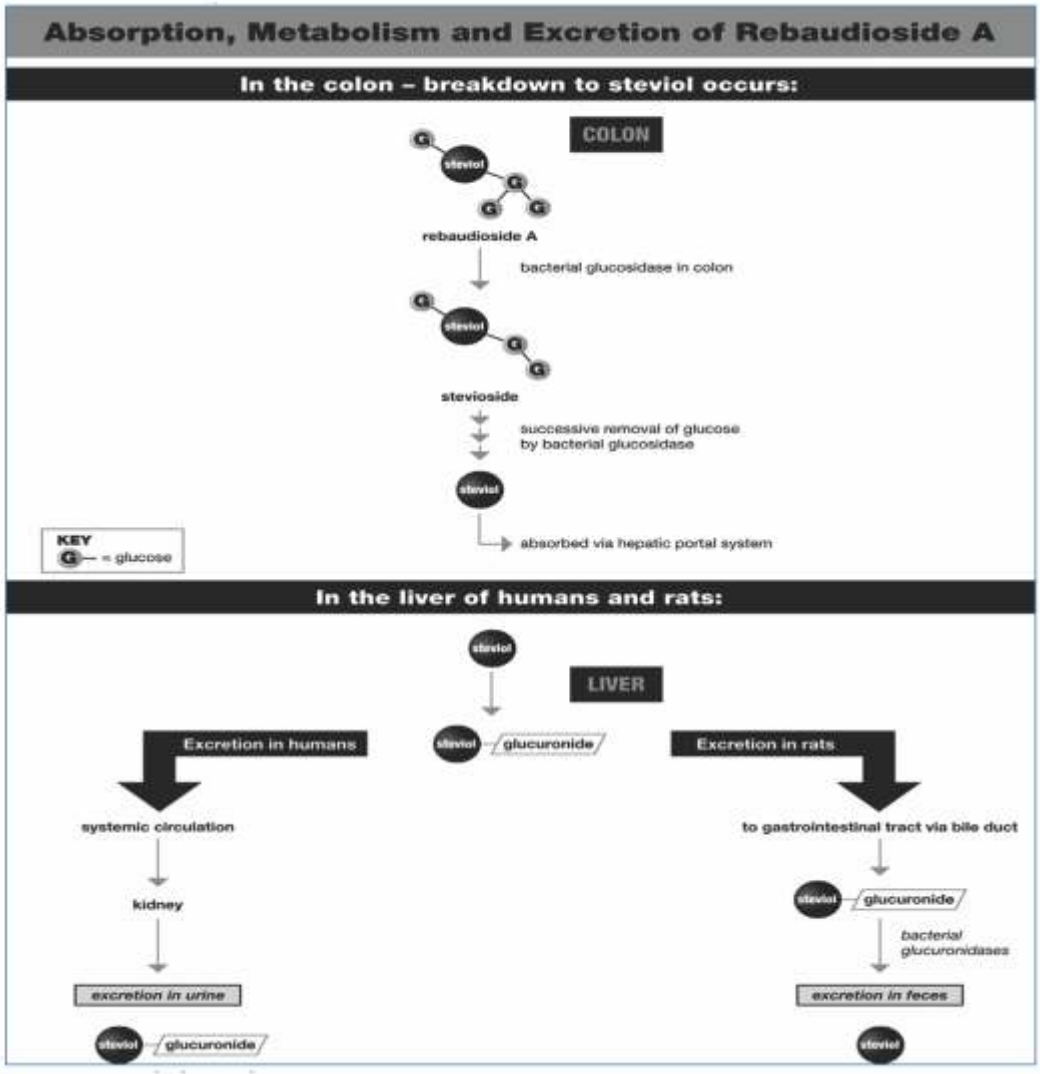
Regulatory status of stevia:

Stevia extracts (Steviol glycosides) are approved for use as a sweetener in many countries, most notably Japan, Brazil, China, Korea, and Paraguay.India approved stevia extracts as "non-nutritive sweetener" in 2015.The Joint FAO/WHO Expert Committee on Food Additives (JECFA) reviewed steviol glycosides at its 58th, 63rd, and 68th meetings and fixed the ADI for steviol glycosides of upto 2 mg/kg body weight/day expressed as steviol equivalent. In addition to detailed information on specifications, JECFA requestedhuman studies conducted in normotensive (normal) and hypotensive subjects to answer questions about potential blood pressure lowering effects, and in subjects with insulin-dependent and insulin-independent diabetes to answer questions about effects on glucose homeostasis. When sufficient information was submitted and reviewed, the Committee stated that the ADI value would be permanent.

Metabolism of stevia

Studies on the absorption and metabolism of steviol glycosides in rats showed that stevioside passes unabsorbed through the stomach and upper small intestine owing to its highmolecular weight. Stevioside is degraded by bacteriaof the colon, resulting in free steviol, part of which isabsorbed by the colon and transported to the liver and part isexcreted in feces. Steviol is then converted into its glucuronide derivative in the liver and excreted from the body through urine.

Figure 2: Metabolism of Stevia



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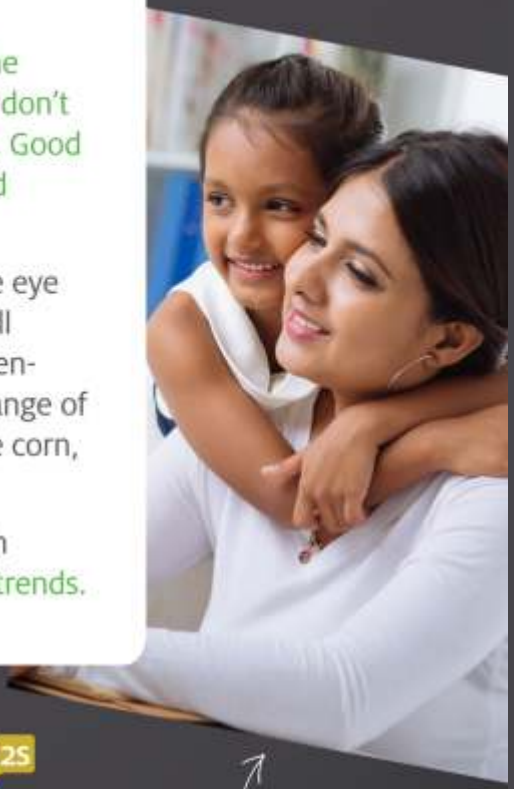

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The basics of steviol glycoside metabolism are similar in rats and humans, but rebaudioside metabolism study results demonstrated a difference between rat and human steviol excretion.Excretion of steviol glucuronide in rats occurs primarily in feces via the biliary tract, while in humans urinary excretion of the glucuronide is predominant. This is due to different molecular weight thresholds for human and rat for biliary excretionof organic anions (e.g., glucuronides) and is normally observed with many other ingested substances. Steviol and its glucuronide are therefore subject to some enterohepaticre-circulation in the rat although much of the steviol appears to be quickly eliminated in the feces. Therefore, both rats and humans have very little systemic exposure to steviol. In rats very little steviol is found beyond the portal orbiliary systems, and in humans absorbed steviol is quickly converted to its glucuronide, a stable detoxification product that is quickly excreted by the kidney.

In the rat, stevioside (125 mg/kg body weight) has a half-life of 24 hour, and is largely excreted in the feces in the form of steviol. Conversion is complete within two days. Non-enzymatic conversion of stevioside to steviol does not occur. Acid hydrolysis (as in the stomach) does not result in detectable formation of steviol. Stevioside appears to be poorly transported across the cell membrane. No uptake was observed in suspensions of human red blood cells. In the isolated, perfused rat liver, no metabolism of stevioside was shown to occur over a two hour period at concentrations of 0.2 mM and 0.5 mM.

In a study of the effect of Steviosides and Rebaudioside on human metabolism, human fecal microflora was found to completely hydrolyze stevioside and rebaudioside A to their common aglycone steviol in 10 and 24 h, respectively. Only bacteroides among the selected microbial groups were able to hydrolyze the two natural sweeteners tested to steviol. Stevioside and rebaudioside A did not influence significantly the human intestinal microflora composition. It seems that stevioside possesses a slight inhibitory effect on total aerobic bacteria, whereas rebaudioside A influences inhibition on the proliferation of total aerobes and significant influence on coliforms. Steviol passes out of the system through faeces. In comparison other synthetic high intensity sweeteners like sucralose is known to inhibit growth of beneficial microbes and alter the gut flora. Sucralose can withstand changes in pH and temperature and is not degraded by the wastewater treatment process. Due to these properties, sucralose is now found to accumulate in the environment and has been found in systems such as wastewater, estuaries, rivers and even sea water.

Pharmacology

Stevioside was found to have no effect on gluconeogenesis or O2 uptake in renal cortical tubules at concentration of 3mM. In isolated perfused rat liver stevioside inhibited the monosaccharide transporter that carries glucose fructose and galactose in both directions to and from the liver. Thus stevioside reduces metabolism of glucose and even fructose in the liver. In the rat kidney, also, stevioside given by in vivo infusion (8 mg/kg/h, or higher) decreased the renal tubular resorption of glucose.

Even after administration of stevioside at 7% of its diet for 56 days, no change in blood sugar levels in rats was observed. There was no change in plasma insulin levels during this experiment. Thus stevia does not affect (increase) the blood glucose levels or insulin production.

Effects on blood pressure and renal function

Studies have shown that stevia lowers blood pressure, improves blood flow in the kidneys, produces diuresis (releases water from the cells), and increases fractional excretion of Na+ and K+(resulting in less sodium retention in kidneys).

Image © iStock.com/Zerbor

Stevioside was found to have no effect on glomerular filtration rate of the kidneys. One group has studied renal effects by using an in vivo priming dose of 8 or 16 mg/kg,followed by an infusion at the rate of 8 or 16 mg/kg/h. The higherdose led to a marked fall in blood pressure in anesthetized rats (from 110 to 72 mm Hg). All theabove effects observed in rats were blocked by indomethacin, an inhibitor of cyclooxygenase, anenzyme involved in prostaglandin synthesis. This suggests that the actions ofstevioside are mediated via a prostaglandin-dependent mechanism.

In another study stevioside was compared with verpamil (a drug given for treatment of angina and hypertension) and stevioside was found to behave like verpamil. A number of authors have suggested therapeutic applications of certain of these actions, particularly of the hypotensive effect.

Properties Of Stevia Sweeteners

Although stevia sweeteners possess a slightly latent sweetness compared to sucrose, their use has been developing steadily. The wide use of stevia sweeteners is due to various characteristics as follows:

1. Approximately 200 times sweeter than sucrose and costing competitive with other high intensity sweeteners

2. Sweetness-quality superior to sucrose in mildness and refreshment

3. Sweetness is intensified by combining with salts and organic acids

4. The slightly latent sweetness is improved with the addition of sugars and organic acids

5. Stable at high temperatures and across a wide pH range

6. Non-nutritive and noncariogenic.

In addition to these characteristics, stevia based sweeteners are sometimes more effective than sugar in application of food systems.

Examples are:
• Fermentation and spoiling in soy sauce, soybean paste, pickles, etc.

• Burning in bread, cookies, fried foods, etc.

• Coloring in foods containing amino acids through the Maillard' s reaction

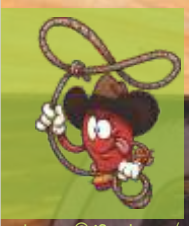
• Hardening in baking of bread, cookies, etc.

• Absorption of moisture in dried foods and baked foods such as cookies

• Depression of freezing point in ice creams, sherbets and frozen foods.

While stevia sweeteners can be used in a wide variety of products, it is first necessary to identify the purpose for using these materials, i.e. as a sweetener, taste modifier, sugar defect eliminator or calorie reducer, before deciding on the type and amount of sweetener to be used.

Stevioside is known to have inherent bitterness, with a liquorice aftertaste and lingering sweetness after the product is ingested. These properties are a disadvantage for application of stevia as a sweetener in table top sugar replacer since comparison of taste is made by the consumer with sucrose. Many studies on masking these tastes are reported and newer sugar replacers containing stevia as the high intensity sweetener are acceptable to the discerning consumer.



REGULATORY ROUND UP

By
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As far as Indian Food Regulatory scene is concerned, it has been a roller coaster ride since the regulations under the new Food Safety and Standards Act 2006 were made operative in 2011. Road blocks to development and growth in Indian Food Industry is, fortunately, behind us. The years 2016 and the beginning of 2017 have made great strides in Indian food regulation which has given a fillip to the Industry. These regulations have also lead to greater harmonization with the international regulations. I personally, consider this as the golden period in the history of Indian Food Industry.

In this Regulatory Round Up, on a regular basis, I propose to touch upon a few game changing regulations with a wider impact on the Indian Food Industry. The salient points in the regulation and its impact would be discussed. Since, the meaning of regulations are open to interpretations, the readers are encouraged to go through the regulations for details. The hyperlink is also provided for easy access. Please give your feedback for continual improvement.

Standards

Proprietary Foods have been subjected to different definitions since 1954 when the Prevention of Food Adulteration Act was enacted. In October 2016, a final definition on Proprietary Food was notified. The regulation states the conditions for a food to be categorized as a proprietary food, which includes

- The product cannot be categorized under the standard products,
- The product is not a supplement or a nutraceutical or any food defined in the recently published regulation on health supplement.
- Contains ingredient which is either standardized or permitted in a standard food
- Has additives permitted for that particular food category
- Has vitamins and minerals within 1 RDA level.

There is also a caveat that the final responsibility of the safety of the product lies with the Food Business Operator (FBO). Proprietary foods do not require prior marketing approval but need to be endorsed in the license.

In terms of use of additives in foods, India has been one of the most restrictive places in the past. This hampered the development of new products and the chorus from the Industry has been to get aligned with CODEX. On 5th September 2016, our wish was granted. FSSAI published an amendment to the Food Standards and Food Additives Regulation. The regulation gives details on Food additives in different foods. It replaces Section 3.1 of Food Product Standards and Food Additives, 2011. We have moved away from the vertical standard for the use of food additives to horizontal standards covering food categories.

The Regulation places foods into 15 categories with number 16 for prepared foods or foods which cannot be included in the 15 categories. The categorization is based on their functionality, ingredients, the way they are marketed, etc. These are detailed under "Food Category Description". Each category is divided into sub categories and further into sub categories within a sub category and so on and so forth. For example: Category 1 – Dairy Products and analogues; 1.1 – Milk and Dairy Based drinks; 1.1.1 – Milk and Butter Milk; 1.1.1.1 – Milk (Plain).

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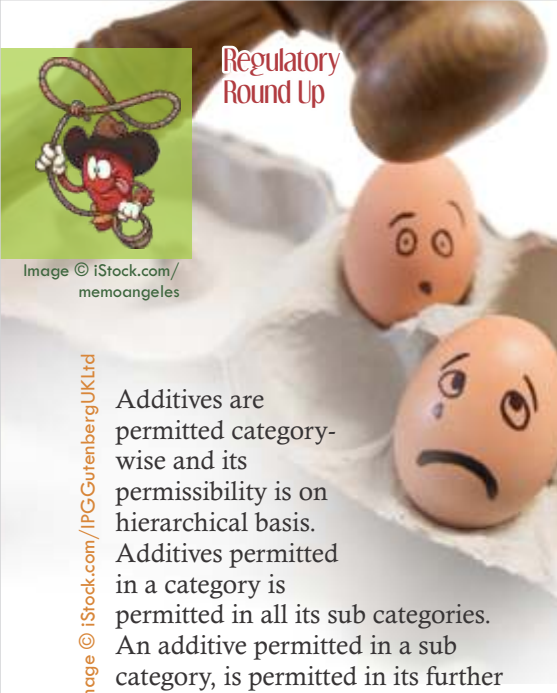

Additives are permitted category-wise and its permissibility is on hierarchical basis. Additives permitted in a category is permitted in all its sub categories. An additive permitted in a sub category, is permitted in its further sub categories. For example – Additive permitted in category 1 would be permitted in all sub categories starting with 1. Similarly, additives permitted in sub category 1.1 would be permitted in all sub categories starting with 1.1. Tables 1 to 15 lists out additives and their levels for the corresponding food categories. Condition mentioned in the "notes" against each entry must be complied with. There is also a "GMP Table" which lists additives permitted at GMP level in food categories under certain conditions. GMP level is defined at the beginning of the regulation. Additives which are not listed cannot be used.

Carry-over of food additives from the ingredients into the final product and the conditions of such carry-over are also explained.This regulation is a must in the hands of every practicing food technologist.

Another path breaking regulation on food or health supplements, nutraceuticals, foods for special dietary uses, foods for special medical purpose, functional foods and novel Food was operationalized in November 2016 and finally notified on 6th January 2017. The regulation opens up an entire new field in foods which is loosely termed as "Functional Foods".

The regulation lists permitted vitamins, minerals and their forms (Schedule I), amino acids and related nutrients (Schedule II), 400 plant or botanical ingredients (Schedule IV), 200 plus Nutraceutical ingredients (Schedule VI), Probiotic strains (Schedule VII) and Prebiotic compounds (Schedule VIII).

The regulation covers six categories, as listed below

• Health Supplements – concentrated source of vitamins, minerals, amino acids, botanical extracts, prebiotics and probiotics. Could be in any delivery form. Capsules, tablets would fall typically under this category. Health supplements can be marketed only to persons above 5 years of age.

• Nutraceuticals –Products containing Nutraceuticals.

• Foods For Special Dietary Uses (FSDU) – A food specially formulated to address a specific physiological or health condition. Example – Food for diabetics. Can be consumed without medical advice.

• Foods for Special Medical Purposes (FSMP) – Foods for persons whose dietary management cannot be achieved by modifying the normal diet. For example patients with impaired kidney function, require low sodium diet which can be obtained only by careful formulation. These foods are to be taken under medical advice.

• Probiotic Foods – Containing permitted probiotics and other permitted ingredients. Minimum levels of probiotic organisms per gram have been defined. All organisms to be non GMO.

• Prebiotic foods - Containing permitted prebiotics and other permitted ingredients.

Annexures specify the additives that can be added along with the levels for each category. The regulation requires specific label declaration for these products over and above the ones specified in Packaging and Labelling Regulations 2011. A few examples of label declaration are given below. Please note that the list is not a complete one.

• In bold " HEALTH SUPPLEMENT" , " NUTRACEUTICAL" , etc. as the case may be

• "NOT FOR MEDICINAL USE"

• In case of FSDU and FSMP, to specify the purpose of the product, age group, etc.

• In case of FSMP, declare " RECOMMENDED TO BE USED UNDER MEDICAL ADVICE"

• A warning that the product is not for parenteral use

• A statement to the effect that the product be stored away from children.

• A warning if the product is not suitable for vulnerable section like expectant and lactating mothers, children, elderly etc.

• A warning regarding the adverse effects, if any.

There is separate section on claims. No claim shall be made to the effect that the product is meant to cure, prevent or mitigate any disease. Different types of claims are listed. Claims to be scientifically sound and substantiated. Claims based on ingredients can be proved by articles in peer reviewed journal, text books, etc. However, claims based on the product requires rigorous proof in terms of clinical trials, etc and needs prior approval from the Authority. The regulation requires that every FBO manufacturing and marketing such products, has the claim-substantiating documents and get it periodically reviewed by scientists or independent experts.

The regulation is effective from 23rd December 2016. However, products presently in the market but not complying with requirements of the regulation, shall do so by 1st of January 2018.

Image © iStock.com/ memoangeles

Draft Food Safety and Standards (Approval for Non-Specified Food and Food Ingredients) Regulations, 2017 is published and comments and suggestions are invited. The regulation details the process for obtaining pre-market approval for Ingredients and foods which have not been part of Indian food chain or consumed but not listed in Indian regulations, new additives and processing aids and foods produced through novel technology. The regulation lists the documents required to obtain approval in each case. As expected, ingredients which have not been a part of our food chain will require more rigorous documentation to prove their safety. This regulation is a gateway to manufacturing and marketing of novel food ingredients.

To improve the micro nutritional status of Indians, FSSAI has taken an initiative for the fortification of mass and commonly consumed foods like vegetable oil, milk, wheat flour, etc. Draft Food Safety and Standards (Fortification of Foods) Regulations, 2016 is notified. Though a draft, the regulation has been operationalized, meaning anyone who wishes to implement, may do so. Fortification is applicable only to packaged foods. This may restrict the reach of fortification.

Fortification of salt with iodine and Vanaspati with vitamin A is mandatory as in the past. Fortification of oil with vitamin A and D, milk with vitamin A and D, atta, maida and rice with vitamins and minerals are not mandatory. Wonder why vitamin E is not included in case of oils? However, if fortified, it must comply with the regulations in terms of nutrients and labelling. The fortified products can carry a special symbol approved by the FSSAI.

Gluten Free and Low Gluten conditions and claims. The final notification describes the conditions under which "gluten free" and "low gluten" claims can be made. For a "gluten free" or " Low gluten" claim, the food should have rice, millets, ragi, pulses or legumes as one of the ingredients. Levels of gluten have been specified for a "gluten free" or "lowgluten" claim. A food which does not have any of these ingredient and is naturally gluten free, to declare – " This product by its nature is gluten free".

Safety

One more step towards food safety. FSSAI has published a final notification on the recall of food products by FBOs. Unsafe products, both manufactured and imported, shall be recalled by the FBO on its own initiative or as directed by FSSAI. The FBO to have a recall plan. The traceability records are to be maintained for at least 1 year after the best before period. All types of communication including media to be used for the recall. Consumers in the affected area to be informed through advertisements in media, press release etc. The regulation lists the details like name of the food, batch number, manufacturing date and place, etc.to be given in the advertisement. The status of the recall to be notified to the Authorities on a weekly basis. The recall shall be terminated only on the approval of the Authority. The FBO to have documented procedure to deal with the recalled product. A detailed report to be submitted to the Authority.

Laboratory testing manuals. Methods of analysis for different product parameters, additives, contaminants, including microbial, pesticide residues, etc. have been published by FSSAI. I found this extremely useful. The internal analytical methods of a company can be aligned with the FSSAI methods for better credibility.

Limits for metal contaminant in various Food. A final gazette notification extending the list of food products and categories for metal contaminants. At the same time, Zinc has been removed from the list of metal contaminants. This important element can now be added as a nutrient within RDA limits. Melamine has been added to the list of contaminants. Infant formula and infant foods are specifically mentioned. The value mentioned against the residual class "Other Foods" to be complied with for all foods.

Compliance

There are thousands of legal cases, under the erstwhile PFA Act (1954) regime in different courts of the country. Many of the cases are of minor nature like missing of vegetarian/ non vegetarian, batch number, innocuous deviation from the standards, etc. FSSAI has taken a step in the right direction to free the courts of this heavy burden. In October last year, the FSSAI had issued a circular addressing the State Food Safety Commissioners requesting them to review the pending old cases under PFA (1954) and other repealed Acts. The State Safety Commissioners are encouraged to withdraw old cases where the offences are not of serious nature. The FBOs may take note and take advantage of the order.

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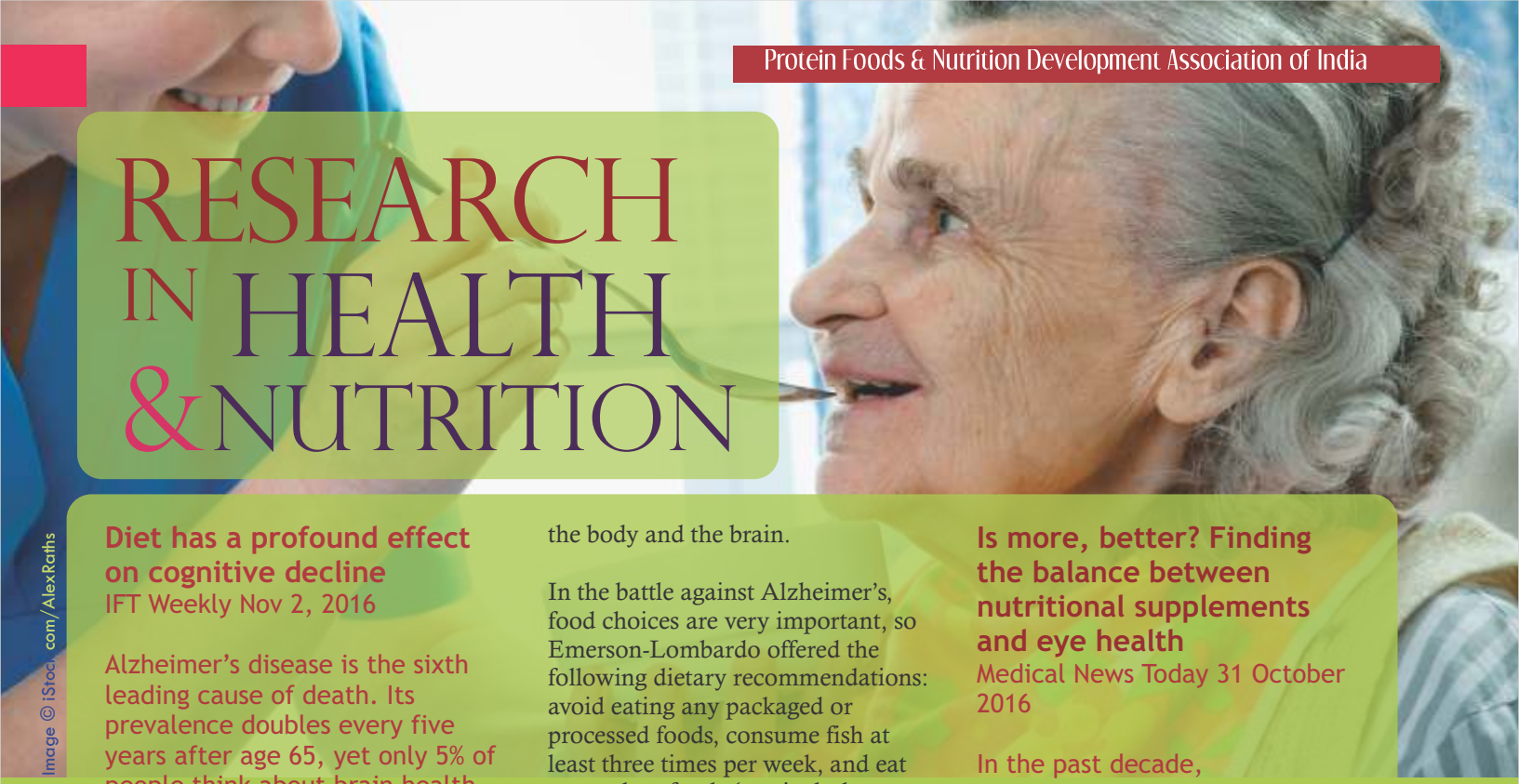
RESEARCH IN HEALTH & NUTRITION



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Diet has a profound effect on cognitive decline

IFT Weekly Nov 2, 2016

Alzheimer's disease is the sixth leading cause of death. Its prevalence doubles every five years after age 65, yet only 5% of people think about brain health when deciding which foods to consume.

During the 2016 Food and Nutrition Conference and Expo (October 15–18, 2016), given by the Academy of Nutrition and Dietetics, Nancy Emerson-Lombardo of Boston University and the Brain Health and Wellness Center discussed how diet can reduce the risk of developing Alzheimer's disease.

Brain health is incredibly affected by the health of the rest of the body, Emerson-Lombardo said, and since all experimental drugs have failed in phase 3 trials, Alzheimer's requires integrative treatment. Healthy brain tissue withstands all destructive forces, so "prevention is key," she said. Brain foods can delay the onset of Alzheimer's symptoms by five years. Nutrition for brain health is nutrient dense, anti-inflammatory, and anti-oxidative. Poor diets increase the rate of mental decline and increase the risk of developing Alzheimer's disease. Emerson-Lombardo said that when people in other countries eat more like Americans (i.e., the Standard American Diet), they experience increased risk for diseases that impair the body and the brain.

In the battle against Alzheimer's, food choices are very important, so Emerson-Lombardo offered the following dietary recommendations: avoid eating any packaged or processed foods, consume fish at least three times per week, and eat more plant foods (particularly green leafy vegetables, dried beans, and berries) and fewer animal foods. Plant foods prevent oxidation of omega-3 fatty acids, which are crucial for brain health. Whole grains, nuts, and seeds are good for brain health; tea, coffee, and herbs and spices are too. Emerson-Lombardo said that excess sugar is toxic to the brain, but modest amounts of sugar (e.g., fruits) are not a problem. These dietary guidelines adhere closely to those of the African Heritage Diet Pyramid.

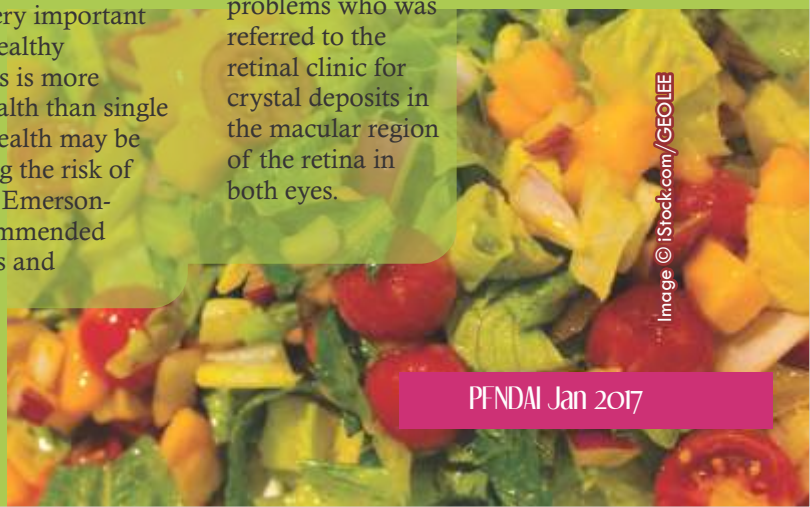
Emerson-Lombardo also advised choosing healthy fats and avoiding toxic fats such as trans fat and excess omega-6 fatty acids. Trans fats directly harm the brain, she said, and Americans consume way too many omega-6 fatty acids compared to the amount of omega-3 fatty acids they consume. Vitamins B, C, D, and E are very important for brain health. A healthy combination of foods is more effective for brain health than single foods. Because gut health may be important in reducing the risk of Alzheimer's disease, Emerson-Lombardo also recommended consuming prebiotics and probiotics.

Is more, better? Finding the balance between nutritional supplements and eye health

Medical News Today 31 October 2016

In the past decade, ophthalmologists have been prescribing nutritional supplements to be taken daily to prevent or slow vision loss from age-related macular degeneration (AMD). Now, using nutritional supplements for eye health has become more common. But does increasing the recommended dose increase your protection?

A case report appearing online in JAMA Ophthalmology from the Moran Eye Center at the University of Utah reveals what can happen when a patient takes more of a supplement than their body needs. In the article, Crystalline Maculopathy Associated with High-Dose Lutein Supplementation, principal investigator Paul Bernstein, M.D., Ph.D., describes a patient with no AMD or vision problems who was referred to the retinal clinic for crystal deposits in the macular region of the retina in both eyes.



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With physician follow-up, it was learned that for the past eight years, the patient took a daily lutein supplement (20 mg) in addition to a diet rich in lutein, which included a broccoli, kale, spinach, and avocado smoothie every morning; she was therefore consuming much more than twice the recommended dose of lutein for an AMD patient (10 mg per day).

Lutein is part of the AMD prevention supplement regimen that was created based on results from the AREDS2 (Age-Related Eye Disease Study 2) clinical trial. In that trial, researchers found that patients at high risk for visual loss from AMD who took lutein (10 mg) and zeaxanthin (2 mg) supplements reduced their risk of progressing to late stage AMD. Lutein and zeaxanthin are carotenoids--antioxidants made by plants--that are believed to neutralize light-induced damage in the eye. Humans don't make carotenoids, so they can only be added to the body by eating plants or taking supplements.

"When we looked at the patient's carotenoid levels in serum, skin, and the retina, all measurements were at least two times greater than carotenoid levels in patients not taking nutritional supplements," said Bernstein. "The patient quit taking the lutein supplement, but maintained her diet rich in lutein, and, after seven months, the crystals in the right eye disappeared."

While AREDS2 supplements are recommended to patients at higher risk for AMD, there has also been increased use in the general population. Bernstein's advice for his patients is that "everyone should eat an 'eye-healthy' diet rich in colorful fruits and vegetables, and individuals should take an AREDS2 supplement if their ophthalmologist detects signs of AMD." This case report must followed up by a larger clinical trial before the results can be considered conclusive but it serves as an indicator that there may be negative effects from consuming lutein considerably higher than the recommended AREDS2 dose.

This work was supported by grants from the National Institutes of Health (EY11600 and EY14800) and an unrestricted departmental grant from Research to Prevent Blindness, Inc., New York, NY, to the Moran Eye Center, Department of Ophthalmology & Visual Sciences, University of Utah. Dr. Bernstein and the University of Utah hold a patent on the measurement of carotenoids in retina, skin, and other tissues using resonance Raman spectroscopy.

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Customizing vitamin D supplements to the individual would ensure benefits are felt

Medical News Today 31 October 2016

Vitamin D supplements are less effective at raising vitamin D levels in pregnant women if they deliver their babies in the winter, have low levels of vitamin D early in pregnancy or gain more weight during pregnancy, a new Southampton study has shown.

The findings, published the Endocrine Society's Journal of Clinical Endocrinology & Metabolism, showed pregnant women respond differently to vitamin D supplementation depending on their individual attributes. The University of Southampton researchers suggest that supplement levels should be tailored according to individual risk factors.

Vitamin D is a hormone that helps the body absorb calcium. It plays a crucial role in bone and muscle health. The skin naturally produces vitamin D after exposure to sunlight but people also obtain smaller amounts of the vitamin through foods, such as milk fortified with vitamin D. Evidence suggests vitamin D deficiency during pregnancy can harm maternal health, fetal development and the child's long-term skeletal health.

Professor Nicholas Harvey, of the Medical Research Council Lifecourse Epidemiology Unit, University of Southampton, who led the study with Dr Rebecca Moon, Clinical Research Fellow, comments: "It is important for pregnant women to have sufficient levels of vitamin D for the health of their baby. Our study findings suggest that in order to optimise vitamin D concentrations through pregnancy, the supplemental dose given may need to be tailored to a woman's individual circumstances, such as the anticipated season of delivery."

The Maternal Vitamin D Osteoporosis Study (MAVIDOS), is a multi-centre, double-blind, randomised, placebo-controlled trial of vitamin D supplementation in pregnancy. More than 800 pregnant women were recruited and randomised to take either 1000 units (25 micrograms) of vitamin D every day or a matched placebo capsule from 14 week's gestation until delivery of the baby.

Analysis showed that participants who received the vitamin D supplement achieved different levels of vitamin D in the blood, even though they received the same dose. Researchers found women who delivered in the summer, who gained less weight during pregnancy and who had higher vitamin D levels early in pregnancy tended to have higher levels of vitamin D in the blood than their counterparts. Women who consistently took the supplement also had higher levels of vitamin D than participants who did not.

"Our findings of varied responses to vitamin D supplementation according to individual attributes can be used to tailor approaches to antenatal care," said Professor Cyrus Cooper, Director, and Professor of Rheumatology at the MRC Lifecourse Epidemiology Unit, University of Southampton. "This work forms part of a larger programme of research at the MRC Lifecourse Epidemiology Unit, University of Southampton, addressing the early life determinants of bone development, and will inform novel strategies aimed at improving bone health across future generations."

The study was funded by the charity Arthritis Research UK, with further funding support from the MRC, National Institute for Health Research (NIHR) and the Bupa Foundation.

A new look at vitamin D challenges the current view of its benefits

Medical News Today 26 October 2016

Research in C. elegans shows the popular supplement engages longevity genes to increase lifespan and prevent the accumulation of toxic proteins linked to many age-related diseases.

A simple Google search for "what does vitamin D do?" highlights the widely used dietary supplement's role in regulating calcium absorption and promoting bone growth. But now it appears that vitamin D has much wider effects - at least in the nematode worm, C. elegans. Research at the Buck Institute shows that vitamin D works through genes known to influence longevity and impacts processes associated with many human age-related diseases. The study, published in Cell Reports, may explain why vitamin D deficiency has been linked to breast, colon and prostate cancer, as well as obesity, heart disease and depression.

"Vitamin D engaged with known longevity genes - it extended median lifespan by 33 percent and slowed the aging-related misfolding of hundreds of proteins in the worm," said Gordon Lithgow, PhD, senior author and Buck Institute professor. "Our findings provide a real connection between aging and disease and give clinicians and other researchers an opportunity to look at vitamin D in a much larger context."

Study Provides Links To Human Disease

The study shines a light on protein homeostasis, the ability of proteins to maintain their shape and function over time. It's a balancing act that goes haywire with normal aging - often resulting in the accumulation of toxic insoluble protein aggregates implicated in a number of conditions, including Alzheimer's, Parkinson's and Huntington's diseases, as well as type 2 diabetes and some forms of heart disease. "Vitamin D3, which is converted into the active form of vitamin D, suppressed protein insolubility in the worm and prevented the toxicity caused by human beta-amyloid which is associated with Alzheimer's disease," said Lithgow. "Given that aging processes are thought to be similar between the worm and mammals, including humans, it makes sense that the action of vitamin D would be conserved across species as well."


Image © iStock.com/yodiyim

Postdoctoral fellow Karla Mark, PhD, led the team doing the experiments. She says the pathways and the molecular network targeted in the work (IRE-1/XBP-1/SKN-1) are involved in stress response and cellular detoxification. "Vitamin D3 reduced the age-dependent formation of insoluble proteins across a wide range of predicted functions and cellular compartments, supporting our hypothesis that decreasing protein insolubility can prolong lifespan."

Clinicians Weigh In

“We've been looking for a disease to associate with vitamin D other than rickets for many years and we haven't come up with any strong evidence," said Clifford Rosen, MD, the director of the Center for Clinical and Translational Research and a senior scientist at the Maine Medical Center Research Institute studying osteoporosis and obesity. "But if it's a more global marker of health or longevity as this paper suggests, that's a paradigm shift. Now we're talking about something very different and exciting.”

"This work is really appealing and challenging to the field," said Janice M. Schwartz, MD, a professor of medicine and bioengineering and therapeutic sciences the University

of California, San Francisco, and a visiting research scientist at the Jewish Home in San Francisco. She has studied vitamin D supplementation in the elderly. "We focus on vitamin D and the bones because that's where we can measure its impact. I believe that vitamin D is as crucial for total body function and the muscles as it is for bones. Vitamin D influences hundreds of genes - most cells have vitamin D receptors, so it must be very important."

Current Recommendations And Controversies

How much vitamin D do humans need and how do they best get it? The issue is confusing with disagreement rampant among experts. The Institute of Medicine's (IOM) latest recommendations (from 2011) pertain only to vitamin D's role in bone health and fracture reduction. Experts concluded that evidence for other proposed benefits of vitamin D was inconsistent, inconclusive, or insufficient to set recommended intakes. The IOM recommends a daily intake of 600 International Units (IU) for people between 1 and 70 years old, and 800 IU daily for those older. The upper limit - the levels above which health risks are thought to increase - was set at 4,000 IU per day for adults. Excess vitamin D can raise blood levels of calcium which leads to vascular and tissue calcification, with subsequent damage to the heart, blood vessels and kidneys.

Many vitamin D researchers and some health organizations, including the Endocrine Society and the International Osteoporosis Foundation, disagreed with the IOM's recommendations for daily intake, instead recommending supplementation of 800 to 2,000 IU per day, at least for people known or likely to have low blood levels. The disagreement highlights another difficulty: measuring blood levels of vitamin D is problematic given a lack of standardization and reliability among labs. Blood levels of the precursor to the active vitamin D are measured in nanograms per milliliter (ng/mL) in the U.S. Many researchers and expert groups have argued that a blood level of at least 30 ng/mL is optimal; some call for optimum levels to be set at 40 or 50 ng/mL. But the IOM report concluded that blood levels starting at 20 ng/mL would be adequate for bone health in the vast majority of people.

Universal Supplementation?

Based on problems with laboratory standards and a lack of agreed-upon meaning of results, both Rosen and Schwartz agree that the costs of universal testing for vitamin D levels would outweigh the benefits. Instead, both recommend universal supplementation of between 800 - 1000 IU of vitamin D daily for adults. "It's safe, there's no reason for anyone not to take it," said Schwartz, who has written about vitamin D for the popular press.

Schwartz says older adults may be particularly prone to vitamin D deficiency because the skin's ability to manufacture vitamin D from sun or UV light exposure declines with age, adding that the elderly are less likely to spend time in the sun, are more likely to have diets lacking in sources of vitamin D, and may suffer from gastrointestinal disorders that make it harder to absorb vitamin D. Others prone to vitamin D deficiency include those with darker skin and those who live in higher latitudes where the sun's angle is low in the sky.

Bringing It Back To Aging

Given adequate funding, senior author Lithgow plans to test vitamin D in mice to measure and determine how it affects aging, disease and function - and he hopes that clinical trials in humans will go after the same measurements. "Maybe if you're deficient in vitamin D, you're aging faster. Maybe that's why you're more susceptible to cancer or Alzheimer's," he said. "Given that we had responses to vitamin D in an organism that has no bone suggests that there are other key roles, not related to bone, that it plays in living organisms."

Lithgow gave a shout out to the tiny, short-lived nematode worms which populated this study. "Working in these simple animals allows us to identify novel molecular pathways that influence how animals age," he said. "This gives us a solid starting point to ask questions and seek definitive answers for how vitamin D could impact human health. We hope that this work will spur researchers and clinicians to look at vitamin D in a larger, whole-person context that includes the aging process."

The work was supported by funding from the Larry L. Hillblom Foundation, the Glenn Foundation for Medical Research and grants from the National Institutes of Health: UL102417, R01AG029631-01A1, R21AG048528, R01AG029631, PL1 AG032118, 1S10 Od016281.

How does a high-protein diet aid weight loss? Study sheds light

Written by Honor Whiteman
Medical News Today 8 November 2016

A number of studies have suggested a diet high in protein can aid weight loss. Now, researchers have shed light on the underlying mechanisms of this association, which may open the door to new preventive and treatment strategies for obesity.

In a new pilot study, researchers from Imperial College London in

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in the United Kingdom reveal how phenylalanine - an amino acid produced by the digestion of protein - boosts levels of a hormone that tells us when we are full, leading to reduced food intake. Lead author Mariana Norton will present the findings at this week's Society for Endocrinology annual meeting in the U.K.

Previous studies have shown that a diet high in protein - essential nutrients found in foods such as milk, fish, eggs, and poultry - can help reduce body weight by suppressing appetite. According to Norton and her team, a high-protein diet can be hard to adhere to, but uncovering the mechanisms by which protein curbs hunger could lead to simpler weight-loss strategies.

How phenylalanine leads to weight loss

For their study, the researchers conducted a series of experiments on rodents, which involved testing the effects of phenylalanine. Phenylalanine is an amino acid produced in the gut after consumption of foods rich in protein. Firstly, the team gave 10 mice and rats a single dose of phenylalanine and compared them with rodents that were not given the enzyme.

The researchers found that mice and rats given phenylalanine showed increased levels of the hormone GLP-1, which suppresses appetite, but reduced levels of the hormone ghrelin, which increases hunger.

Additionally, the researchers found that phenylalanine reduced the rodents' food intake and increased weight loss. Rats that received the amino acid also moved around more, which the team notes may have contributed to their weight loss. Next, the team administered regular doses of phenylalanine to mice with diet-induced obesity over a 7-day period. Compared with mice that were not treated with phenylalanine, those that received the amino acid showed a reduction in weight, the researchers report.

Phenylalanine stimulates CaSR receptor to reduce appetite

In a final experiment, the researchers sought to gain a better understanding of the mechanisms by which phenylalanine affects levels of GLP-1 and ghrelin.

On applying phenylalanine to gut cells in a petri dish, the team found that the amino acid targets a receptor called the calcium-sensing receptor (CaSR), and it is this receptor that increases GLP-1 levels and lowers levels of ghrelin.

Obesity has become a major public health concern in the United States; around 2 in 3 adults and 1 in 6 children and adolescents are considered obese, putting them at greater risk of health conditions such as diabetes, heart disease, and some types of cancer. According to Norton and her team, their findings may fuel much-needed new strategies to tackle the obesity epidemic. "Our work is the first to demonstrate that activating CaSR can suppress appetite. It highlights the potential use of phenylalanine or other molecules which stimulate CaSR - like drugs or food components - to prevent or treat obesity." Mariana Norton

The researchers note that further studies are needed to pinpoint the exact mechanisms by which phenylalanine can curb hunger and aid weight loss, and future research should assess whether the amino acid poses the same appetite-suppressing effects in humans as in rodents.

Vitamin D deficiency may raise bladder cancer risk

Written by Yvette Brazier Medical News Today 8 November 2016

Could vitamin D have another feather in its cap? As concerns grow regarding adequate vitamin D intake, low levels have now been linked to a risk of bladder cancer, according to results presented this week at the Society for Endocrinology conference in the United Kingdom.

The findings add to a body of evidence suggesting that low vitamin D is detrimental to health. Some vitamin D comes from the diet. Good sources include fatty fish and fish oil, dairy products, mushrooms, liver, and egg yolks. However, it is mostly synthesized when the body is exposed to sunlight. Dietary sources alone cannot normally provide sufficient vitamin D. Vitamin D helps the body to maintain healthy levels of calcium and phosphates. Low levels have been linked to a range of health problems.

In children, it can lead to bone deformities, such as rickets. Concentrations tend to decrease with age, and, in time, a lack of vitamin D can lead to osteoporosis, especially in postmenopausal women. Low levels have also been linked to cognitive impairment, cardiovascular disease, cancer, and autoimmune conditions.

Who is at risk of vitamin D deficiency?

Vitamin D deficiency is common among people with limited exposure

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to sunlight. This includes populations from northern regions, where winter days are short, and those in climates where it is too hot to spend time outdoors.

Fast facts about bladder cancer

76,960 new cases of bladder cancer are expected in the U.S. in 2016
There are expected to be 16,390 deaths from bladder cancer in 2016
77.5 percent of patients survive for 5 years or more.

Learn more about bladder cancer

Others at risk include those who cover up or use sunscreen with a strong SPF factor to avoid sunburn or skin cancer, those who cover their bodies for cultural or religious reasons, and those who stay out of the sun to keep their skin pale. People with darker skin are also more prone to low vitamin D levels.

Overconsumption of sugary drinks may have an impact on levels of vitamin D. In the United States, the Centers for Disease Control and Prevention (CDC) note that between 2002-2006, 8 percent of the population aged 1 year or over were at risk of vitamin D deficiency, 24 percent were at risk of inadequacy, and in only 17 percent met desirable levels.

Fewer than 1 percent raised concerns about an excess of vitamin D. Around 2.4 percent of men and women in the U.S. are expected to develop bladder cancer. It accounts for 4.6 percent of all new cancer cases and is responsible for 2.8 percent of cancer deaths.
Researchers from the University of Warwick and Coventry in the U.K., led by Dr. Rosemary Bland, wanted to know more about how synthesis of vitamin D might affect immune responses in specific tissues.

Vitamin D may benefit immune response

They carried out a systematic review of seven studies to investigate the link between vitamin D and bladder cancer. The number of participants per study ranged from 112 to 1,125. Some of the studies measured vitamin D levels before diagnosis, some during, and some at the follow-up stage.

Five out of the seven studies found that the risk of bladder cancer goes up when vitamin D levels are low. Higher vitamin D levels also correlated with better survival and outcomes in people with bladder cancer.

The team also examined the cells that line the bladder, known as transitional epithelial cells. They found that these cells can activate and respond to vitamin D, and that they can synthesize enough vitamin D to trigger a local immune response. By recognizing abnormal cells before they develop further, the immune system may be able to use this information to prevent cancer.

The researchers conclude that "bladder cancer risk correlates with low serum [vitamin D] levels." Dr. Bland suggests that if this is confirmed, administering supplementary vitamin D could be a safe and economical means of prevention.

"More clinical studies are required to test this association, but our work suggests that low levels of vitamin D in the blood may prevent the cells within the bladder from stimulating an adequate response to abnormal cells. As vitamin D is cheap and safe, its potential use in cancer prevention is exciting and could potentially impact on the lives of many people." Dr. Rosemary Bland
Dr. Bland told Medical News Today that vitamin D has been associated with an increased risk of other cancers, too. She added that she would suggest a supplement for people with low vitamin D.


Image © iStock.com/master1305

Harm from a week's overeating may be cancelled by exercise

Written by Yvette Brazier
Medical News Today 6 November 2016

With Thanksgiving and Christmas on the horizon, the majority of Americans are looking forward to a festive feast, with turkey, side dishes, and pumpkin pie. The holiday season is not limited to one day, and with family visits and other events, many people will have at least two big dinners around Thanksgiving alone.

Is this disastrous for health? Apparently not, as long as people keep exercising. These are the findings of research presented at the American Physiological Society (APS) Integrative Biology of Exercise VII meeting in Phoenix, AZ. Obesity affects 36.5 percent of Americans, and it is a public health issue of major concern. It is often associated with type 2 diabetes and other "lifestyle" diseases, especially cardiovascular disease, that come under the umbrella of metabolic syndrome. Metabolic syndrome involves a cluster of cardiometabolic risk factors. These include a large waist circumference, high levels of triglycerides and blood glucose, and hypertension, or high blood pressure. It also features low levels of high-density lipoprotein (HDL), or "good" cholesterol. A lack of exercise and an unhealthy diet have been linked to obesity and metabolic syndrome.

Previous studies have concluded that increasing aerobic fitness may reverse the early symptoms of metabolic syndrome. Inflammation of fatty tissue and high levels of fatty acid play a key role in the development of obesity-related insulin resistance.

Even occasional bingeing can cause damage

Even people who overeat only from time to time may experience an increase in adipose tissue and metabolic abnormalities. There is evidence that just a week of overeating can have a negative effect on glycemic control and insulin sensitivity, putting people at risk of prediabetes. Other evidence suggests that exercise can protect against the metabolic damage that results from overeating. However, exactly what impact exercise has on the structure and function of fat tissue remains unclear.

Researchers from the University of Michigan in Ann Arbor, wanted to know what would happen to people's fatty tissue if they continue to exercise during a week-long blowout. The team carried out a pilot study involving four lean and active adults, aged between 21-26 years. They hypothesized that regular aerobic exercise during a week of overeating would protect metabolic health, preserve lipolytic response - the breakdown of lipids - and prevent inflammation of the fatty tissue.

The participants consumed 30 percent more calories in one week than they usually did. They continued to exercise as usual. This included at least 2 ½ hours of aerobic exercise spread over at least 6 days of the week. The study authors, led by Alison C. Ludzki, measured oral glucose tolerance levels and samples of abdominal fat prior to the week of overeating, and again at the end. To measure for inflammation, they looked at markers of inflammation in fat tissue - such as pJNK/JNK, pERK/ERK - or circulating C-reactive protein.

Exercise appears to reduce hazards of overeating

In people who do not exercise, the markers of inflammation in fat tissue would normally increase after a week of overeating, but this time the results were different. **Instead, the active participants in this study showed no signs of inflammation in their fatty tissue, and no change in glucose tolerance or the chemical breakdown of fat.** The researchers conclude: "Our preliminary findings expand on existing work to support a protective role of exercise in the metabolic response of adipose tissue to brief periods of overeating."

Probiotics may enhance cognitive function in persons with Alzheimer's

IFT News November 16, 2016

A study published in Frontiers in Aging Neuroscience shows that eating yogurt or health drinks that contain probiotics may help improve the memories of people with Alzheimer's disease.

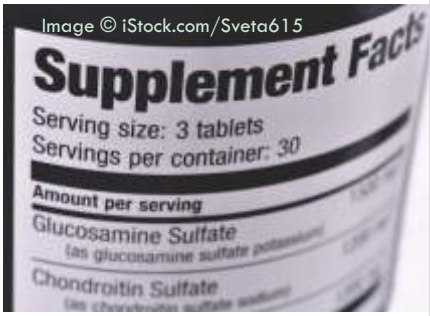
Researchers enlisted 52 men and women aged 60–95 with Alzheimer's disease and assigned half to consume a daily 200 mL milk drink enriched with four probiotic bacteria—Lactobacillus acidophilus, L. casei, L. fermentum, and Bifidobacterium bifidum. The other half had a daily milk drink containing no probiotics. Before starting the study, the participants gave blood samples and were tested for cognitive function. They had to answer a questionnaire known as the Mini Mental State Examination (MMSE). All the tests were repeated after the 12-week study to see if there were any improvements in people's scores. The researchers found the average score on the MMSE questionnaire significantly increased in the treatment group, from 8.7 to 10.6, out of a maximum of 30. There were no improvements in the non-treatment group, in which the scores deteriorated slightly from 8.5 to 8.0. While the participants all remained severely cognitively impaired, the researchers said the results showed the impact of probiotics over just a short period.

Image © iStock.com/travellinglight

The mechanisms by which the probiotics affect Alzheimer's isn't yet known, but the researchers noted that the treatment with probiotics also resulted in lower levels of fat and cholesterol in the blood, alongside other potential markers of disease. They plan to investigate these mechanisms in future studies.

Glucosamine and Chondroitin Associated with Reduced Colorectal Cancer Risk

10 Nov 2016
Nutrition Insight



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New research has shown that the dietary supplements glucosamine and chondroitin, may be associated with a reduced risk of colorectal cancer.

The supplements, commonly used in joint health, are best known for their use in preventing and treating osteoarthritis. After an analysis of

the VITamins and Lifestyle (VITAL) cohort, researchers found that use of glucosamine and chondroitin supplements was associated with a reduced risk of colorectal cancer. People who had used glucosamine in the 10 years before baseline had a 27% decreased colorectal cancer risk, and those who had used chondroitin had a 35% risk reduction. Later, a more in-depth analysis of the same cohort found that people using chondroitin and glucosamine together 4+ days a week for 3 or more years had a 45% reduction in colorectal cancer risk compared to nonusers.

An additional study published in the November 2016 issue of the International Journal of Cancer, saw researchers seeking to clarify the association between glucosamine and chondroitin and colorectal cancer risk. Using data from 2 large prospective cohorts, the Nurses' Health Study and Health Professionals Follow-up Study, the researchers looked at regular use of glucosamine and chondroitin at the beginning of the study and at colorectal cancer rates 8 years later. The study found that use of glucosamine with chondroitin was associated with a 23 percent reduction in colorectal cancer risk.

That association remained the same even when accounting for change in exposure status over follow-up, and no significant differences were found based on sex, BMI, or physical activity. This research provides additional support for the idea that glucosamine and chondroitin are associated with a reduced risk of developing colorectal cancer. More studies are needed to confirm the association and to explain the mechanisms of protection.


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Animal study: High-fibre diet may protect colon's lining

Nutrition Insight 13 Oct 2016

An animal study published in Cell shows that when mice don't receive enough fibre the microbes in the gut may attack the natural mucus lining. This can erode the lining to the point where dangerous invading bacteria can infect the colon wall.

In this study, the mice were born and raised with no gut microbes of their own, then received a transplant of 14 bacteria that normally grow in the human gut. Scientists know the full genetic signature of each one, making it possible to track their activity over time.

Using the University of Michigan's gnotobiotic, or germ-free, mouse facility, and advanced genetic techniques that allowed the researchers to determine which bacteria were present and active under different conditions, they studied the impact of diets with different fibre content and those with no fibre.

The researchers found that the mucus layer stayed thick, and the infection didn't take full hold, in mice that received a diet that was about 15% fibre from minimally-processed grains and plants. But when the researchers substituted a diet with no fibre in it, even for a few days, some of the microbes in animals' guts began to eat the mucus. Interestingly, when the researchers tried a diet that was rich in probiotic fibre, it resulted in the same erosion of the mucus layer as observed in the lack of fibre.

The researchers also saw that the mix of bacteria changed depending on what the mice were being fed, even day by day. Some species of bacteria in the transplanted microbiome were more common—meaning they had reproduced more—in low-fibre conditions, others in high-fibre conditions. And the four bacteria strains that flourished most in low-fibre and no-fibre conditions were the only ones that make enzymes that are capable of breaking down the long molecules called glycoproteins that make up the mucus layer.

Going forward, the researchers intend to look at the impact of different prebiotic fibre mixes, and of diets with more intermittent natural fibre content over a longer period.

Prebiotic fibre with satiety, microbiome modulating effects

By Hank Schultz, NutraIngredients USA, 31 Oct 2016

Ingredient distributor has added a multifunctional fibre to its product line-up that can help beneficially alter consumers' microbiomes.

It will start supplying into the US market two plant-based galacto-oligosaccharide (GOS) ingredients, Alpha-GOS, a gut health ingredient, and another meant to promote satiety for weight management


Image © iStock.com/ValentynVolkov

Both are different dosages of an ingredient based on the same raw material, the leftovers from pea protein extraction.

They developed Alpha-GOS using a clean-label water extraction from pea whey. Alpha-GOS has the same neutral, mildly sweet characteristics expected of saccharide-based functional fibres, but Alpha-GOS is also non-GMO, gluten free, allergen free, and lactose free. GOS are widely used as prebiotics, but in the form of beta-GOS primarily sourced from dairy," Webber told NutraIngredientsUSA. The researchers concluded that the soluble fibres may help promote satiety and decrease inflammation in obese people. The researchers also had this to say about the fibre's microbiome altering effects: "Analysis of the microbiota revealed that the alpha-GOS interventions led to significant increases in bifidobacteria levels, compared with the control group," they said.

Purified fibres vs. whole plant sources

Purified fibres always run up against the call from some researchers and dietitians that what's really needed to promote consumers' gut health is just to get them to eat more whole plant foods. Getting a sufficient amount of whole plant food particles into the distal gut ought to be the true goal of microbiome modulation, they maintain. Webber doesn't dispute that fact but said the situation is similar to the recommendation for consumers to get other important nutrients, such as key vitamins and essential fatty acids, solely from the diet. In principle it's a great idea, but in practice most consumers fall short, hence the need for targeted supplementation.

"Of course, unprocessed whole plant sources of fibre are the gold standard for promoting optimal gut health by providing a variety of prebiotic fibres as part of the natural blend of fibres inherent in the plant. Since recommended daily doses of the purified prebiotic fibres range from 110 or more grams per day, however, a very high dietary intake of whole plant fibre would be needed every day," she said.

Benefits at lower doses

Webber said one of the big benefits of purified prebiotic fibres is that they can provide these benefits at lower doses. "By selectively supporting only 'good' (bifidogenic) bacteria, AlphaGOS allows consumers to ensure they are promoting an environment in the gut that supports a healthy ratio of 'good' to 'bad bacteria by making sure the 'good' bacteria have what they need to survive at a low fibre dose. Purified prebiotic fibres with high digestive tolerance ratings can also be a great option for those who suffer gastrointestinal (GI) distress from large amounts of whole plant fibres and seek a predictable, minimal GI response (if any)," she said.

Webber also said that, depending on the goal of the product, a variety of fibres and probiotics could be considered in a formulation. One size does not necessarily fit all when it comes to fibre. "Because we have naturally a wide variety of 'good' bacteria in our bodies, it is beneficial to provide a variety of prebiotics as well. A solid strategy in formulating a digestive health supplement would be to identify the bacterial strains you want to target based on their research outcomes, then select one or more prebiotic fibres to include based on your chosen bacterial strains. When evaluating prebiotic fibres as a formulator, keep the consumer in mind," she said.


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Amla (Amalaki), antioxidant support for a healthy immune system

Food News Latam 02 NOVEMBER 2016

Amla powder (also known as amalaki or Indian gooseberry) is known as the great rejuvenator. It is traditionally used for a variety of digestive problems, enhances cell regeneration and is well known for its possible antibacterial and antioxidant properties.

It can support the health of the heart and brain through the promotion of stronger circulation. It has also been used to improve eyesight, regulate and improve fertility, help the urinary system, act as a body coolant, eliminate toxins, increase vitality, strengthen eyes, improve muscle tone, strengthen bones and teeth . Amla is excellent for helping to eliminate toxins and has been used for thousands of years in Ayurvedic herbal applications.

Unlike many super foods that have been introduced in recent years the chemical profile of raw amalaki can not be limited to a star ingredient or beneficial compound . Research has uncovered an unparalleled spectrum of potent antioxidants, polyphenols, tannic acids and bioflavonoids. Amla also contains a high concentration of amino acids, trace elements and other beneficial phytonutrients. For example the Amla powder (amalaki) also

contains the potent phenolic combination of ellagic acid, gallic acid and Emblicanin A + B. These polyphenols together are important for reducing cellular oxidative stress and preventing, destroying damaging free radicals and supporting the General detoxification of the body.

Bioflavonoids and quercetin also contribute to the antioxidant qualities in general, anti-inflammatory and youth promoting this remarkable fruit. In addition, amla contains the potent antioxidant enzymes superoxide dismutase (SOD), glutathione peroxidase and catalase.

Amla can also be used externally and can work as an excellent moisturizer to promote skin, hair and nail health. Several studies have shown the benefit of Amalaki and the important role it plays in the formation of fibrin collagen, aiding in fibrin production, and iron absorption.

Green tea extract supplements may improve lipid levels for women

By Stephen Daniells, NutraIngredients USA 09Nov2016

Taking green tea supplements for one year may slash total cholesterol and LDL cholesterol levels in postmenopausal women, says a new study.

The cholesterol-lowering effects were found to be even stronger in women with higher baseline levels of total cholesterol, reported researchers from the University of Minnesota, the University of Pittsburgh, and the University of Southern California.

"Current evidence from this trial suggests that GTE [green tea extract] may be recommended for cholesterol lowering, in particular in those with borderline or high cholesterol concentrations," wrote the researchers in the American Journal of Clinical Nutrition. "Green tea is an inexpensive, easily accessible, and popular drink and may indirectly lead to lower morbidity and mortality rates due to CVD through improving hyperlipidemia outcomes."

Tea benefits

The study adds to an ever-growing body of science supporting the potential benefits of green tea (Camellia sinensis) and its constituents, most notably EGCG (epigallocatechin gallate). Green tea contains between 30% and 40% of water-extractable polyphenols, while black tea (green tea that has been oxidized by fermentation) contains between 3% and 10%. Oolong tea is semi-fermented tea and is somewhere between green and black tea. The four primary polyphenols found in fresh tealeaves are EGCG, epigallocatechin (EGC), epicatechin gallate (ECG), and epicatechin (EC).

The supplement used in this study was the Corban Complex GTB ingredient by Corban Laboratories/ Eniva Nutraceutics. The capsules were decaffeinated and provided 1,315 mg of catechins per day, consisting of 843 mg EGCG, 202 mg EG, 107 mg EGC, and 107 mg EC.

Study details

The new paper details results of an ancillary study of a randomized controlled trial investigating the effects of green tea extracts on breast cancer risk. The study involved 1,075 women randomly assigned to receive placebo or the green tea extract supplement for 12 months.

Results showed that, for the 936 women who completed this sub-study, the green tea extract was associated with a 2.1% reduction in total cholesterol and a 4.1% reduction in LDL cholesterol, compared with increases of 0.7% and 0.9% in the placebo group, respectively. "Surprisingly" triglyceride concentrations increased by 3.6% in the green tea group, compared with a 2.5% decrease in the placebo group.

"Among the bioactive green tea catechins, EGCG is of great interest because it is the most abundant and purported to be the main bioactive catechin responsible for the hypolipidemic effects of green tea," wrote the researchers. "The exact mechanisms by which EGCG and green tea exert their lipid-lowering effects remain largely unknown. The hypothesized mechanisms are through the suppression of cholesterol biosynthesis, the interference of lipid absorption, and the increase in fecal excretion of cholesterol."

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FOOD SCIENCE & INDUSTRY NEWS

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Applications of wine pomace in the food industry

IFT Weekly Nov 2, 2016

Winemaking generates large amounts of wine pomace, also called grape pomace. This by-product has attracted the attention of food scientists and the food industry due to its high content in nutrients and bioactive compounds. A paper published in Comprehensive Reviews in Food Science and Food Safety discusses the different published approaches to the use of wine pomace and its functions in the food industry.

Traditionally, wine pomace has been used to obtain wine alcohol, food colorings, and grape seed oil. More recently, research has focused in the production of other value-added products, such as extracts of bioactive compounds, mainly phenols, recovery of tartaric acid, and the making of flours. The most common functions associated with wine pomace products are their use as antioxidants, followed by their use as fortifying, coloring, and antimicrobial agents. These products have mainly been applied to the preparation of meat and fish products and to, a lesser extent, cereal products.

The large number of wine pomace applications described in this review shows the high potential of the revalorization of this by-product in the food industry. These alternatives may contribute to reduce winery residuals, improve environmental aspects, so as to reduce production costs, and offer new ways to diversify the production. Furthermore, the food industry is provided with natural products that are able to inhibit different microbiological and chemical reactions, enabling the reduction in the use of synthetic food preservatives and antioxidants without compromising the stability of the final product. These advantages may contribute to a higher consumer's perceived value that would balance the cost of the development of new formulations and optimization of the food-making processes.

FAO stresses need to support smallholder farmers in adapting to climate change

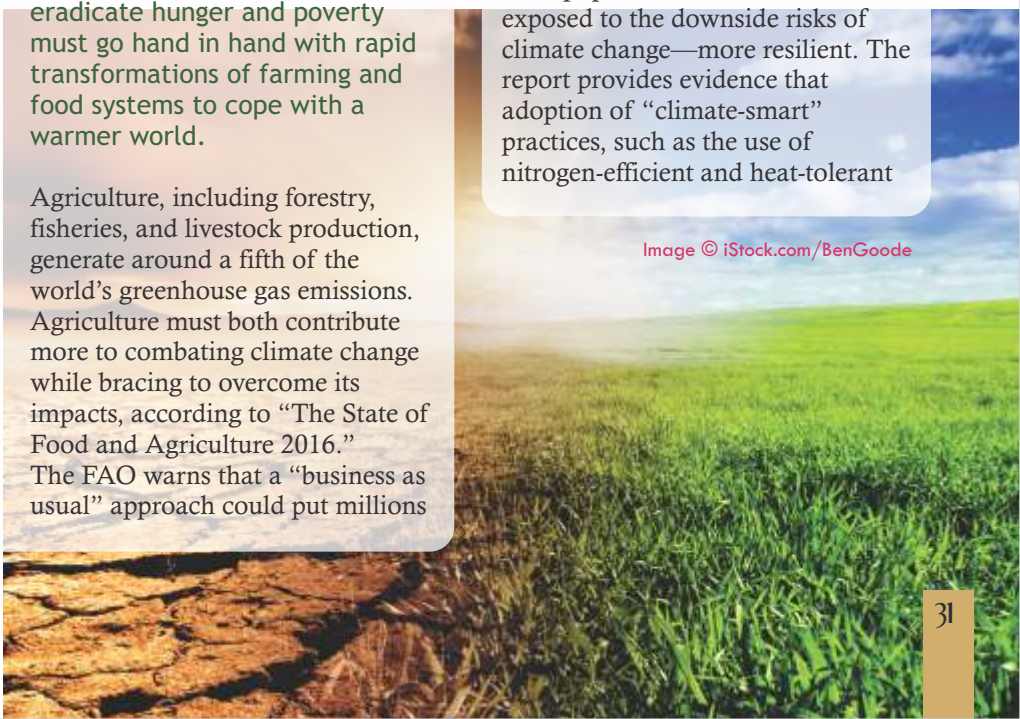
IFT Weekly November 9, 2017

According to a new report from the Food and Agriculture Organization of the United Nations (FAO), the pledge to eradicate hunger and poverty must go hand in hand with rapid transformations of farming and food systems to cope with a warmer world.

Agriculture, including forestry, fisheries, and livestock production, generate around a fifth of the world's greenhouse gas emissions. Agriculture must both contribute more to combating climate change while bracing to overcome its impacts, according to "The State of Food and Agriculture 2016." The FAO warns that a "business as usual" approach could put millions more people at risk of hunger compared to a future without climate change. Most affected would be populations in poor areas in sub-Saharan Africa and South and Southeast Asia, especially those who rely on agriculture for their livelihoods. Future food security in many countries will worsen if no action is taken today.

The FAO report underscores that success in transforming food and agriculture systems will largely depend on urgently supporting smallholders in adapting to climate change. Developing countries are home to around half a billion smallholder farm families who produce food and other agricultural products in greatly varying agro-ecological and socio-economic conditions. Solutions have to be tailored to those conditions; there is no one-size-fits-all fix.

The FAO report describes alternative, economically-viable ways of helping smallholders to adapt and making the livelihoods of rural populations—often the most exposed to the downside risks of climate change—more resilient. The report provides evidence that adoption of "climate-smart" practices, such as the use of nitrogen-efficient and heat-tolerant



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crop varieties, zero-tillage and integrated soil fertility management would boost productivity and farmers' incomes. Widespread adoption of nitrogen-efficient practices alone would reduce the number of people at risk of undernourishment by more than 100 million, the report estimates.

It also identifies avenues to lower emission intensity from agriculture. Water-conserving alternatives to the flooding of rice paddies for example, can slash methane emissions by 45%, while emissions from the livestock sector can be reduced by up to 41% through the adoption of more efficient practices. Helping smallholders adapt to climate change risks is critical for global poverty reduction and food security. Close attention should be paid to removing obstacles they may face and fostering an enabling environment for individual, joint and collective action, according to the report. The FAO urges policy makers to identify and remove such barriers. In addition, the report stresses that more climate finance is needed to fund developing countries' actions on climate change.

Eliminating GM crops may raise food prices, harm environment

IFT Weekly November 9, 2017

A study published in the Journal of Environmental Protection shows that a global ban on genetically modified (GM) crops may raise food prices and add the equivalent of nearly a billion tons of carbon dioxide to the atmosphere.

Image © iStock.com/nevarpp

Researchers from Purdue University used an extension of the Purdue-developed Global Trade Analysis Project (GTAP-BIO) model to investigate two hypothetical scenarios: "What economic and environmental effects would a global ban on GMO corn, soybeans, and cotton have?" and "What would be the additional impact if global GMO adoption caught up to the U.S. and then a ban were implemented?"
The model was set to 2011 crop prices, yields, and growing conditions and encompassed the ripple effects of how a change in one sector impacts other sectors. GTAP-BIO predicted that replacing GM corn, soybeans, and cotton with conventionally-bred varieties worldwide would cause a 0.27%–2.2% increase in food costs, depending on the region, with poorer countries hit hardest.

Banning GMO crops would also lead to an increase in global cropland of 3.1 million hectares (about 7.7 million acres), as land would be cleared to compensate for the lower yields of conventional crops. Converting forests and pastures into farmland is an environmentally-costly process that releases carbon stored in plants and soil, and this expansion of cropland would add the equivalent of 0.92 billion tons of carbon dioxide to the atmosphere.

Conversely, if countries that already plant GMOs expanded their use of genetically modified crops to match the rate of GMO planting in the United States, global greenhouse gas emissions would fall by the equivalent of 0.2 billion tons of carbon dioxide and would allow 0.8 million hectares of cropland (about 2 million acres) to return to forests and pastures.

"It's quite fine for people to be concerned about GMOs—there's no scientific basis to those concerns, but that's their right," said Wally Tyner, the James and Lois Ackerman professor of agricultural economics, Purdue University. "But the adverse impact on greenhouse gases without GMOs is something that is not widely known. It is important that this element enter into the public conversation."

Image © iStock.com/Rasica

Mintel predicts 2017 to be the year of extremes

IFT News November 16, 2016

Mintel, a market intelligence agency, has announced six key trends that will influence the global food and drink market—highlighting ingredient and food and drink product trends set to make an impact over the coming year.

According to the agency, 2017 will be a year of extremes, from "ancient" products including grains, recipes, practices, and traditions to the use of technology to create more and better tasting plant-enhanced foods.

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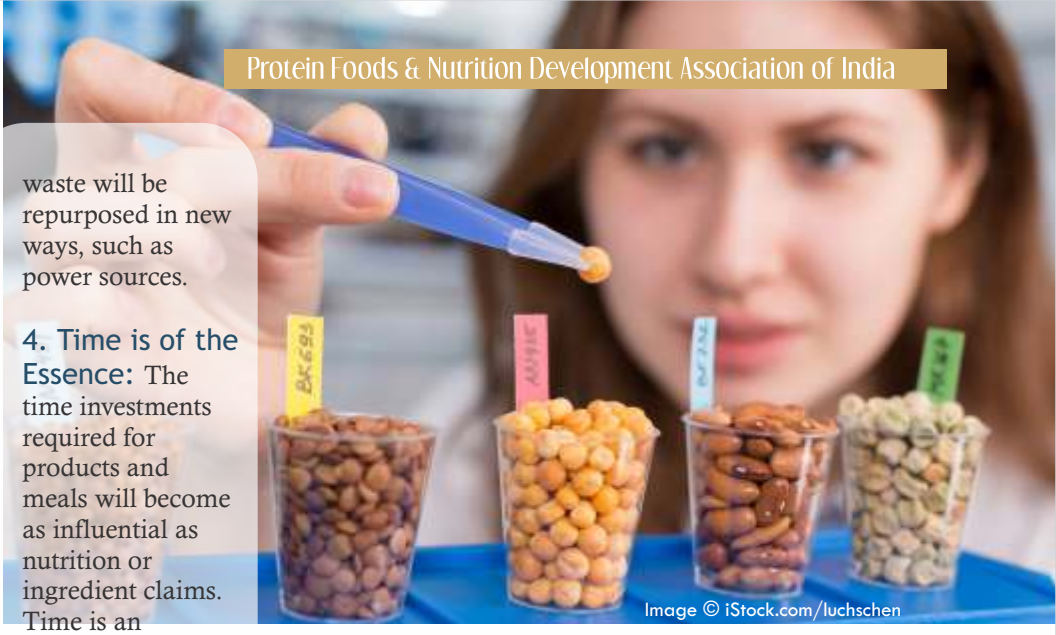


Image © iStock.com/luchschen

Expect to see a rise in both "slow" and "fast" claims as well as more products designed to help people calm down before bedtime, sleep better, and restore the body while they rest. Opportunities will exist for more products to leverage the reputation of the tea category and use chamomile, lavender, and other herbs in formulations as a way to achieve a sense of calm before bedtime. There will also be a valid excuse for nighttime chocolate indulgence. In 2017 and beyond, expect to see more of the unexpected, including fruit snacks made with ugly fruit and mayonnaise made with the liquid from draining chickpeas, which has been dubbed aquafaba.

The top food and drink trends for 2017 are:

1. In Tradition We Trust: Consumers seek comfort from modernized updates of age-old formulations, flavors, and formats. The trust in the familiar emphasizes the opportunity for manufacturers to look to the past as a dependable source of inspiration such as "ancient" product claims including ancient grains and also ancient recipes, practices and traditions.

2. Power to the Plants: The preference for natural, simple, and flexible diets will drive further expansion of vegetarian, vegan, and other plant-focused formulations. More packaged products and recipes for home cooking will leverage fruits, vegetables, nuts, seeds, grains, botanicals, and other plants as a way to align with consumers' nearly omnipresent health and wellness priorities.

3. Waste Not: The focus of sustainability zeros in on eliminating food waste. In 2017, the stigma associated with imperfect produce will begin to fade, more products will make use of ingredients that would have otherwise gone to waste, and food waste will be repurposed in new ways, such as power sources.

4. Time is of the Essence: The time investments required for products and meals will become as influential as nutrition or ingredient claims. Time is an increasingly precious resource and our multitasking lifestyles are propelling a need for short-cut solutions that are still fresh, nutritious, and customizable. In 2017, the time spent on—or saved by—a food or drink product will become a clear selling point, inspiring more products to directly communicate how long they will take to receive, prepare, or consume.

5. The Night Shift: The increasingly hectic pace of modern life is creating a market for food and drink that helps people of all ages calm down before bedtime, sleep better, and restore the body while they rest. Ahead, there is potential for more evening-focused innovations formulated for relaxation, satiety, and, taking a cue from the beauty industry, food and drink that provide functional benefits while the consumer sleeps.

6. Balancing the Scales—Health for Everyone: Healthy food and drink are not "luxuries." Many lower-income consumers want to improve their diets but the access to—and the cost of—healthy food and drink is often an impediment. More campaigns and innovations are to be expected that will make it easier for lower-income consumers to fulfill their healthy ambitions, including apps to help people make use of ingredients that are on sale.

Nutrition revolution "FoodConnects" coordinated by TU Munich

NEWS RELEASE Technical University of Munich, Corporate Communications Centre (https://www.tum.de/en/about-tum/news/press-releases/short/article/33553/)

It was a resounding success at the European level: The European Institute for Innovation and Technology (EIT) has announced the winner of the competitive, large-scale project EIT Food, which has an endowment of 400 million Euros.

The winning candidate was the European consortium of 50 partners from 13 countries led by the Technical University of Munich (TUM). The joint FoodConnects project unites leading companies, research institutes, and universities under a vision of becoming a driver and center for a global nutrition revolution.

With research institutes and universities such as Fraunhofer, the University of Cambridge, and the Polish Academy of Sciences, but also with partners from the industry, the best scientists, students, and entrepreneurs from the food industry were enlisted for EIT Food. FoodConnects already counts among its ranks global companies such as PepsiCo, Siemens, Robert Bosch and Nestlé in a new European alliance.

"Through the collaboration of EIT Food with the top minds in the food industry, we are heralding a paradigm shift along the entire value creation chain, from European agricultural production to food and foodstuffs manufacturing, which is set to be organized in a manner that is increasingly sustainable and digital", says Professor Thomas Hofmann, Vice-President for Research and Innovation at the TUM and head of the Chair of Food Chemistry and Molecular Sensory Science. Hofmann was the main coordinator and applicant of FoodConnects, and will now establish the corresponding Food Innovation Hub for Germany and the Netherlands at the TUM School of Life Sciences Weihenstephan (WZW) — the TUM's campus in Freising, Germany. This would make it the first co-location centre of its kind in Bavaria.

"Within seven years, 350 start-ups will be funded, 10,000 graduates trained, and 290 new or improved products brought to market with the help of the results and findings from the EIT Food consortium", explains Hofmann, speaking about the large-scale endeavour. The winner FoodConnects was selected based on a Europe-wide bid for tenders, which began in January 2016. The groups of applicants underwent a detailed evaluation process which was presided over by independent external consultants and the EIT board.

"The crucial aspect that made us decide on FoodConnects was its ability to spark the necessary innovation which is essential in today's society. The new EIT Food comprises excellent partners which will generate growth and create new jobs, which was the highest priority for Jean-Claude Juncker, the president of the European Commission", says Peter Olesen from the EIT board in Budapest.

Over 400 million in EU funding for EIT Food

EIT Food will receive four million Euros immediately as start-up funding. If the goals are achieved, the EIT funding pool will receive a total of 400 million Euros. "It is the largest joint project the science hub of Freising has ever seen", says Professor Wolfgang Herrmann, the president of the TUM. "Furthermore, the fact that the Technical University of Munich, the coordinator of EIT Food, was able to prevail in the face of stiff competition, such as from Wageningen, is further proof of the validity and success of our long-standing policy of reform in Weihenstephan."

In addition TUM is core partner of the Knowledge and Innovation Community (KIC) "EIT Health". Here the international headquarters of the project could be established in Munich. The TU Munich is also represented in the KICs "EIT Digital" and "Climate KIC". Likewise, the TUM is involved in both EU flagship projects, the "Human Brain Project", where it coordinates the "Neurorobotics Platform" and in the "Graphene Flagship Project", which includes researchers of the Walter Schottky Institute.

Arjuna launches Ayurveda-based clean-label preservative

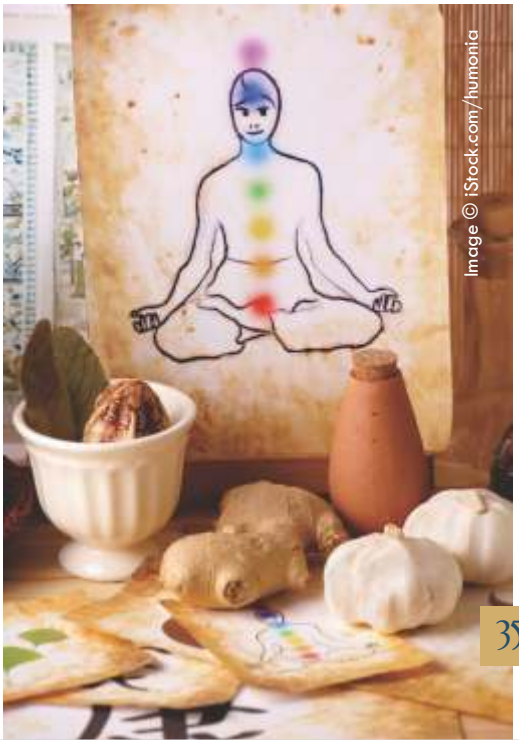
By RJ Whitehead, Dairy Reporter
08Nov2016

Kerala-based botanicals major Arjuna Natural Extracts will launch a range of preservatives that the company says will appeal to the clean-label food fixation of millennials by combining herbal extracts with advanced technologies.

The Xtend range consists of distinctive formulations of proprietary blends of essential oils and oleoresins after Arjuna's researchers identified a selection of botanical extracts that possessed antimicrobial activity. The natural antimicrobial system is made from a combination of natural antifungal and antibacterial components isolated from spices, herbs and bacteriocins. They are targeted specifically to address the spoilage issue in fresh foods and beverages, and improve shelf life naturally.

The researchers, based at Arjuna's new food technology division in Cochin, combined the botanical extracts, which are used in traditional Indian medicine, with methods of fermentation for bacteriocins, in concert with advanced technologies such as microencapsulation and emulsification. These techniques allowed the formulations to maintain their clean-label promise, which is in demand among a growing number of young, middleclass Indians, Arjuna's joint managing director said.

"Consumers' growing demand for food free from preservatives directly influences food manufacturers' and retailers' decisions in developing and marketing new products," said Benny Antony.



"Millennials, especially, are actively seeking safe foods without artificial ingredients. New product developers can help ensure success by focusing on clean labels."

The scientists found no change in sensory profiles for taste and mouth-feel from the formulations after testing in a range of bakery, dairy, condiment and juice products, which tend to have shorter shelf-lives. "Consumers are not aware that a lot of fruit-based drinks are susceptible to oxidation and microbial degradation," said Antony. "Drinking fresh fruit and vegetable drinks, or enjoying healthful and nutritious snacks like hummus spread that are refrigerated without preservatives could be dangerous to health."

While these foods are highly sensitive to oxidation and contamination, many products on the market still rely on synthetic preservatives, he added.

Fruit and veg life extended with new chemical coating

By Michelle Perrett, Food Manufacture UK 27Oct2016

Australian researchers have come up with a way of extending the life of fruit and vegetables with a new innovative nontoxic compound for coating produce.

The researchers, horticultural specialist Professor Zora Singh and organic chemist Dr Alan Payne, from the Curtin University in Western Australia have developed the compounds called 'ethylene antagonists'. These can help solve the problem of fruit and vegetables over-ripening and spoiling due to the natural production of ethylene gas as they ripen.

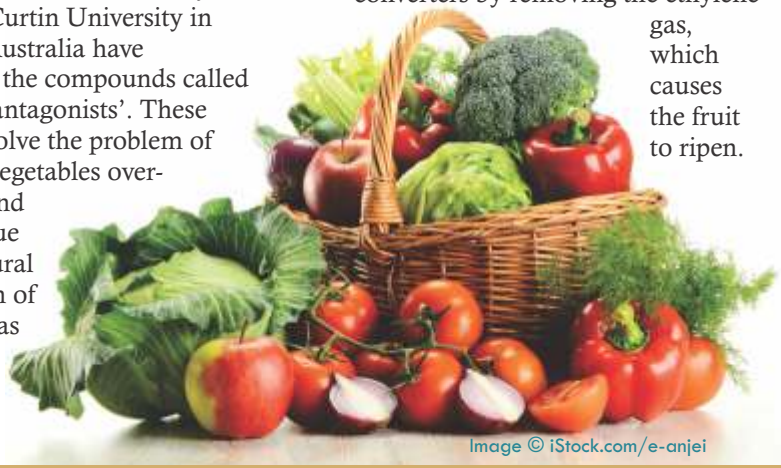
According to Curtin University, nearly half of all fruit and vegetables spoil before they are bought, and one of the main reasons for this is a chemical called ethylene, which fruit gives off as it ripens. This causes over-ripening of fruit, spoilage of vegetables and loss of petals in flowers.

Nontoxic compound

The new compound developed by the researchers, prevents the produce from reacting to ethylene by coating it. It can be distributed in a range of ways such as a stable solid, liquid or gas. This means it can be used as a spray, dip or wax and can be added in the field or postharvest. This development, according to the University, promises to reduce food waste, so that land and water can be used more sustainably, benefitting the environment and economy. There are already products on the market being used by manufacturers and supermarkets to slow down the deterioration of fruit and vegetables.

Ethylene scavengers

Ethylene scavengers are inserts placed into packages to stem the ripening process by aiding the adsorption ethylene as it is produced. In 2013, Marks & Spencer, Tesco and Waitrose adopted the use of ethylene scavengers in their packs of fresh produce. They act like catalytic converters by removing the ethylene gas, which causes the fruit to ripen.



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Australian team discover methane busting seaweed

By Jane Byrne, Food Navigator Asia 11Nov2016

Seaweed can reduce methane emissions in cattle dramatically, found the team behind an Australian research project.

The Canberra headquartered Commonwealth Scientific and Industrial Research Organization (CSIRO) has been leading the initiative. So FeedNavigator caught up with Dr Rob Kinley, research scientist, and Michael Battaglia, group leader, greenhouse gas mitigation and adaptation in agriculture, at CSIRO Agriculture and Food, to hear more.

FeedNavigator: What has the CSIRO team found out from studying the effects of the seaweed on cow's methane production?
CSIRO: The seaweed Asparagopsis is a potent agent that reduces methane production in the digestive process of cattle and sheep. Most seaweeds have a beneficial effect on methane production by reduction of 1020% but Asparagospis is the star performer with unprecedented mitigation from a natural product. In the laboratory, using the digestive processes of cattle with 2% of the feed as seaweed, the methane production was reduced to undetectable levels that we refer as reduction greater than 99%. When included in sheep feed, methane emissions dropped by 85% compared to sheep receiving identical conditions and feed without seaweed included.

FeedNavigator: How is the seaweed processed for use in feed?
CSIRO: It is whole seaweed that has been dried and will be incorporated directly into the feed either in a pellet with the mineral and vitamin mix, or as a suspension in a molasses base to be mixed in as the ration is finished just prior to delivery to the feed bunkers, or included as a seaweed flake with the roughage. Other technologies are expected to be developed as the feed formulators and farmers work together to refine their systems. This depends on the feeding system that varies between feedlot style (high grain), dairy style (medium grain), and grass fed (low grain).

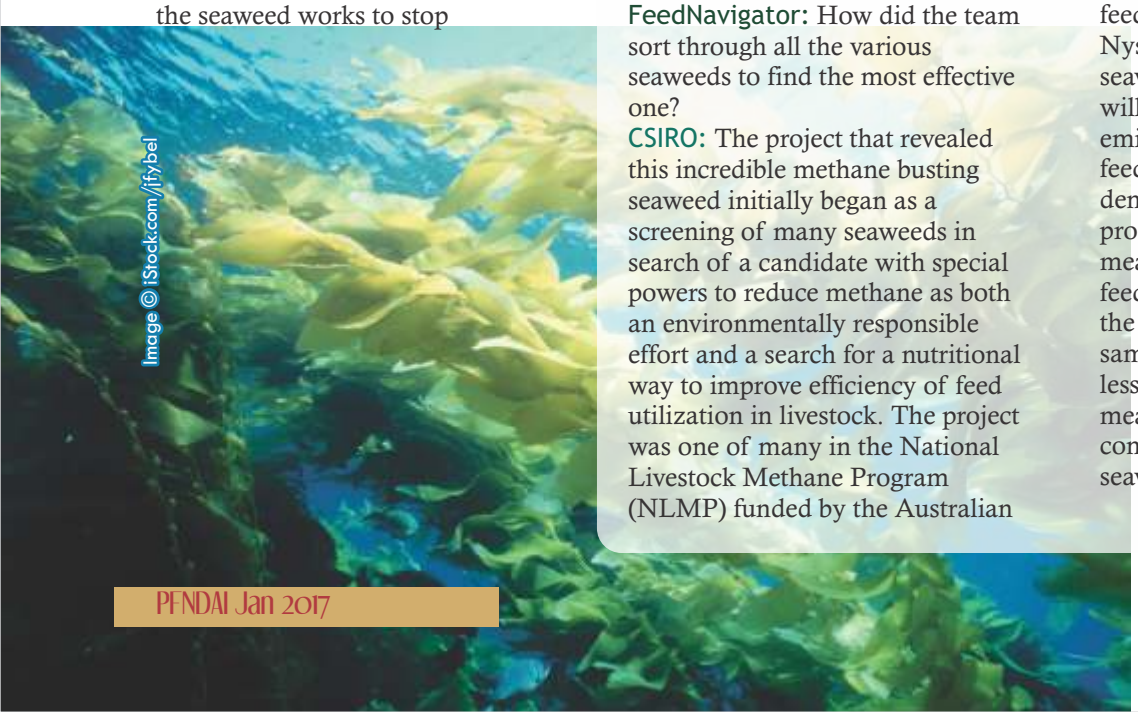
FeedNavigator: What is the mode of action?
CSIRO: The seaweed contains bioactive compounds and the main player is bromoform. The action occurs at the final step in the methane forming pathway by prevention of methane release through reaction with vitamin B12 in the chain causing disruption of the cobamide-dependent methyl transferase, thereby causing enzyme inhibition. The enzyme is unable to complete the pathway and the methane molecule is not emitted. There are many different types of methanogens but they all use the same final step in the process (pathway) in the creation of methane. This final step is where the seaweed works to stop formation of methane.

FeedNavigator: What was the initial trigger for this research?
CSIRO: There were a few scientists with a similar idea for different reasons that came together to make this happen. For Dr Rob Kinley, it was a search beginning in Canada where Joe Dorgan, an innovative farmer, had noticed his cows with beach front paddock were performing better and the only difference was availability of seaweed on the beach. So he took the seaweed to the landlocked herd and those cows soon caught up. That farmer started up a company called North Atlantic Organics to commercialize this but regulations required it be scientifically tested first and that's where Dr Kinley discovered a 20% reduction in methane emissions. Excited by this finding he then went on a global search for seaweed with even more methane busting potency. Professor Rocky de Nys and his team at James Cook University (JCU) were aware of the fascinating chemistry of seaweeds and were investigating seaweeds for livestock nutrition with scientists at CSIRO in Queensland, Australia. So, Dr Kinley joined CSIRO and the program, and the team moved forward in the quest for a natural feed additive to reduce methane and improve feed use efficiency.

FeedNavigator: How did the team sort through all the various seaweeds to find the most effective one?
CSIRO: The project that revealed this incredible methane busting seaweed initially began as a screening of many seaweeds in search of a candidate with special powers to reduce methane as both an environmentally responsible effort and a search for a nutritional way to improve efficiency of feed utilization in livestock. The project was one of many in the National Livestock Methane Program (NLMP) funded by the Australian government and guided by Meat and Livestock Australia (MLA).

The screening was completed using laboratory methodology whereby we take the digestive microbiology of the cow rumen and culture that in artificial stomachs fermentation bottles with gas production monitors attached. The gas is sampled and analyzed for methane over time during the digestion of typical feed – grass with the seaweed added as a supplement. The seaweeds all reduced methane at least a little bit. However, we were looking for seaweed that was super potent, that would set it apart from all other 'natural' methods of managing livestock emissions. While analyzing the gas samples using gas chromatography (GC) there was a repeating scenario of 1020% methane reduction observed until suddenly there was nothing. At first it seemed that there was a problem with the GC so the test was repeated, when same result was observed that was the moment of discovery. Those results are now history, and have been reproduced on every subsequent test. The red seaweed Asparagopsis is the star performer.

FeedNavigator: Are trials continuing?
CSIRO: Yes, there are still questions that require answering. We are performing a MLA funded beef feeding trial soon and Professor de Nys's team has already supplied the seaweed for the study. This study will provide proof of concept for emissions reduction in a beef feedlot scenario and will demonstrate what we can expect in productivity enhancement. That means we will know how much feed-use-efficiency is improved by the seaweed in terms of either the same production of meat for the less feed cost or more production of meat for the same feed cost compared to animals without seaweed.



Also we will demonstrate 'how low we can go' with seaweed inclusion and still get the results. After that study, we will seek to demonstrate where the benefit can be best applied and we will research the application of seaweed included with feed of decreasing quality. We predict that as the feed quality gets lower that the seaweed will provide increasing benefit where the window for productivity enhancement gets bigger. Think of feedlot cattle that get the very best feed and are already performing extremely well versus paddock grazing animals eating dry grass stubble the law of diminishing returns.

FeedNavigator: Are commercial opportunities being explored?
CSIRO: This is somewhat of a perspective question. The seaweed could be tested on commercial scale after the feedlot scenario study is completed. However, the barrier to doing that is supply of the seaweed for a study using 1,000 cattle. That type of study would demonstrate the technology as it fits with commercial operations in terms of beginning to end processes. That defines the cultivation and processing of the product, delivery, incorporation into the feed ration, feeding and intake, and production of the cattle including productivity improvements, emissions reduction, and product quality. There is plenty industry interest and they are watching this develop and some are discussing it with us in terms of when and how they can get involved. First we need to develop a commercial partnership to cultivate and supply the seaweed at scale enough to supplement even a fraction of the cattle that would benefit. That is tens of thousands of tons of seaweed per year just for 10% of cattle in Australia alone. Seaweed supply is the primary barrier. There is no current cultivation of Asparagopsis taxiformis and the technology to cultivate it does not exist yet so a start-up will be a pioneer that develops a 'how-to' manual for that species.

China supplements market uncovered (part one): Minerals and dietary supplements outperforming vitamins

By Gary Scattergood+, Food Navigator Asia 21Nov2016

Minerals and dietary supplements are leading the nutrition industry's charge in China, with vitamins lagging behind, according to a new report which suggests the total market will reach RMB124bn (USD$20bn) by the end of the year, up 12.2 % from 2015.

Analysis from Mintel suggests that minerals and dietary products (defined as animal-based nutritional supplements such as cod liver oil, and plant-based supplements like garlic oil and spirulina tablets) are growing faster than vitamins due to a wider variety of products entering the market and increasing consumer interest in more diversified health benefits.

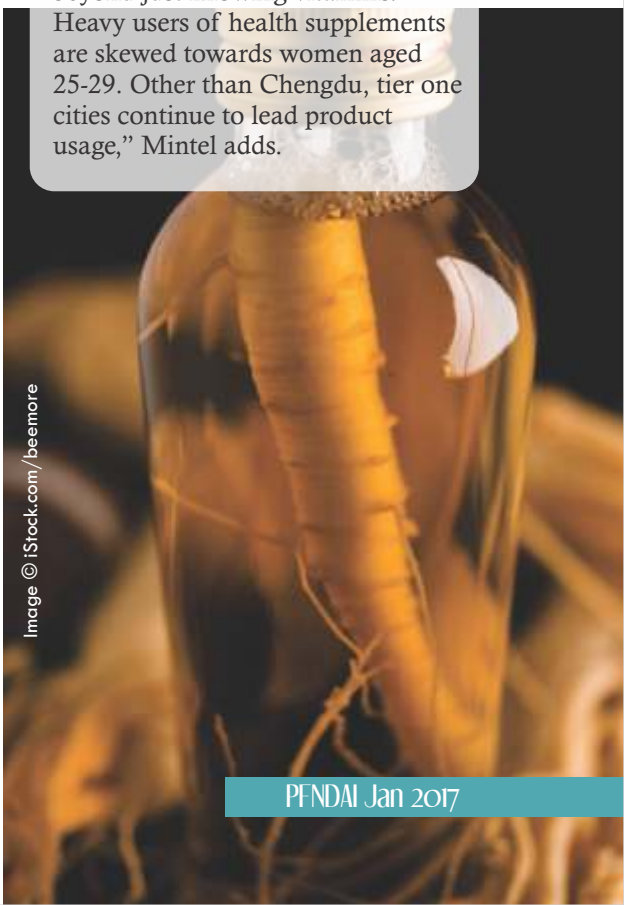
Researchers are forecasting a value CAGR of 11% for dietary supplements , 9.7% for minerals and 8.6% for vitamins over the period 2016-21. "The market will continue to benefit from an aging population, more health conscious consumers, positive regulatory changes and development in ecommerce. Younger consumers' open attitudes towards using health supplements as a necessary step of health management, means the market enjoys a broadening customer base," said Mintel.

They point out that the health supplement market remains highly fragmented with leading players such as Pfizer, DongEEJiao, Herbalife and Amway each accounting for 46% of the value share in 2015, only marginally ahead of other key players. "These big manufacturers are also facing challenges brought by new entrants as development of ecommerce and haitao shopping intensifies market competition. Noticeably, Amway is losing its share as direct selling comes under pressure," it adds.

In terms of health claims, Mintel says an analysis of the top 20 claims of new health supplement launches in China over 2014-16 shows products targeting female and seniors products are on the rise, with claims related to bone cardiovascular and brain health increasing.

Diverse supplements

They add a survey shows that minerals and dietary supplements see a clear overall consumption increase from 36% to 40%, and 28% to 33% in the heavy user category (at least several times a week) over 2014-16. "This shows that consumers are looking for more diversified health supplements and their category knowledge is growing beyond just knowing vitamins. Heavy users of health supplements are skewed towards women aged 25-29. Other than Chengdu, tier one cities continue to lead product usage," Mintel adds.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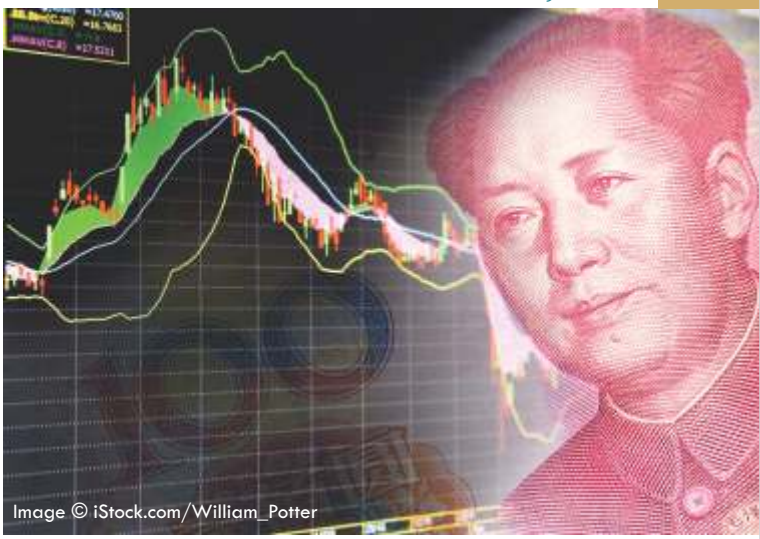
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The report states that firms should be optimistic about the market's future potential because health will remain a highly relevant topic in Chinese consumers' lives, "with so many other factors (regulation changes, aging population, rising income and access to more products) playing in favour of the weight loss and health supplement market."

It concludes: "Mintel is confident about the long term growth prospect of the market. However, companies should not be under the illusion that competing in the market is easy and take success for granted."

Image © iStock.com/plavevski

China supplements market uncovered (part two): Which health claims can entice Chinese citizens ?

By Gary Scattergood+, Food Navigator Asia 23Nov2016

Analysis of the top 20 claims of new health supplement launches in China between 2014-16 shows products targeting female and seniors are on the rise, with claims related to bone, cardiovascular and brain health increasing rapidly. But is this what consumers want?

Data published by Mintel in its China Weight loss and Health Supplements report, actually shows that immunity remains the main health condition that consumers want supplements to help with. They are then most interested in probiotics, followed by products to help with sleep disorders and fatigue. Interestingly, there appears to be a clear gap in the market for products that can benefit eye health, with 47% of all respondents saying they had poor eyesight, but only 19% of them believing that a supplement could offer any improvement or prevent further deterioration.

"Consumers relate health supplements with improving immunity, helping with digestive problems, insomnia, chronic fatigue and three 'highs'," said Mintel. "On the other hand, not many consumers think health supplements can help with poor eyesight and back/shoulder pain, despite the fact that these two are identified as common health issues," the report added.

Young consumers in their 20s were found to have higher faith in supplements to aid immunity, digestive issues and insomnia. "This is good news for the market as it shows people are more open to the idea of using health supplements as a necessary step of health management, rather than only taking it when getting ill," adds the report. In terms of the products that are currently been consumed, there is a pretty even split among the supplement groups. Eleven per cent of respondents to a Mintel survey said they took single vitamin supplements once a day, with 26% saying they did so several times a week.

It was similar for multivitamins (9% daily, 24% several times a week) minerals (12% and 28%) dietary supplements (9% and 24%) and fortified food (10% and 24%) "This shows that consumers are looking for more diversified health supplements and their category knowledge is growing beyond just knowing vitamins," said Mintel.

Functional food formats

Chinese consumers also seem willing to consider a whole range of fortified food options, with only a range of 7% to 14% of consumers surveyed not interested in any of the potential formats. "The typical choices are fairly expectable, with dairy as top snacking format for protein and calcium, juice for vitamins, and biscuits for fibre," the report adds. Mintel concluded it is imperative for brands to blend into consumers' lifestyles in China, rather than trying to change them.

They say this is particular true for products that promote weight-loss, because supplements are low down the pecking order for people who are seeking to shed some pounds. "Positioning them as part of a comprehensive weight management programme or essential nutrition supplement to people's diet has better chance resonating with body shape-conscious consumers. "After all, consumers are expecting weight-loss and health supplement products to be more natural, and even more tasty or fun to eat, just like food, drinks or snacks," it states.

REGULATORY NEWS

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New nutrition label presents challenges for food industry and dietitians

IFT Weekly Nov 2, 2016

The new Nutrition Facts label will be required on packaged foods by June 26, 2018. During the 2016 Food and Nutrition Conference and Expo (October 15-18, 2016), given by the Academy of Nutrition and Dietetics, speakers discussed the new label requirements and how they will affect food formulations and dietary choices.

A new list of required nutrients must be declared on the new nutrition label as well as updated serving size requirements. Constance Geiger of Geiger & Associates and the University of Utah said that daily values of certain nutrients are changing because they had not been updated in decades. The new label must have information on the amount (grams) and Daily Value (expressed as %DV) of vitamin D, calcium, iron, and potassium that a packaged food contains. Information on vitamins A and C will no longer be required on nutrition labels. Geiger said that it will be challenging for the food industry to update vitamin D content on food labels because there isn't a lot of content data for Vitamin D and because very few foods are natural sources of vitamin D.

Geiger also pointed out that the U.S. Food and Drug Administration (FDA) has newly defined dietary fiber: non-digestible soluble and insoluble carbohydrates and lignin that are intrinsic and intact in plants and isolated or synthetic non-digestible carbohydrates determined to have beneficial physiological effects on human health. According to this definition, only seven types of fiber added to foods can be called dietary fiber: 1) beta-glucan, 2) cellulose, 3) guar gum, 4) hydroxylpropylmethylcellulose, 5) locust bean gum, 6) pectin, and 7) psyllium husk. Thus, neither non-digestible polysaccharides nor inulin will qualify as dietary fiber when added to foods. Geiger said that because of the new definition for dietary fibers, food manufacturers will have to change the language regarding dietary fiber content on food labels and marketing materials.

The amount of added sugars in grams and as %DV will also be required on the new Nutrition Facts label. "Added sugars" are sugars that have been added to food during processing or packaging. Julie Jones, a former food and nutrition professor at St. Catherine University, said that many foods with added sugar or preservatives are being unfairly demonized. Food activists have caused consumers to believe that foods with fewer ingredients and no added sugar are better, Jones said. Their rhetoric along with the label changes may cause consumers to believe that the ingredients used to make foods are somehow unsafe.

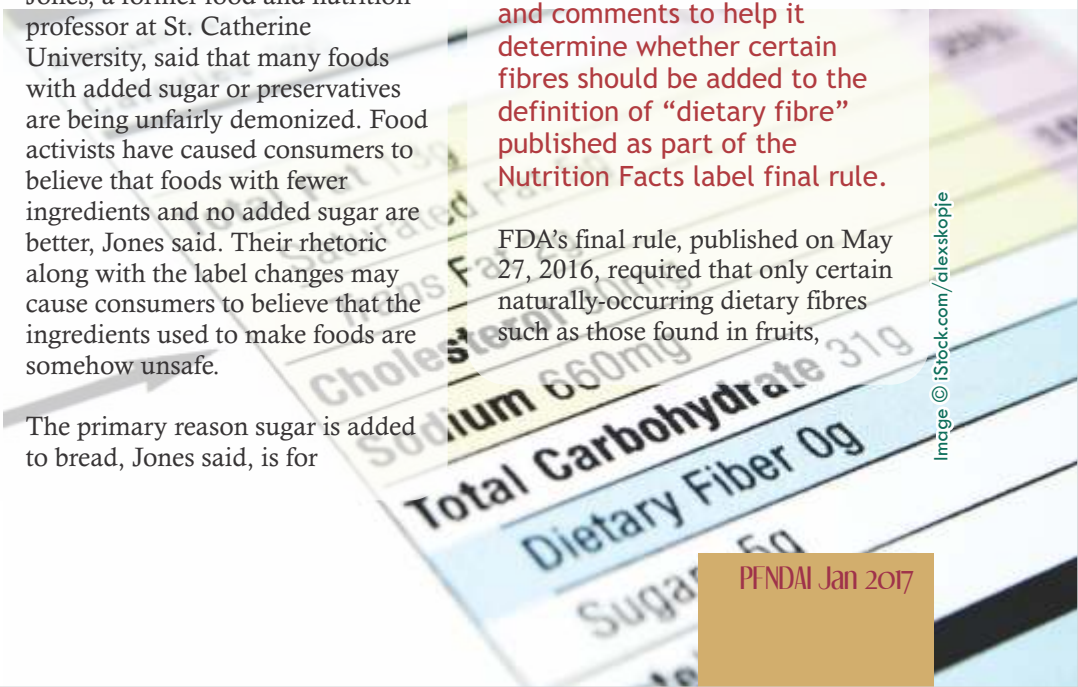
The primary reason sugar is added to bread, Jones said, is for fermentation; another key reason is to increase shelf life. And without preservatives, the cost of food would increase dramatically as would food waste, Jones added. Benzoates are natural components of cranberries, Jones said, but they contain more benzoic acid, a common food preservative, than the FDA allows to be added to foods. Jones said that food additives are rigorously tested for safety—more than the chemicals that occur naturally in many natural herbs and foods. Shorter ingredient decks on labels do not equate with safer foods, Jones concluded, and just because something is unpronounceable doesn't mean it is unsafe.

FDA requests comments on fibre on the Nutrition Facts label

IFT Weekly November 23, 2016

The U.S. Food and Drug Administration (FDA) is publishing a request for scientific data, information, and comments to help it determine whether certain fibres should be added to the definition of "dietary fibre" published as part of the Nutrition Facts label final rule.

FDA's final rule, published on May 27, 2016, required that only certain naturally-occurring dietary fibres such as those found in fruits,



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vegetables, and whole grains, and added isolated or synthetic fibres that the FDA has determined have a physiological effect that is beneficial to human health, could be declared on the label under "dietary fibre."

Previously, fibres in foods could be labelled as dietary fibre without necessarily providing physiological effects that are beneficial to human health. Naturally-occurring fibres contained in foods have already been determined to have physiological benefits. In addition to fibre that is naturally occurring in foods, the rule identified seven fibres that, when added to foods, could be declared as "dietary fibre."

The request for information, along with an accompanying draft guidance, will help industry understand how the FDA reviews the scientific evidence to determine whether other fibres beyond the seven identified in the rule should be added to the regulations. It also provides an opportunity to add to or comment on FDA's review of the science with respect to whether any of 26 additional specific types of fibre provide a physiological effect that is beneficial to human health and thus should be included in the fibre definition.

The comment period for the Request for Information opens on November 23 and will be open for 45 days.

Allergen-friendly, free-from claims offer marketing potential beyond conventional food, beverage

By Elizabeth Crawford, Food Navigator USA, 31Oct2016

With the number of Americans with food allergies and sensitivities increasing, free-from claims have become du jour in the conventional food and beverage space, but they remain relatively rare in the supplement segment and as such offer manufacturers a powerful tool to set their products apart.

"From a food perspective and from a healthy lifestyle perspective, people are increasingly cognizant of not wanting junk in their food and they are reading nutrition labels and trying to avoid things …. But, I am not sure that people take the same time for their supplements," even though they should, said Barry Ritz, VP of scientific and regulatory affairs at Atrium Innovations, which makes Pure Encapsulations hypoallergenic dietary supplements. He explained at the Food and Nutrition Convention and Expo in Boston in mid-October that for most people buying supplements can be confusing, and often they are so focused on finding the primary ingredients for the benefits they seek that they do not realize they also need to look at the label to ensure the other ingredients will not trigger an allergy or ingredient sensitivity. Or they may not realize that there are allergy-friendly options available, he added.

But given that food allergies and sensitivities are on the rise, he suggests , "we are at a crucial time to make sure people are recognizing that their supplement choices are as relevant to their allergies and sensitivities as" their conventional food choices. Beyond helping the consumer, such claims also would help manufacturers' products stand out on crowded shelves to an ever-growing segment of the population, he said.

Indeed, according to the Food Allergy Research and Education, as many as 15 million people have food allergies, including nearly 9 million adults and 6 million children. In addition, 34 million people in the US – or about 15% of the population – have an ingredient sensitivity, which can cause a range of reactions from mild upset stomach, to a rash or a negative mental feeling. Ritz said he suspects this number will continue to rise, at least in the short term, given that a brief published by the National Center for Health Statistics in 2013 found that from 1997 to 2011, children with food allergies in the US increased 50%.

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Meeting consumer demand

To help meet growing consumer demand for allergy-friendly products, Ritz says Pure Encapsulations offers hypoallergenic dietary supplements that are held at a standard above and beyond the common Good Manufacturing Practices required by FDA and can serve as a role model for other manufacturers. Specifically, he explained that the company's products avoid allergens in the sourcing and manufacturing of dietary supplements avoids unnecessary binders or fillers in the manufacturing process as well as other substances commonly avoided by sensitive consumers, such as coatings, shellacs, artificial flavours, artificial sweeteners and artificial colour; and screens for environmental contaminants.

The company also tests all of its solvents to avoid contamination of allergens or ingredients associated with sensitivities, he said. Pure Encapsulation products that meet those standards, as well as are free from any of the major food allergens, bear a claim on the principle display panel that the product is hypoallergenic – a helpful reminder to consumers that they should remember allergens when buying supplements and that there are products available to them if they have an allergen, Ritz said. He added that Pure Encapsulation products also warn consumers not only when one of the top eight major allergens are present in a product, but also of other potentially allergenic materials, including corn, sesame, monosodium glutamate and others.

Beyond this, Ritz said, Pure Encapsulations is working closely with health care providers to inform them about which supplements are safe for people with allergies and sensitivities and which are not. This strategy helps raise consumer awareness as well as connect the brand with potentially long-term loyal consumers because those who seek guidance from qualified health professionals are less likely to switch brands based on promotions and other market variables. Finally, Ritz said, supplement manufacturers can provide an added layer of assurance to consumers with allergies and sensitivities by having their products third-party certified for quality.

Food Crime Unit should get more power: review

By Matt Atherton+, Food Manufacture UK 10Nov2016

The National Food Crime Unit (NFCU) should be given more powers and resources to investigate food crime, according to a Food Standards Agency (FSA) review.

The review – which began in August – recommended the NFCU be made into an "arms-length body" of the FSA, with the power to make day-to-day law enforcement decisions. The findings would be considered by the FSA Board at its next meeting on November 23.

The FSA review said: "There was unanimous agreement from consumer representatives, industry, enforcements partners and professional bodies that the work of the NFCU is a good strategic fit for the FSA.

'NFCU should have investigative capacity'

"There was [also] broad consensus among all of the key stakeholder groups consulted that the NFCU should have investigative capacity." The NFCU should have a small separate nonexecutive board, and its chair should sit on the FSA Board as a nonexecutive director, the review recommended. It also said there should be performance assessments of the NFCU at regular intervals.

Despite the unit's limitations, imposed by its current mandate and lack of investigative capacity, the unit had provided financial, tactical and strategic support for local authorities running the investigations, judged the review. The NFCU currently has no investigatory powers, and instead works with local authorities and the police to combat food crime.

More powers by March 2017

The FSA recommended the unit be given more powers by March 2017. "If the FSA Board accepts the review's recommendation, the next stage is to develop a business case and consult with other government departments on more detailed delivery options. "There will also need to be in depth consultation with devolved governments and stakeholders in Wales and Northern Ireland, to ensure that a future NFCU takes into account devolved enforcement arrangements and the need for local political accountability. Meanwhile, the NFCU achieved three key goals over the past year, its boss Andy Morling claimed in an exclusive video interview, filmed at Food Manufacture's food safety conference last month.


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FSA calls on industry to be more open about sharing data

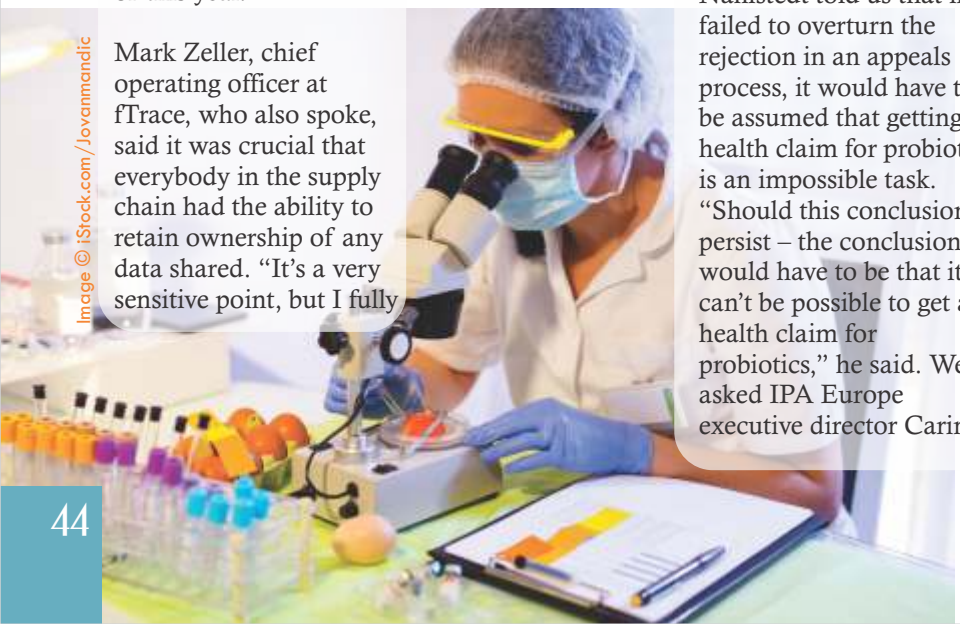
By Noli Dinkovski, Food Manufacture UK 10Nov2016

An industrywide approach to data sharing could bring enormous food safety and traceability benefits, a data expert at the Food Standards Agency (FSA) has claimed.

Bringing together different data sets may seem like "an act of faith" for individual businesses with vested interests, but it enabled correlations and insights that otherwise wouldn't be possible, Julie Pierce, director of openness, data and digital at the FSA said. Pierce was speaking at Food Manufacture's food safety conference in London last month, which was sponsored by Appetite Learning, Glass Technology Services, Sealed Air, Testo and the University of Greenwich. Pierce told delegates that it was important for the private sector to be open to get the best out of data.

Get the best out of data

"A good example is how supermarkets are starting to publish data on food waste, based on data through the whole of the supply chain," she said. "In doing so, trying to generate interest, and thereby, challenge everyone back up through the supply chain. We at the FSA have a target to make 95% of the data we hold, open by the end of this year."



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Mark Zeller, chief operating officer at fTrace, who also spoke, said it was crucial that everybody in the supply chain had the ability to retain ownership of any data shared. "It's a very sensitive point, but I fully understand why businesses want to control their data. Other parties might use that information in a way that isn't in your interest," he said. "Putting your data into a cloud-based solution, such as ours, can rectify this problem. Collaboration will be key to better traceability in the future."

Is it time to admit it's impossible to get a probiotic health claim ?

By AnnieRose HarrisonDunn, NutraIngredients 10Nov2016

If the European Food Safety Authority (EFSA) continues to treat probiotics like pharmaceuticals, it will never be possible to win a health claim, says the European arm of the International Probiotics Association (IPA). But not everyone agrees. With not a single health claim application for probiotics approved, some have concluded that it is simply impossible to get such a dossier past EFSA scrutiny.

This summer the EU authority rejected Swedish supplier Probi's article 13.5 health claim for a probiotic strain and improved iron absorption. The rejection was the 310th such disappointment for the probiotics industry since the creation of the EU's Nutrition and Health Claims Regulation (NHCR) in 2006. The company's CEO Peter Nähllstedt told us that if it failed to overturn the rejection in an appeals process, it would have to be assumed that getting a health claim for probiotics is an impossible task. "Should this conclusion persist – the conclusion would have to be that it can't be possible to get a health claim for probiotics," he said. We asked IPA Europe executive director Carine Lambert if she agreed. She told us if EFSA continued to use a pharmaceutical approach of "one molecule, one end point, one effect" to look at probiotic dossiers, "it will never be possible to claim".

Image © iStock.com/nensuria

'It has been rendered in a way impossible': IPA Europe

Yet she said the problem was the approach of EFSA, not the science of the probiotics industry. "It's not impossible because of our science, because it's obviously possible everywhere else in the world, except in Europe. So we believe in our science and this must be clearly, clearly stated," she said. "It has been rendered in a way impossible because of the whole technical approach and the way EFSA evaluates. It's not because we have a lack of science." She said there had been more than 11,000 probiotic papers published in journals over the last 50 years. But there are countless other claims approved under the same system, so what is it about probiotics?

"Probiotics are live microorganisms intervening in several mechanisms and pathways of the body so it's quite complex, and much more so than vitamins and minerals or fibres or whatever," she said. "It is true that trust has been eroded, resources for research have diminished as industry has suffered so many setbacks and restrictions in the market place due to the NHCR and, since putting together a successful application is likely to require massive resources, with no certainty of a positive outcome, it has all become very difficult." In the past companies have estimated it costs between one and two million Euros to gather enough evidence for a successful health claim application.

Early failures

Yet Lambert conceded that many of the early dossiers counted in the 310 list of rejections were far from perfect. Indeed some of these early applications didn't have strain numbers. Bucchini agreed: "I think it is not fair to put all the rejected probiotic claims in the same basket. Most applications (especially the earlier ones, which count for most) had several flaws." "It was not all down to applicants, and EFSA could not be faulted: the NHCR had to be implemented too quickly, and there was insufficient time for a dialogue in which EFSA could define and explain its requirements."

He said by contrast recent applications like Probi's were "successful in most respects", including characterisation and type of effect. "So, yes, I think that now there is sufficient understanding of how EFSA is going to assess a probiotic claim to make a successful application. At the same time, I do understand the frustration of the applicants, and their arguments."

He remained optimistic about a future probiotic claim win, and urged industry to keep applying. He called for industry with a presence in Italy to take a particular interest. Unlike the rest of Europe, in Italy the term probiotics is not considered a health claim needing approval.

Way forward

Key to any EUlevel progress would be dialogue beyond stakeholder conferences to address scepticism and produce clear guidance, both Bucchini and Lambert said. Dr Mark Tallon, managing director at UK-based consultancy firm Legal Foods, said dialogue would incentivise investment. "A solution would be an ability to submit to EFSA a proposed study design and claim. If the study yields a significant effect the claim can be used. Such an assessment would give certainty to companies that investment in research is worth the risk."

He said without this certainty companies may not see the value of playing by the NHCR rules. "Food businesses are ultimately ignoring the health claims regulation and making more non-authorised claims to connect to their consumers. In most member states noncompliance and fines are cheaper than trying to get 'consumer friendly' health claims authorised."

The bigger picture

Beyond dialogue, Lambert said IPA Europe was calling for movement on the de facto ban of the term probiotic. They also want a basic definition of probiotics. Specific regulation on probiotics would help regulate labelling, quality, concentration. The lack of any standard here has led to a situation whereby probiotic is a term banned on food and food supplement packs, but allowed on toilet cleaners. "All in all, the situation is really not viable anymore," said Lambert.

Goa the go-to state for FSSAI's community food safety programme

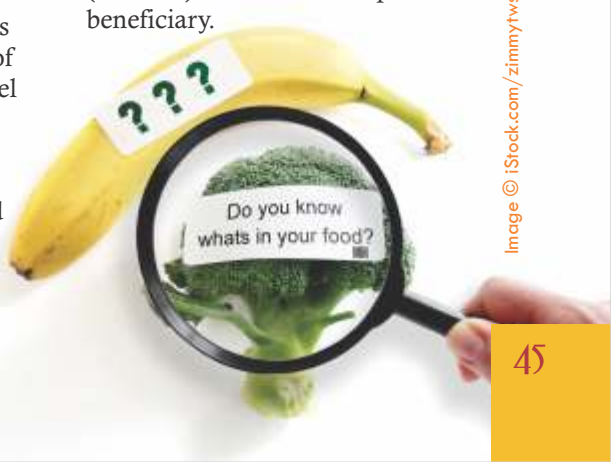
By RJ Whitehead, Food Navigator Asia 01Nov2016

India's food regulator has singled out Goa as a potentially model state for promoting food safety habits among consumers.

Pawan Agarwal, chief executive of the Food Safety and Standards Authority of India, said that the tiny western state's small population would allow authorities to make headway in changing the food habits of its residents. "Goa is already doing quite well in terms of health it can also become a model for other states in food safety measures," said Agarwal.

The FSSAI has chosen Goa's food and drugs administration to pilot three food safety initiatives in the state. "The initiative is planned to connect with citizens in multiple ways for creating food safety culture," said Salim Veljee, director of the state FDA. Under it, the FSSAI will provide in-house training to Goa FDA enforcement officials, who will collaborate with consumers and other agencies conduct state-wide programmes at homes and in schools and restaurants to promote a culture of safe and nutritious food consumption. Backers of the initiative aim to provide every Goan household with a handbook on healthy diets and food safety. It will also provide a web-based platform were housewives can share their experiences online. FSSAI-trained food safety supervisors will also inspect Goan restaurants for hygiene standards, giving each one a publicly visible food safety rating.

Meanwhile, the state's agriculture department has launched a scheme to encourage farmers to work with organic inputs in a bid to reduce the use of chemical fertilisers and pesticides. "This is the first step we have taken in the direction of organic farming in the state. Hopefully, more and more farmers should adopt the practice of organic farming after availing this scheme." said Goa's agriculture head, Ulhas Pai Kakode. Under the scheme, vermin-compost, mushroom waste and neem cake, as well as bio-fertilizers such as rhizobium, azotobacter and azospirillium, will be made available for farmers. The state government will also offer assistance towards the cost of organic materials for farmers by giving subsidies of up to Rs 20,000 (US$300) for two hectare per beneficiary.



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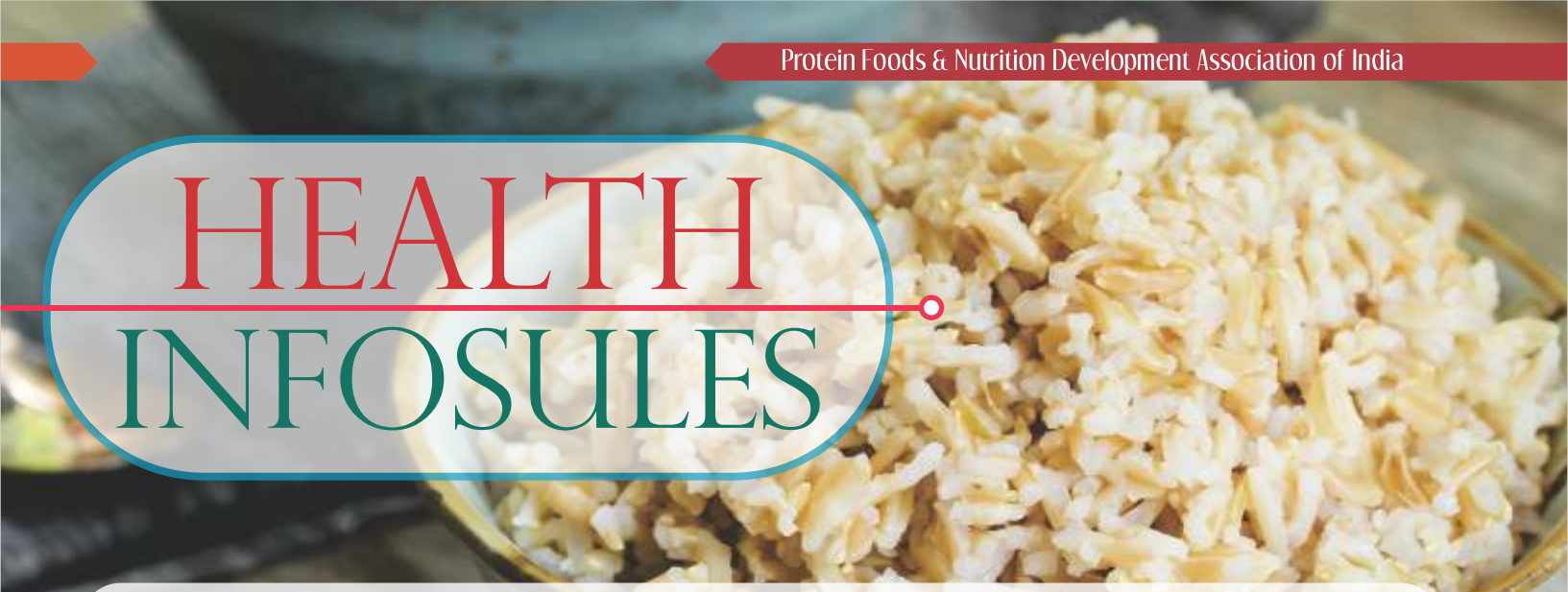

HEALTH INFOSULES

Can I Eat Rice If I Have Diabetes?

Written by Caroline Leopold, Medical News Today 20 November 2016

Diet plays an important role in staying healthy, especially for people with diabetes. Many people wonder whether high-carbohydrate foods such as rice are healthy to eat.

Diabetes basics

Diabetes mellitus is a group of diseases where the body does not adequately produce insulin, use insulin properly, or both. Insulin plays a crucial role in allowing blood sugar into the cells to be used for energy. There are two main types: type 1 and type 2 diabetes.

People with diabetes have abnormally high levels of blood sugar. This can damage many organs in the body if left untreated. The National Institute of Diabetes and Digestive and Kidney Diseases recommend the following steps to manage diabetes:

- Make healthy choices in eating
- Engage in regular physical activity or exercise
- Take medications, if required.

Healthy eating is important in keeping blood sugar levels at a healthy level. The healthy range is 80 to 130 mg/dL before meals or below 180 mg/dL after meals, according to the American Diabetes Association. People with type 1 diabetes require insulin. Various insulin delivery systems and protocols are used to manage blood sugar both between and at meal times. People with type 2 diabetes often manage their condition with diet and exercise, and with medications as needed to keep blood sugar within the target range. These medications vary in how they work.

People with diabetes will have different treatment plans, and they will respond to food, exercise, and medication differently. It is important to consult with a doctor to get individualized recommendations on target blood sugar levels, medications, diet, and exercise.

How do carbohydrates affect diabetes?

Carbohydrates are an important source of energy for the body. Carbohydrates are found in foods that have starches and natural or added sugars. Examples are grains, vegetables and legumes, fruit, dairy products, and sweets.
Carbohydrates are broken down by the digestive system into sugar. When the digested sugar enters the blood, the body produces a hormone called insulin. Insulin helps the sugar enter cells. Once the cells absorb the sugar, blood sugar levels fall.
People with diabetes have an impaired ability to produce insulin, use insulin, or both. People with type 1 diabetes cannot produce insulin, so they take insulin to make sure the cells can get the sugar they need for energy. People with type 2 diabetes are often insulin resistant. They also often have difficulty producing enough insulin to keep their blood sugar in the normal range.

Counting carbohydrates

Carbohydrate counting is a way of keeping track of the carbohydrates in the daily diet. A person with diabetes who uses carbohydrate counting to manage their diet sets an amount of carbohydrate to eat for meals and snacks.

The American Diabetes Association suggest a target of about 45 to 60 grams of carbohydrate per meal. This recommendation may vary depending on other factors such as gender, weight goals, and blood sugar target goals. The three different types of carbohydrates are starch, sugar, and fibre. Starches are complex carbohydrates found in starchy vegetables such as peas, potatoes, and corn. Beans and whole grains are also complex carbohydrates.

Fibre comes from plants and cannot be digested. Fibre is found in foods such as vegetables, fruit, whole grains, legumes, and nuts. Unlike other carbohydrates, fibre does not

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raise blood sugar, and it can help to slow the digestion of meals. This helps to minimize spikes in blood sugar. It is recommended to eat between 20 to 35 grams of fibre per day.

Sugar is a carbohydrate. It is generally absorbed into the body more quickly. There are natural sugars found in milk and fruit. There may also be added sugars in canned fruits, baked goods, and processed foods. There are also carbohydrates in non-starchy vegetables such as lettuce, peppers, cucumber, mushrooms, and many others. There are fewer carbohydrates in these foods because they have a high water content. For example, a half cup of cucumber has around 2 grams of carbohydrate.

The type and amount of carbohydrate will affect post-meal blood sugar levels. Foods that digest more slowly, such as those with a lot of fibre, and those eaten as a mixed meal, digest more slowly. They can help to prevent post-meal spikes in blood sugar. Large amounts of carbohydrates eaten at one time will raise blood sugar more than smaller amounts.

Is eating rice healthy with diabetes?

High-carbohydrate foods like grains, cereals, pasta, rice, and starchy vegetables are not forbidden, but they should be eaten in moderation. Rice is a high-carbohydrate grain, but it can be incorporated into meals in appropriate amounts. One-third of a cup of rice has 15 grams of carbohydrate. That accounts for one-fourth to one-third of the amount of carbohydrate recommended for a single meal, if the target is 45-60 grams of carbohydrate per meal. Meals that also include healthy proteins and fats can help to slow the impact of the rice on blood sugar levels.

Are some types of rice healthier than others?

Some grains are better than others for managing diabetes.
A scale called the "glycemic index" measures how quickly food is digested into sugar and absorbed in the blood. High glycemic foods raise blood sugar faster and should be eaten in limited portions, or eaten with lower glycemic index foods. White rice is more processed and it has a higher glycemic index than brown rice, although the index of brown rice can vary with type and brand. Different varieties of rice have different glycemic indexes. Some long grain rice varieties, converted rice, and basmati rice varieties are lower on the GI scale than white rice.
Puffed rice cereal and rice cakes are sometimes thought of as diet foods, but they have a high glycemic index and they are not ideal for healthy meals. Foods that are high in fibre offer many health benefits. They help with blood sugar control, they promote bowel health, and they may lower cholesterol. Whole grains have more fibre than other grains. It is important to check the label to check the fibre content.

Tips for preparing rice

Some brown rice varieties are unprocessed and have more fibre. They can be part of a balanced meal when eaten in proper portions. Mixing brown rice with other foods can help to balance blood sugar levels. Examples include legumes, such as red beans, or protein and healthy fats.
Brown rice takes longer to cook than white rice, but the cooking process is simple. People can cook brown rice in a pot or rice cooker at a ratio of 1.5 cups of water per 1 cup of rice.
The instructions are as follows:

- Bring rice and water to a boil in an uncovered pot
- Cover the pot and simmer for about 20 minutes
- Turn off heat and let the covered pot sit for at least 10 minutes.

Rice can be mixed with seasonings, herbs, vegetables, and nuts such as slivered almonds. Brown rice can be stored in a refrigerator and used for leftovers. People can reheat brown rice on the stove or microwave and serve with beans and salsa for a quick meal. Care must be taken with storage, because cooked rice left at room temperature can develop toxins that lead to food poisoning.

Nutritious and delicious alternatives to rice

Because rice is high in carbohydrates, it should be accompanied by other foods. Vegetables are high in fibre, vitamins, and other nutrients. Vegetables are made of carbohydrates, but at a much lower level than grains. Eating foods that are lower in carbohydrates and higher in fibre can make meals more satisfying. For example, one-half cup of rice has 22 grams of carbohydrate. In contrast, one cup of squash only has 8 grams of carbohydrate.

Many foods can serve as substitutes for rice. Examples include cauliflower, mushrooms, and eggplant. Quinoa contains the same amount of carbohydrates as rice, but it has more protein, and some types have more fibre.

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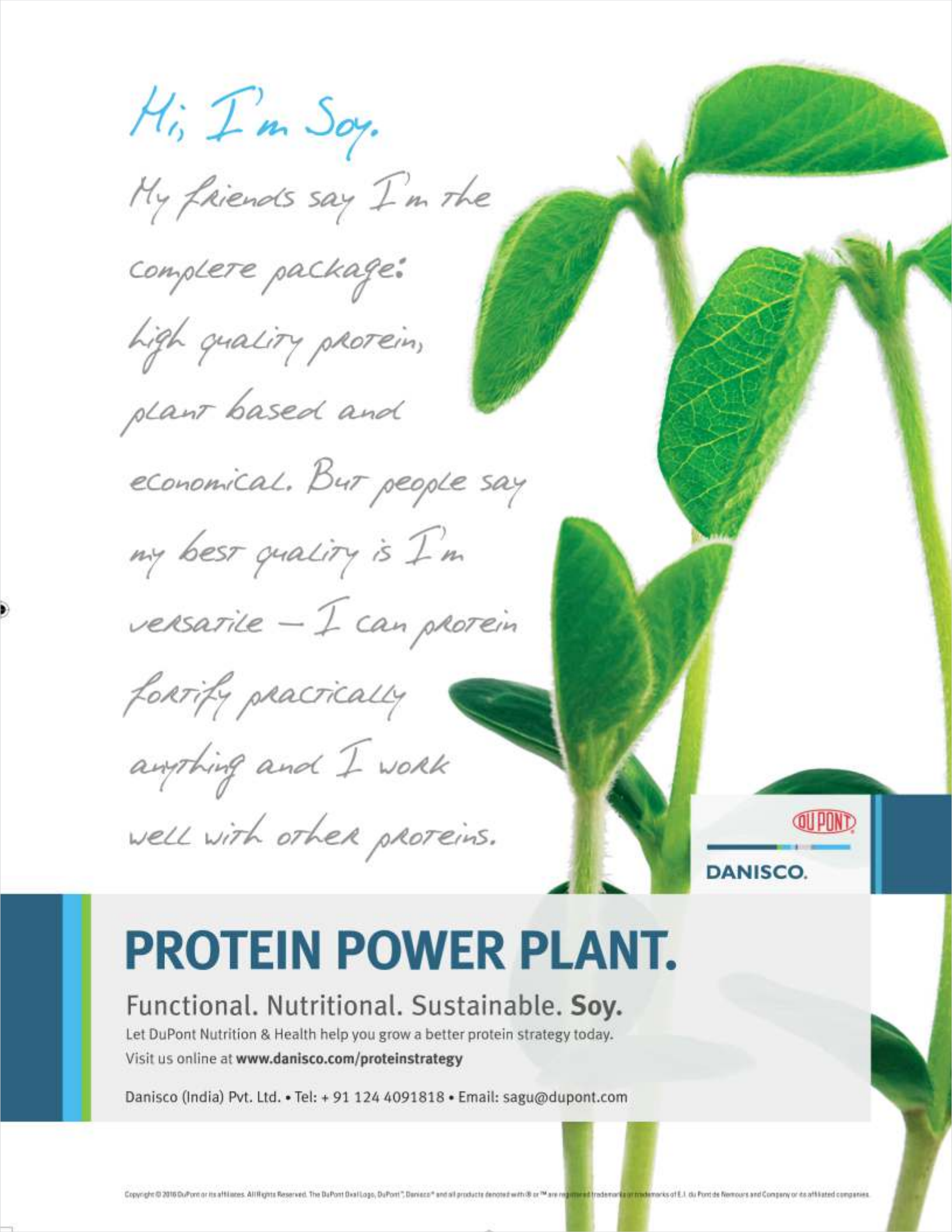

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