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FOOD, NUTRITION & SAFETY MAGAZINE

AUG 2016

BUCKWHEAT — A PROMISING PSEUDO CEREAL

Also Inside

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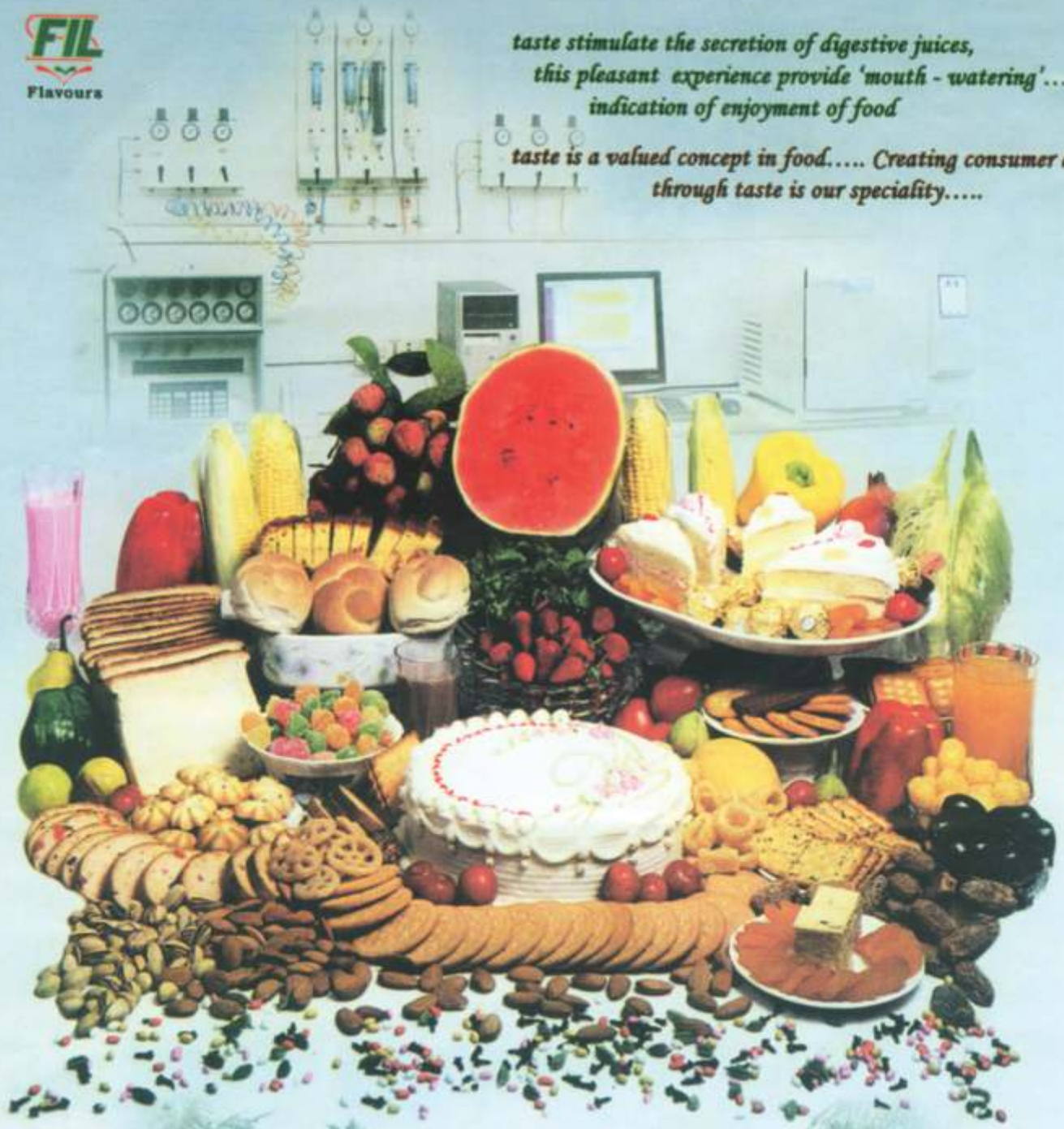

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FOOD, NUTRITION & SAFETY MAGAZINE

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EDITORIAL

Three D Printing has been in the news lately. Everyone knows about printing nice pictures and posters and magazines etc. Printing technology has gone long way since the days of letter press and offset printing etc. The new age printing has come and it is mind-boggling. The possibilities that new technology allows sometimes make one wonder, where will it all stop.

Printing began centuries ago with woodblock printing when wooden blocks were carved to a make a design or writing and this would be inked and repeated prints could be taken so an image or letter could be mass produced. Later the technology developed in the industrial revolution. The letter press which was used in printing presses was turned into rotary press and then the most advanced offset printing was developed in the last century allowed very intricate printing possible. However, these look ancient with the advent of computers and along with it came inkjet, thermal and laser printing.

Now there is a new toy in the electronics market namely the 3D printing. When people started seeing imagery and writing on computers, tabs and mobiles there were doubts about existence of printing. People said the books and pictures in frame will be gone as all the data could be stored on discs, drives or even clouds and viewed virtually even in a 3D format so there will be no longer needs for paper or canvas. Then the 3D printing appeared.

This technology creates solid objects using 3 dimensional files and 3D printers. Objects are created by building layers of material. The applications are many in industries including aerospace, architecture, automotive, defense as well as medical replacement. There are many applications in consumer areas also. One of them has become feasible in food products.

Using various ingredients which could be forced through orifices of different shapes and sizes, one can print sweets, chocolates and other foods. Initially the speeds of printing were slow as well as printers were quite expensive, however, like everything in electronics things became cheaper and much faster so now there is a possibility of having vending machines which could 3D print the foods that you order. There could be a large variety of options a customer would have as we have seen in coffee vending machines you can have a dozen different types of coffees with or without sugar and milk. Here the choice is extremely large with colours, flavours and textures and shapes that a customer can choose from.

Earlier there used be families wherein everyone would eat at the same time sitting together the same food. Things have changed and now everyone wants different things at the same time or even their dinner times are different. So one can simply get a 3D food printer and just like ordering from a restaurant each member of the family would request his or her choice of food.

Even the restaurants can have menus which are all-inclusive with regional, Chinese, Italian etc. all rolled into one place where several printers would churn out (or will it be print out) foods that are ordered. You do not have to go to or order from different restaurants the different cuisines. Everything will be available at one point. They will probably also add some nutrients that you desire to make the food healthier. It would be exciting to see such a situation become a reality.

Prof. Jagadish S. Pai,
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BUCKWHEAT — A PROMISING PSEUDO CEREAL

By **Prof. Shobha A. Udipi, Senior Nutritionist, PFNDAI**

Many plants from the family Chenopodiaceae are used for human nutrition e.g. spinach, beet;however, in recent times three plants - Buckwheat, Quinoa and Amaranthus have gained worldwideimportance as pseudo-cereals. All three pseudocerealsare nutritious and can contribute positively to human health.

Buckwheat (Fagopyrum-esculentum) is one of these grains that is receiving increasing attention worldwide, but is relatively ignored in India.

Between the 17th–19thcenturies, it was very popular, but as wheat became popular during the 20th century in Western countries, it was neglected. One reason for the world toseriously consider crops that are presently underutilized is because currently, about half of the world's requirement for calories and protein is met by only three crops - maize, wheat and rice. This places great pressure on the available agricultural land since productive agricultural land is being increasingly used for urban development. Globally, experts believe that by diversifying production and promoting consumption of a broader range of plant species, there would be advantages not only in terms of providing food for millions but also giving a means of income generation and ecological sustainability. Buckwheat has tremendous ecological adaptability and can grow in extreme environments.

Due to its health-promoting properties, recently buckwheat cultivation increased in France, U.S.A, China, Taiwan and Japan. In the Asian countries it is regarded as a functional food. The major buckwheat producers are China, Russia, Ukraine, Poland and USA, as they provide more than 80 percent of the world's production, with China producing about 39 percent of the total. Besides this, China is the leader in pioneering innovations and focusing on increasing the yield of buckwheat.

Buckwheat seeds are small, silvery grey to brown or black in colour, irregularly shaped and have four triangular surfaces. There are many varieties but nine have agricultural and nutritional value. Two buckwheat species are commonly cultivated: common or sweet buckwheat(F. esculentum) and tartary buckwheat or bitter (F.tartaricum).Tartary buckwheatis a frost-tolerant crop and is generally grown at higheraltitudes, whereas common buckwheat is grown atlower altitudes.
It is largely cultivated where crops are grown on marginaland fairly unproductive land, often as a subsistence crop with barley, andat higheraltitudes.In India, buckwheat is grown in the northern parts of

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the country from Jammu and Kashmir in the west to Arunachal Pradesh in the east, as well as in Himachal Pradesh and Uttarakhand, because of the temperate climate. In Himachal Pradesh, the hilly terrains have diverse eco-geographic cultivation pockets which are suitable for cultivation of hardy crops specifically small millets/ pseudocereals like amaranth, buckwheat. Buckwheat is known by various names, more commonly as Kutti/Kuttuin India and is often used as a food during fasting.

It has different names in various countries – China(tianqiaomai in Mandarin), Bhutan (jare or bjo), Pakistan (jawas), Nepal(mite phapar), France (sarrasin/ble noir, renouee or bouquette), Italy (fagopiro, granosaraceno, Sarasin or faggina), Germany, Russia (grecichakul'furnaja), Japan (soba), Poland (tatarkagrykaorpoganka). Although the name is similar to wheat, it bears no relation as the structure and characteristics of buckwheat grain are very different from those of wheat grains. This plant is not taxonomically related to wheat. It is classified as a pseudo-cereal because of the similarity to conventional cereals in its use and chemical composition. Its nutritional value appears to be superior to other cereals.

Macronutrients: Its protein content is similar to some millets and higher than rice. Protein content in buckwheat flour ranges from 8.5 to 18.9g%, depending on the variety. The proteins are albumin (180 mg/g), globulin (430 mg/g),prolamin(8 mg/g) and glutelin(230 mg/g).Unlike other cereals, it is a good source of lysine,histidine, methionine, tryptophan that are generally limiting in wheat. It contains less glutamicacid and proline, and more arginine and aspartic acid than cereal proteins. Its amino acid composition is close to egg protein.Hence its protein quality is superior to other cereals.

The biological value of buckwheat protein is high (93) - 92.3% of the value of non-fat dry milk and 81.4% of whole egg solids. Buckwheat flour is reported to have an amino acid score of 100. Its protein digestibility is 79.9%. However, in animal feeding studies, buckwheat was found to compare well with casein in terms of promoting growth of the animals.

The composition of buckwheat and its products is given in Table 1. Whole groats i.e. hulled seeds contain less starch than the flour.

Table 1. Composition of Buckwheat

Component/ Nutrient Gms/100gms	Whole buckwheat groats	Buckwheat flour	Buckwheat bran
Starch	55.0	70-75	1.8
Soluble carbohydrate	2.0	NA	0.6
Total dietary fibre	7	2-2.4	4
Lipid	4	1-3	1.1
Protein	8.5-18.9	6-10	3.6

NA- not available

Soluble carbohydrates are mostly present in the embryo, followed by bran, whereas the endosperm contains only a small fraction. The amylose content varies from 15-52% (degree of polymerization varies from 12 to 45 glucose units) Raw buckwheat starch contains 17.1 to 26.1% amylose. Majority of the starch is easily digestible . Raw buckwheat grain may contain 33 to 38%resistant starch, although cooking reduces its content three-fold. However, it contains enough resistant starch to serve as a candidate prebiotic food.

Buckwheat bran is a good source of dietary fibre, of which 2.5 g% is soluble dietary fibre if hull fragments are present. Bran fraction also has considerable amount of protein. The amount of soluble dietary fibre in buckwheat bran is higher than in wheat bran and slightly higher than in oat bran.

Lipid is mostly present in the embryo and only small amounts are present in the hull. Most of the lipid is triglycerides, with only a small fraction of the fatty acids being saturated (16-25%), the main fatty acids being linoleic (31-41%), oleic (30-45%) and palmitic (15-20%) acids.

A good source of vitamins and minerals: The pseudo-cereal is a better source of B-vitamins, especially


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thiamin, riboflavin, vitamin E, niacin and vitamin B-6, than other cereals. It also has a higher iron, copper and magnesium content than wheat. Compared with rice, wheat flour or maize, buckwheat has a higher content of zinc, copper, manganese and the bioavailability of these minerals has been found to be high, possibly due to its relatively lower phytic acid content. Most of the minerals are present in the bran followed by the endosperm. Buckwheat accumulates selenium as organic compounds – selenomethionine, methyl-selenocystine, γ -glutamyl methyl seleno-cystine – these compounds are part of the anti-oxidant system.

Anti-nutritional factors: It contains protease inhibitors, trypsin inhibitors (resistant to heating/thermal processing), tannins and phytic acid.

Uses of buckwheat:

Buckwheat flour has been used in the manufacture of bread, cookies, pies, pancakes, macaroni. Buckwheat is an important ingredient of several traditional Asian foods. In Japan, soba noodles are made with buckwheat flour and wheat flour (8:2 ratio of buckwheat to wheat flour). Similarly, in Korea "naengyeon" noodles, "memilmuk" or jelly are made.

Buckwheat is made into pancakes in France called "Breton gallettes" and "blinis" in Russia, where it is also made into a porridge called "kasha". In Northern Italy also, it is served either as hot porridge called "polenta taragna" or pasta called "pizzoccheri". In India, it is used to make rotis, puris or khichdi during fast. Buckwheat has also been used in pastries multigrain pasta, energy bars, cereals, waffles, bagels and as a meat extender.

Buckwheat flakes have been found to have a better effect on parameters of the technological process and quality of bread when compared with buckwheat flour.

Besides the grain, the leaves can be used as food. Dried buckwheat is used in medicinal products whereas fresh green plant parts, especially sprouts, are consumed as a vegetable. One of the important uses of buckwheat is in gluten-free diets for patients with celiac disease.

A traditional medicinal plant: In many countries, buckwheat has been used in traditional medicine. For example in some European countries, the leaf tea/buckwheat herb tea is used to treat leg oedemain patients with chronic venous insufficiency. It has been tried on diabetic patients with retinopathy. In China, tartary buckwheat is used to alleviate diabetes mellitus, hypertension, hypercholesterolemia, and gallstones. In Taiwan, buckwheat has shown to have beneficial effects in controlling blood sugar and reducing insulin resistance in experimental animals.

Buckwheat a functional food: Buckwheat contains several functional components that have several health benefits – reduction of high blood pressure, cholesterol, control of blood sugar and decreasing the risk of cancer. Buckwheat contains catechins and other polyphenols (flavonoids and flavones, phenolic acids), that have good antioxidant activity, phytosterols, fagopyrins and thiamine binding proteins. These polyphenols and flavonoids are mostly concentrated in the outer layers of buckwheat seed.

Flavonoids have been shown to have good anti-oxidant activity and other beneficial effects such as anti-allergic, anti-viral, anti-cancer as well as reducing risk of heart disease by reducing cholesterol, hypertension and maintaining flexibility of the arteries. Buckwheat contains six flavonoids – rutin being predominant, followed by quercetin, orientin, vitexin, isovitexin, and isoorientin. Rutin has been shown to reduce capillary fragility associated with hemorrhagic disease and hypertension. Germination of buckwheat for seven days increased the rutin and quercetin content.

Improves lipid profile: In experimental animals, buckwheat was found to have a beneficial effect on lipid profile. It significantly reduced plasma total cholesterol, triglycerides, LDL and glucose along with slight increase in HDL. Part of this benefit has been attributed to the proteins that are resistant to digestion and to the amino acid profile of buckwheat.

Some investigators have stated that the ratio of lysine to arginine and methionine to glycine are the main

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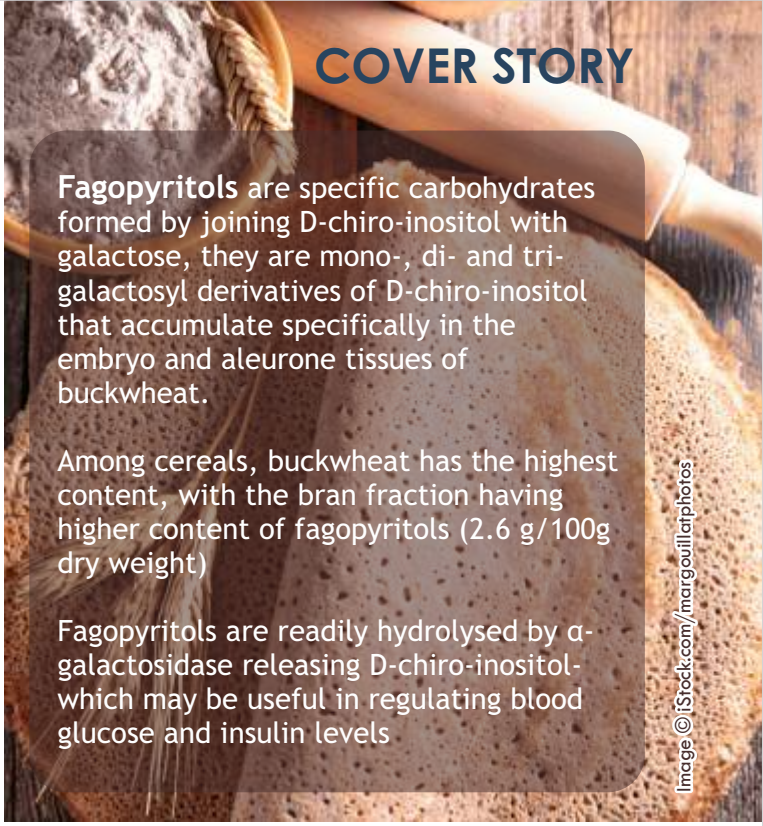

Fagopyritols are specific carbohydrates formed by joining D-chiro-inositol with galactose, they are mono-, di- and tri-galactosyl derivatives of D-chiro-inositol that accumulate specifically in the embryo and aleurone tissues of buckwheat.

Among cereals, buckwheat has the highest content, with the bran fraction having higher content of fagopyritols (2.6 g/100g dry weight)

Fagopyritols are readily hydrolysed by α-galactosidase releasing D-chiro-inositol- which may be useful in regulating blood glucose and insulin levels

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factors determining the cholesterol - lowering properties of proteins because these amino acids are involved in regulation of hepatic LDL formation. In buckwheat, ratios of these amino acids are lower than in other plant proteins – among plant proteins buckwheat has been shown to have the highest cholesterol - lowering properties. Buckwheat protein isolate was reported to be more efficient in lowering cholesterol than soybean protein isolate and it was more effective than other plant and animal proteins in lowering VLDL.

Activity of liver transaminases ALT and AST/SGOT and SGPT were significantly decreased. Extracts of buckwheat hull also improved plasma enzymatic antioxidants glutathione – S – transeferase and glutathione reductase. Comparison with wheat bran extract, showed that the buckwheat hull extract was more effective, which has been explained by the lowering of plasma cholesterol, antioxidant activity and lowering lipid peroxidation along with enhancement of antioxidant enzyme activity. Cookies made from common buckwheat (lowrutin content) and tartary wheat (highrutin content) were found to reduce serum total cholesterol and HDL cholesterol, and also improved lung capacity.

Will it be helpful for diabetics?

Buckwheat has a low Glycemic index. There is considerable interest in some compounds present in buckwheat.
Polyhydroxylatedpiperidines i.e. azasugars or iminosugarsare of interest because they are glycosidaseinhibitors. The 1 and 2-dideoxy-azasugars such as D-fagomine and its stereoisomers from the seeds of Japanese buckwheat Fagopyrumesculentumaustrale Moench, have been found to have the potential to reduce the risk of developing insulin resistance, becoming overweight and of having excess of potentially pathogenic bacteria.

Fagomine strongly inhibits mammalian α-glucosidase, β-galactosidase and may potentiate glucose-induced insulin secretion. Therefore, buckwheat has the potential to have anti-hyperglycaemic effect. In one study it was shown that a single dose of buckwheat extract could keep the blood glucose level lowered by 20% for an extended period of time.

Other health benefits:

Buckwheat protein isolates have been found to lower the activity of angiotensin converting and hence can be used as a functional ingredient to treat hypertension. The protein and its dietary fibre may be useful for relieving constipation and there are suggestions that it could protect against development of colon cancer. Buckwheat is also a good source of lignans (fourth highest among cereals and oilseeds after flaxseed meal, flaxseed oil, and rye meal) that are considered to have protective effect against hormone-related cancers. The ethyl acetate and ethanol extracts of the seeds, stem, and aerial parts of buckwheat have been shown to have neuro-protective effect. Further work is needed to substantiate these health benefits.

Other uses:

In the early 2000s, buckwheat sprouts were introduced as functional vegetables. The leaves have been found to have antioxidant properties. Honey from buckwheat flowers has up to 20 times more antioxidants than any other honey. In Japan and Korea, the flowering buckwheat plant is dried and used as a natural food colourant in ice cream etc.

In 2010, the world market for this food had reached about $400 million. However, one needs to use some caution when trying new foods. Although buckwheat is being increasingly used in gourmet dishes and is touted to be gluten-free, in rare cases, buckwheat allergy may occur. There are reports of allergy mostly in those who have gluten intolerance. There are other challenges in terms of production and storage. These are production of good quality seeds and to develop technologies in order to protect the functional components especially when the seeds are converted into food products.

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OBITUARY

Prof Dinanath V. Rege was one of the youngest professors in University of Mumbai who started his teaching career in UDCT Mumbai after a degree in Drugs & Foods and a Ph.D. in Food Technology from UDCT and post-doctoral fellowship from MIT USA.

He was one of the most popular teachers and research guides having guided over 30 doctoral students. He had sound understanding in different disciplines including nutritional biochemistry, microbial metabolism, food chemistry and toxicology in which he carried out significant fundamental research.

Because of his understanding over different areas he was very successful as a consultant in many applied areas including food and drug development and was on advisory boards of many research bodies including CFTRI, RRL, CIFT and Central Coffee Research Institute.

He was also honoured with several awards. State and Central governments appointed him on many important advisory committees. Even after he retired as Director of UDCT, he was advising actively food industry and many companies appointed him consultant and director.

He was President of Association of Food Scientists & Technologists (India). He also advised PFNDAI on many issues and was closely associated with its development and growth always supportive of its various activities giving encouragement and useful advice. He encouraged many of his students to become the Executive Directors of PFNDAI. He was invited to be the Honorary Member of the Association and he has been a source of inspiration for it all these years.

16th October 1926 - 13th August 2016

Prof. Rege was a very modest, genial, warm-hearted, extremely helpful and cheerful person. That earned him a lot of goodwill and a large number of friends. He was an avid reader of books and enjoyed Hindustani classical music. He spent his final years with his family in the US and passed away on August 2016, nearing 90 years of age.

COMING EVENTS

Global Rajasthan Agri-Tech Meet (GRAM)
November 9-11, 2016
Jaipur
T: +91-11-2348 7547
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Indian Convention of Food Scientists & Technologists ICFOST
Food Processing for Sustainable Agriculture & Industry
November 10-12, 2016
Guru Nanak Dev Univ, Amritsar, Punjab
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E: nutritionist@pfndai.org

12th CII Agro Tech
Agro Technology & Business Fair
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Parade Ground, Sector 17, Chandigarh
M: +91 98882 78540,
E: gautam.sood@cii.in
W: www.agrotech-india.com

Health Ingredients Europe
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Location: Frankfurt, Germany
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APPLICATIONS OF PROTEIN ISOLATES IN FOOD PRODUCTS

Protein is essential to life but proteins from different sources are different. They contain amino acids, some of which are essential e.g. histidine, isoleucine, leucine, lysine, methionine, cystine, phenylalanine, tyrosine, threonine, tryptophan and valine must be present in a protein in adequate amounts for that protein to be considered complete. The Protein Digestibility-Corrected Amino Acid Scoring (PDCAAS) method takes into account both protein digestibility as well as essential amino acids. Complete proteins like egg, milk and soy have PDCAAS scores of 1.0.

While proteins are valued for their nutritional value, they are also extremely useful due to their functionality in food systems. Depending on the type of protein and its chemical structure, it may provide excellent water or fat binding, foam or gels forming, and emulsification which are extremely important in texture, appearance, soft or firm feel, and many others in various foods. Protein isolates with over 80 to 90% protein provide food developer with the most concentrated form of protein. Protein isolates from wheat, soy, egg, milk or whey are now available.

Soy Protein

Soy protein offers functionality similar to milk and meat proteins in many applications. These proteins can be replaced by soy proteins with similar functional properties such as emulsification or solubility characteristics with a cost advantage. In some cases, one can use less soy protein to get the similar functional benefit.

Many proteins provide emulsification. Fat is hydrophobic so when forming an emulsion hydrophobic portions of protein are aligned with fat so they can interact and remain stable in emulsion with polar portions are on the outside interacting with water. It does not matter whether it is soy or milk protein isolate as long as it is soluble.

Water binding is another valuable property of soy protein. This is quite useful in replacing lean-meat protein. Soy protein with good gelation character can achieve similar gelling performance with soy protein that would be obtained with meat proteins, which is not possible with other proteins. Isolated soy protein has about 90% protein on a dry basis. In marinated meat product one may use as little as 1%. In chicken patty about 5% soy protein isolate may be used while about 18% content hydrated isolated soy protein may be needed as meat replacer.

For dairy applications, soy can replace fully or partially the milk protein. Yogurt with 10g milk protein can be totally replaced with soy to have soy-based yogurt with 10g soy protein. Soy protein has full complement of all essential amino acids and is considered nutritionally equivalent to egg, milk and fish. Major applications for soy protein isolate are in nutritional products. Soy isolates have been used in nutritional/protein bars, protein crisps, meal replacement and bakery applications. With increasing awareness and focus on nutrition, many consumers are considering soy products as healthy. With this trend continuing, soy protein will play an important role in providing foods and beverages that consumers will be demanding.

While there have been improvements, soy still has some unique flavour associated with soy protein. Each protein, whether milk, soy, wheat or meat, has unique flavour associated with it. Masking agents are used in products with soy but today flavourists produce flavours that work well with soy. Proteins bind flavour components. If one uses flavour developed for dairy protein in soy-based product, soy would bind some compounds critical to flavour perception. A strawberry flavour developed for dairy may be lacking some key flavour notes of strawberry when used in soy-based product. Product designers need to remember to develop flavours specifically for certain proteins.

Besides flavour, it is also important to select right protein. When choosing a soy protein isolate, it is best to work with technical persons of soy supplier. They understand


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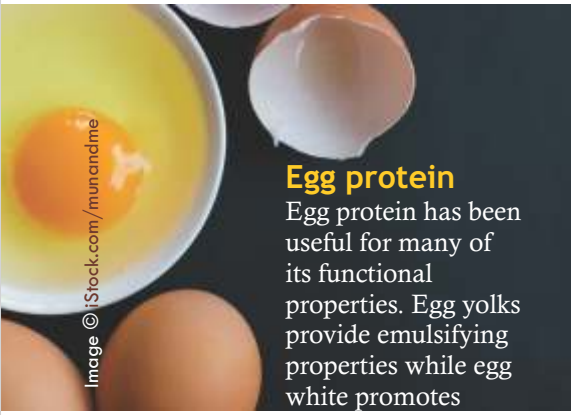
what is being attempted in product development efforts and they can suggest the right protein isolate out of a range of over 25 different ones with unique and different functional characteristics that would be suitable for a specific application.

In any aqueous-based product application like an RTD beverage, it is important to ensure that protein is properly hydrated. There are methods used to hydrate protein in order to achieve the proper product functionality and stability. Protein may be heated in 40-50°C water for at least 10 min. High-shear mixer may be used to initially disperse the protein in water, reducing speed later to minimise air incorporation into mixture that would cause foaming and result in difficulty with homogenisation and packaging later. After hydration, gums may be used to stabilise beverage product. Proper stabilisers are also critical for getting good properties from proteins.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Egg protein

Egg protein has been useful for many of its functional properties. Egg yolks provide emulsifying properties while egg white promotes binding and foaming. Nutritionally, eggs are complete protein with PDCAAS score of 1.0. Dried egg whites are totally protein so there is no isolation step to remove other components like fat and carbohydrates as in soy and whey.

One company produces egg white peptides with over 90% protein. Nutritional benefit of egg white protein is fast and easy digestion, allowing amino acids to reach muscles quicker for rapid recovery after exertion. Egg white protein is also complete with no limiting essential amino acids. Also it contains higher levels of sulphur amino acids than whey and soy. These are needed for collagen formation and maintenance of joint health. Sulphur amino acids contribute distinct flavour.

Also currently available egg white peptides have a strong bitter taste so have limited usage. This company has product with bland flavour allowing it to be used in a wide range of products needing protein fortification. It was designed for nutrition bars and protein drinks but can be used in other categories. It also has low dusting, free-flowing powder as it was made by using controlled enzyme hydrolysis before spray drying. Peptides produced by hydrolysis allow rapid digestion with quicker utilisation of amino acid than intact proteins in soy and whey. This may also be a good choice for aging population which may have trouble digesting many common sources of protein leading to deficiency.

Milk Proteins

Milk protein isolates are prepared by ultrafiltration of fluid milk and an additional diafiltration step to concentrate to 90% protein. Milk protein contains about 80% casein and 20% whey protein. These isolates are well suited for nutritional beverages as they are soluble in water and have a clean dairy flavour. They are heat stable and have emulsification properties and work well in retorted beverages. They work best at neutral pH. The isoelectric pH of milk is 4.6 at which caseins precipitate. These isolates are commonly used in beverages above that pH and are generally opaque. They could also be used in non-dairy creamers, margarines, imitation cheese, bakery, confection and meat. Their superior emulsification properties allow applications in whipped products.

Whey Proteins

Whey proteins isolates are produced by two methods; one by filtration and the other by ion exchange. Filtration produced about 80% whey protein concentrate, which with microfiltration removes remaining lipids allowing proteins to pass through membrane. In ion-exchange method, proteins in freshly skimmed sweet whey are exchanged with sodium ions on a resin bed and then the bed is regenerated by strong salt solution removing the proteins. Resulting solution is evaporated and spray dried. Isolate by this method does not contain all the proteins from original whey and also has different mineral profile compared to isolate by membrane processing. Ion exchange product contains less all minerals except sodium. It also contains more of alpha-lactalbumin, beta-lactoglobulin, but has almost no glycomacropeptide.

Alpha-lactalbumin is one of the most nutritious proteins. When added to infant formula, it produces amino acid profile similar to breast milk. It also is shown to stimulate serotonin and melatonin synthesis improving sleep. Beta-lactoglobulin is responsible for functional properties such as gelation and water binding.

It also contains highest content of branched-chain amino acids

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Ready in 3 Minutes

Available in many delicious flavours.

*MRP incl. of all taxes.

(BCAA) among proteins. BCAA are important in muscle metabolism and can be used for source of fuel during endurance exercise.

Advantages of whey protein are pertinent to athletes. It provides a large source of energy which largely comes from BCAA, which are metabolised by muscle and not liver. They provide ready and direct energy source to muscle during exercise. During exercise body needs more BCAA and adequate dietary supply is needed to prevent muscle catabolism. BCAA are soluble at pH of the digestive tract and increase blood amino acid levels in a much shorter time after ingestion. Other proteins need to be pre-digested to provide same benefits.

Whey protein isolates with 90% protein and above, are well suited for nutritional applications as they provide pure, high quality protein with little or no fat and lactose. Whey proteins with over 80% protein have excellent digestibility and the right balance of essential and non-essential amino acids for optimal nutrition. Beta-lactoglobulin, alpha-lactalbumin, bovine serum albumin, immunoglobulins and minor proteins including lactoferrin and lactoperoxidase in whey protein can all make unique contributions to human health and athletic performance.

Hydrolysed whey protein isolates provide free amino acids and peptides for quicker absorption in sport-nutrition products such as bars and beverages. Hydrolysates can also provide specific functional benefits like heat stability in RTD beverages and shelf-life extension in bars.

Isoelectric point of whey proteins varies for different components e.g. beta-globulin has between 5.3 and 5.5 pH, alpha-lactalbumin 4.2 & 4.5 pH. If whey protein isolates are used in a beverage where pH is closer to say 3.5 to 4.5, the beverage will be more creamy in appearance. If a clear beverage is desired, the pH should be brought down to 2.8 to 3.4. Adequate hydration of about 10 to 20 min will increase beverage clarity.

Choosing optimal level of whey protein in formulation depends on nutritional target as well as other ingredients and processing steps. Also selecting right isolate is important for functionality, flavour and protein load. Developers can use isolates with good acid and/or heat stability at higher concentration in an RTD beverage for low viscosity and clarity. Acidic isolate is suited for sports nutritional products where consumers want a large dosage of protein that still tastes good. Proteins have an impact on flavour so a bland base with minimal effect on flavour is preferred. Acidic isolate is used when many nutritional products are acidic and allows citrus and tropical flavours which are acidic. Neutral pH isolate is limited to neutral flavours like chocolate, vanilla and strawberry. With neutral isolate, acid is needed to lower pH to desired level and as proteins act as buffers good amount of acid goes into formulation.

Usage level may vary from 1 to 7% protein content in products, the latter normally intended for serious sports people like bodybuilders. For bar and bakery applications neutral isolates are suitable. Functional properties are important for applications where thickening and water-binding is important.
Gel formation of isolates by ion-exchange technology can be manipulated by controlling ionic conditions of the solution. Thus it can be heated in solution above denaturation point of all the proteins at a high solids concentration and still remain fluid and uncoagulated. If a calcium source is then added, a clear, firm and irreversible gel forms. This ability is advantageous in comminuted products like surimi and processed meats.

Whey protein isolates are finding new applications. One new product, oatmeal for instant weight control uses whey protein isolate. The product contains 7g of protein per 45 g serving. Oats contribute part of the protein. Whey protein can help in building and maintenance of muscle mass which is important in weight management. Some unique opportunities have also appeared for whey protein in jelly drinks and protein shots. Jelly drinks are common in Japan and are appearing in western markets. Protein shots are extension of carbohydrate shots and are popular with people undertaking prolonged exercise.

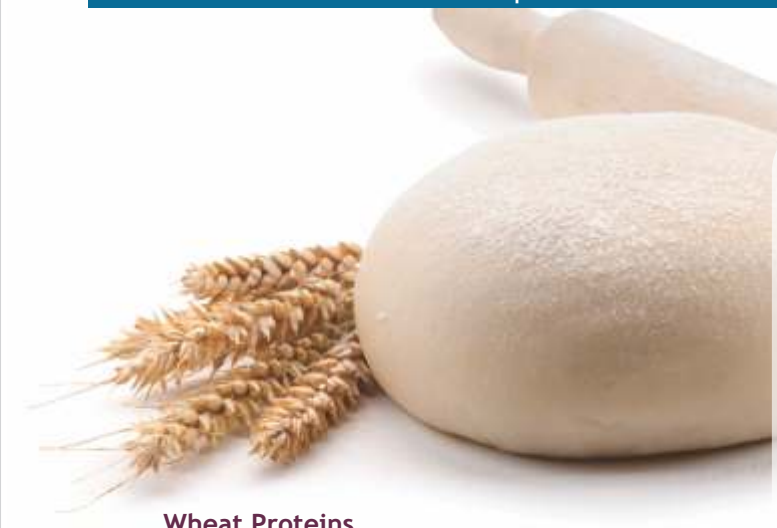

Image © iStock.com/Timmary

Wheat Proteins

Some manufacturers of flour-based foods like breads, rolls, pasta or snack foods are adding wheat protein isolate with 85 to 90% protein to them. Wheat protein isolate is unique compared to soy or dairy protein especially their ability to form dough upon hydration which is extensible or elastic. In addition to adding protein they also provide gas retention due to film-forming properties. Wheat proteins have isoelectric pH around 6.5 and as the pH is higher or lower, it shows higher solubility. Wheat proteins have most strength and elasticity near isoelectric point.

When there are many particulates in the dough, more elastic dough gives better strength. In delicate baked goods like muffin or cookie, if more protein is to be added, a more extensible protein isolate from wheat maintains tenderness. Added extensibility helps in sheeted and pressed-dough products like pizza crust or tortillas by reducing the retraction or contraction of dough. This also extends shelf life.

High protein wheat products were in demand after people were looking for low-carb products. This posed challenge to bakery scientists as high level of wheat protein was difficult to process. Addition of wheat protein isolate balances the ratio of elasticity and extensibility. It made possible for high protein products to be processed in conventional bakery plants. Addition of 0.5 to 1.5% wheat protein isolate to bread and roll flour helps reduce mix time, add extensibility and improve dough-handling properties. Isolate helps retain gas resulting in increased volume. In pasta and noodles, isolate at 1% noodles to 4 to 6% in retorted application can replace egg whites while retaining firmness.

Nutritionally, wheat protein isolates have lower PDCAAS score (0.25) as its composition is lower in lysine thus it may not be useful for formulating nutritional drinks. However, wheat proteins are rich in glutamine, a nonessential amino acid which helps the body recover from stress and fatigue due to overexertion from activities like weightlifting.

New Opportunities

Although developers are familiar with dairy, egg, soy, wheat and whey proteins, other options exist. Brown rice protein concentrate is derived from sprouted brown rice wherein protein is distributed between bran and endosperm and makes up about 7 to 9% of the grain. This beige-coloured product is marketed which is hypoallergenic and has a sweet, bland taste. Protein quality of brown rice protein is claimed to be high and the limiting amino acid lysine is supposed to be greater than recommended.

In future, it may be possible to add canola protein to the mix. One company has developed an extraction process for canola protein ingredients with isolate ranging 90% plus protein having a bland, slightly grainy flavour, golden colour and little or no odour. However canola protein still has no FDA approval for food use.

Protein fortified oatmeal, jelly drinks and protein shots are a glimpse into how food industry has expanded our diet options with newer ingredients.

(Condensed from an article by **Cindy Hazen, Natural Products Insider** June 5, 2006)

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REGULATORY THINKING ON PROPRIETARY FOODS AND PRODUCT APPROVAL

By Ms. Ummeayman R., Nutritionist, PFNDAI

In view of the far-reaching impact that the new Product Approval process will have on many of our members, an interactive meeting was held for PFNDAI memberson Friday 19th August 2016, Hotel VITS, Andheri (east), Mumbai

Mr. Mohan Vegulaparanan, Chairman, Regulatory Affairs PFNDAI & Partner at IntllAdvocare, gave opening remarks wherein he pointed out the advisories that were struck down by the Hon'ble High Court and stated that government cannot regularize by just advisories and notifications, there has to be a process followed. It was a welcome ruling by the High Court but it did not resolve the problem of proprietary foods. Industry has to come together to take a call on resolving the issues related to proprietary food as grey areas in regulation are hampering the business. Industry members seek to get a reply as to what is that the government wants to do despite putting the onus on the industry i.e. entirely on FBOs and to what extent the government wants to regularize food. The HC has said 'decision should be predictable's o if regulations are unpredictable it will not be considered as rule of law.

Dr. Shatadru Sengupta, Sr. Director Legal & Company Secretary, Hardcastle Restaurants, presented 'Trends towards new regulations for Proprietary Food and Product Approval' wherein he presented the Proprietary foods regulations and gave a comparative analysis of the various notifications. When one refers to FSSA Act, it would be noticed that definition of 'standardized food' is not defined in act & regulation, similarly some words and definitions have been introduced even though these definitions are already mentioned in the act and are redefined in another form in FAQs. He also gave an insight into some of the words and definitions that are newly introduced and what implications it may have on the future innovations and products.

Mrs. Shilpa Telang, R&D Manager (GM MUMBAI –INDIA) General Mills, presented 'Global Practices as regards Product Approval' wherein she gave an insight on some of the practices followed globally for product registration. Some developed countries do not have product registration /approval system .She also gave a typical snapshot of documents in a registration / approval process that countries follow, thus Indian authority should also follow a simple new product registration system for all products with key document submission i.e. COA, Product specification, label and health certification (depending on categories). FBOs need to only intimate governing bodies about the product and manufacturing (LikeUS).

Panel Discussion was chaired by Dr. Lewis J.I. , Consultant FSSAI, Past Chairman of Regulatory Affairs Committee-PFNDAI, and panelists comprised of Mr.Shashank Joshi-Vista Processed Foods , Mr.KuldeepMulik-Britannia Industries, Mr.VinayHastak - Hardcastle Restaurants, Ms.GauriIyer-AAK Kamani Oils. The FSSAI regulations are science based safety standards, thus it was proposed that the frame work of standards has to be safety, thus where there is risk make standards otherwise leave it as it is. Also when food is safe and ingredients are safe then food product is safe. Products approval is inbuilt in all the regulations so there is no need of other product approval. There has to be common parlance test put which is common in trade and being followed world over.

Panel recommended as follows:
1. Language of regulation needs to be simple
2. There has to be time line for notification and compliances
3. New technologies are coming and ingredients being found so there cannot be complete standardization as standards need to be evolved every timeand there has to be industry consultation
4. Law making has to be of the level that statutes speak for themselves and there is no need for FAQ's .New words should not be introduced in the FAQ's and regulations.

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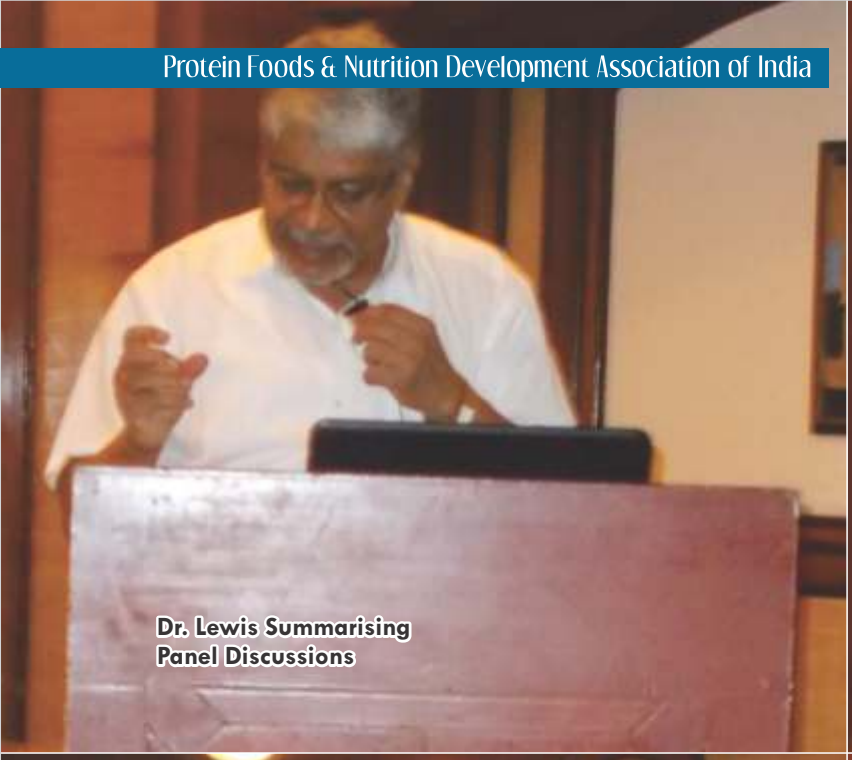
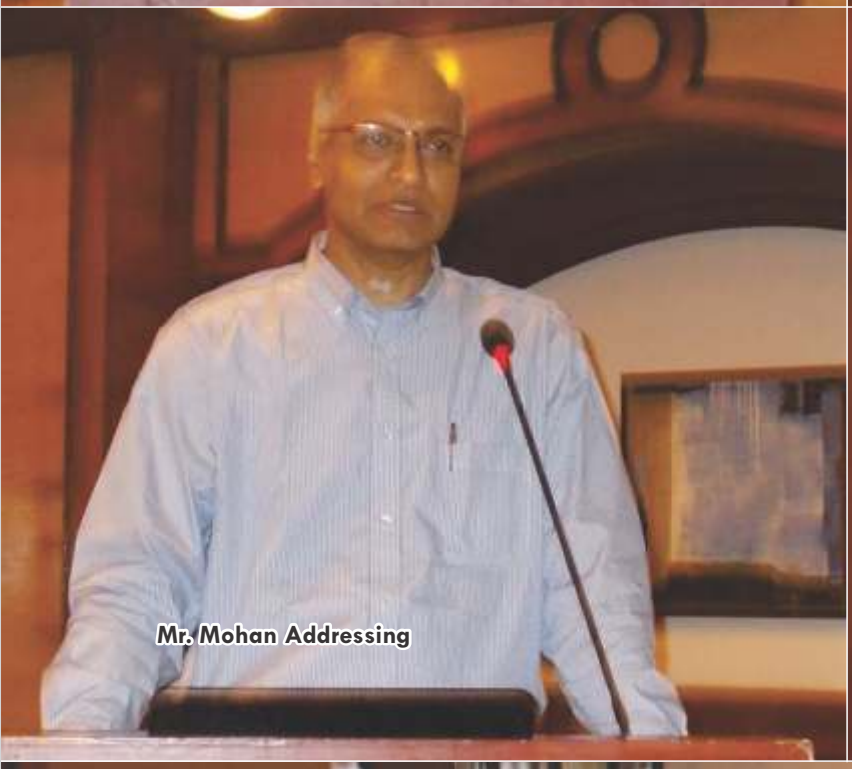


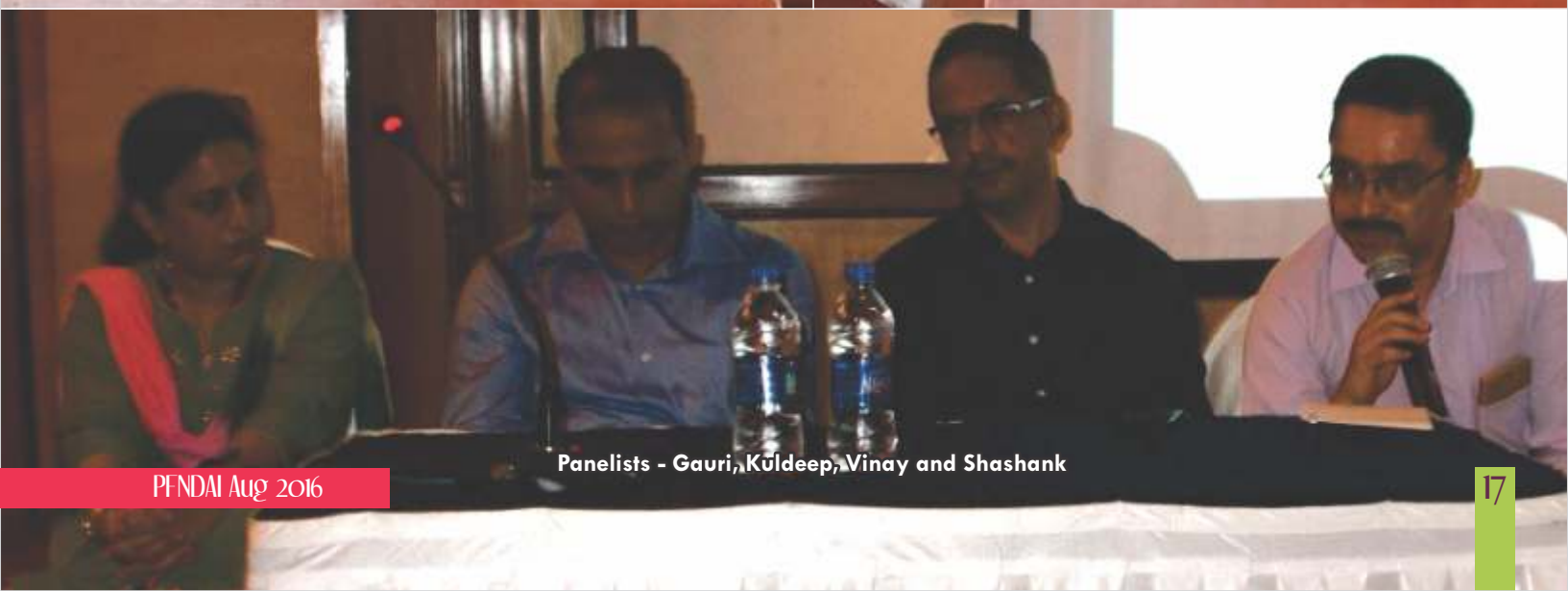
Dr. Lewis Summarising Panel Discussions

Dr. Shatadru Making Presentation



Mr. Mohan Addressing

Ms. Shilpa Telang Presenting



Panelists - Gauri, Kuldeep, Vinay and Shashank

RESEARCH IN HEALTH & NUTRITION

Image © iStock.com/senaiaksoy

Coffee might prevent exercise-induced eye fatigue

Written by **Honor Whiteman**
Medical News Today 31 May 2016

It's not only the legs that feel the effects of cycling; a new study suggests it can put a strain on the eyes, too. But don't get off your bike just yet. The study also found that drinking coffee might prevent such an effect.

Study leader Dr. Nicholas Gant, of the University of Auckland in New Zealand, and colleagues recently published their findings in the journal Scientific Reports. In their study, the researchers explain that vigorous exercise can lower the central nervous system's ability to drive muscle function, resulting in what is known as central fatigue.

Prolonged cycling, for example, can trigger central fatigue, which normally presents through tiring of the legs. But while it is well known that central fatigue affects limb movement, Dr. Gant and colleagues note that it is unclear whether it impacts other motor systems, such as those involved in eye movement.

To find out, the team enrolled 11 well-trained cyclists, who cycled using exercise bikes for 3 hours. Some of the participants consumed caffeine during their 3-hour cycling session - at a dose equivalent to two cups of coffee - while the remaining subjects consumed a decaffeinated placebo solution.

The researchers explain that caffeine can indirectly boost the activity of certain neurotransmitters - chemicals that relay signals between brains cells - and note that previous studies have suggested that impairments in neurotransmitter activity might be responsible for central fatigue. Once participants had finished cycling, the researchers tested their eye movement using a head-fixed eye-tracking system.

Impaired eye movement was restored with caffeine

The team found that the strenuous exercise the participants engaged in caused a neurotransmitter imbalance, which slowed down the subjects' rapid eye movements. "Interestingly, the areas of the brain that process visual information are robust to fatigue. It's the pathways that control eye movements that seem to be our weakest link," says Dr. Gant.

"These results are important because our eyes must move quickly to capture new information," he adds. "But there's hope for coffee drinkers because this visual impairment can be prevented by consuming caffeine."

The researchers found that participants who consumed the caffeinated beverages saw their neurotransmitter balance restored, which improved their rapid eye movements. No such effect was found among subjects who drank the decaffeinated solution.

Commenting on their findings, the authors say: "This is the first study to show impaired control of eye movements following fatiguing exercise. Prolonged use of the skeletal motor system influences the function of the oculomotor system, implicating a possible role of central fatigue.

Caffeine is capable of countering this effect, suggesting that central fatigue may be related to a disruption in the balance of one or more excitatory and inhibitory neurotransmitters." The researchers are now in the process of investigating whether psychiatric drugs - which work by restoring neurotransmitter levels - might be effective for treating fatigue caused by strenuous exercise.

Prenatal fruit consumption boosts babies' cognitive development

Medical News Today 26 May 2016

Study discovers previously unknown benefits of fruit consumption in expectant mothers.

Image © iStock.com/gpointstudio

Most people have heard the old adage "an apple a day keeps the doctor away." It's an old truth that encompasses more than just apples -

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eating fruit in general is well known to reduce risk for a wide variety of health conditions such as heart disease and stroke. But now a new study is showing the benefits of fruit can begin as early as in the womb.

The study, published in the journal EbioMedicine, found that mothers who consumed more fruit during pregnancy gave birth to children who performed better on developmental testing at one year of age. PiushMandhane, senior author of the paper and associate professor of pediatrics at the University of Alberta's Faculty of Medicine & Dentistry, made the discovery using data from the Canadian Healthy Infant Longitudinal Development (CHILD) Study - a nationwide birth cohort study involving over 3,500 Canadian infants and their families. Mandhane leads the Edmonton site of the study.

"We wanted to know if we could identify what factors affect cognitive development," Mandhane explains. "We found that one of the biggest predictors of cognitive development was how much fruit moms consumed during pregnancy. The more fruit moms had, the higher their child's cognitive development."

The study examined data from 688 Edmonton children, and controlled for factors that would normally affect a child's learning and development such as family income, paternal and maternal education, and the gestational age of the child. Using a traditional IQ scale as a model, the average IQ is 100 and the standard deviation is 15; two thirds of the population will fall between 85 and 115. Mandhane's study showed that if pregnant mothers ate six or seven servings of fruit or fruit juice a day, on average their infants placed six or seven points higher on the scale at one year of age.
"It's quite a substantial difference - that's half of a standard deviation," Mandhane explains. "We know that the longer a child is in the womb, the further they develop - and having one more serving of fruit per day in a mother's diet provides her baby with the same benefit as being born a whole week later."

To further build on the research, Mandhane teamed with Francois Bolduc, an associate professor in the Faculty of Medicine & Dentistry's Division of Pediatric Neurology, who researches the genetic basis of cognition in humans and fruit flies. Both researchers believe that combining pre-clinical models and epidemiological analysis is a novel approach that may provide useful new insights into future medical research.

"Flies are very different from humans but, surprisingly, they have 85 per cent of the genes involved in human brain function, making them a great model to study the genetics of memory," says Bolduc. "To be able to improve memory in individuals without genetic mutation is exceptional, so we were extremely interested in understanding the correlation seen between increased prenatal fruit intake and higher cognition."

According to Bolduc, fruit flies have a long track record in the field of learning and memory. Several genes known to be necessary in fly memory have now been found to be involved in intellectual disability and autism by Bolduc and others. In a subsequent series of experiments, he showed that flies born after being fed increased prenatal fruit juice had significantly better memory ability, similar to the results shown by Mandhane with one-year-old infants. He believes it suggests that brain function affected by fruit and the mechanisms involved have been maintained through evolution, and conserved across species.

While the findings are encouraging, Mandhane cautions against going overboard on fruit consumption as potential complications such as gestational diabetes and high birthweight - conditions associated with increased intake of natural sugars - have not been fully researched. Instead, he suggests that expectant mothers meet the daily intake recommended in Canada's Food Guide and consult with their doctors.

Mandhane also says he will continue work in the field, with plans to examine if the benefits of prenatal fruit consumption persist in children over time. He will also be looking to determine if fruit can influence childhood development related to executive functioning - in areas such as planning, organizing and working memory.

Copper is key in burning fat

Medical News Today 7 June 2016

Berkeley scientist says results could provide new target for obesity research. A new study is further burnishing copper's reputation as an essential nutrient for human physiology.

A research team led by a scientist at the Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Lab) and at the University of California, Berkeley, has found that copper plays a key role in metabolizing fat.

Image © iStock.com/ayo888

Long prized as a malleable, conductive metal used in cookware, electronics, jewellery and plumbing, copper has been gaining increasing attention over the past decade for its role in certain biological functions. It has been known that copper is needed to form red blood cells, absorb iron, develop connective tissue and support the immune system. The new findings, to appear in the July print issue of Nature Chemical Biology but published online today, establishes for the first time copper's role in fat metabolism.

The team of researchers was led by Chris Chang, a faculty scientist at Berkeley Lab's Chemical Sciences Division, a UC Berkeley professor of chemistry and a Howard Hughes Medical Institute investigator. Co-lead authors of the study are Lakshmi Krishnamoorthy and Joseph CotruvoJr, both UC Berkeley postdoctoral researchers in chemistry with affiliations at Berkeley Lab. "We find that copper is essential for breaking down fat cells so that they can be used for energy," said Chang. "It acts as a regulator. The more copper there is, the more the fat is broken down. We think it would be worthwhile to study whether a deficiency in this nutrient could be linked to obesity and obesity-related diseases."

Dietary copper

Chang said that copper could potentially play a role in restoring a natural way to burn fat. The nutrient is plentiful in foods such as oysters and other shellfish, leafy greens, mushrooms, seeds, nuts and beans. According to the Food and Nutrition Board of the Institute of Medicine, an adult's estimated average dietary requirement for copper is about 700 micrograms per day. The Food and Nutrition Board also found that only 25 percent of the U.S. population gets enough copper daily.

“Copper is not something the body can make, so we need to get it through our diet," said Chang. "The typical American diet, however, doesn't include many green leafy vegetables. Asian diets, for example, have more foods rich in copper." But Chang cautions against ingesting copper supplements as a result of these study results. Too much copper can lead to imbalances with other essential minerals, including zinc.

Copper as a 'brake on a brake’

The researchers made the copper-fat link using mice with a genetic mutation that causes the accumulation of copper in the liver. Notably, these mice have larger than average deposits of fat compared with normal mice. The inherited condition, known as Wilson's disease, also occurs in humans and is potentially fatal if left untreated.

Analysis of the mice with Wilson's disease revealed that the abnormal buildup of copper was accompanied by lower than normal lipid levels in the liver compared with control groups of mice. The researchers also found that the white adipose tissue, or white fat, of the mice with Wilson's disease had lower levels of copper compared with the control mice and correspondingly higher levels of fat deposits.

They then treated the Wilson's disease mice with isoproterenol, a beta agonist known to induce lipolysis, the breakdown of fat into fatty acids, through the cyclic adenosine monophosphate (cAMP) signaling pathway. They noted that the mice with Wilson's disease exhibited less fat-breakdown activity compared with control mice.

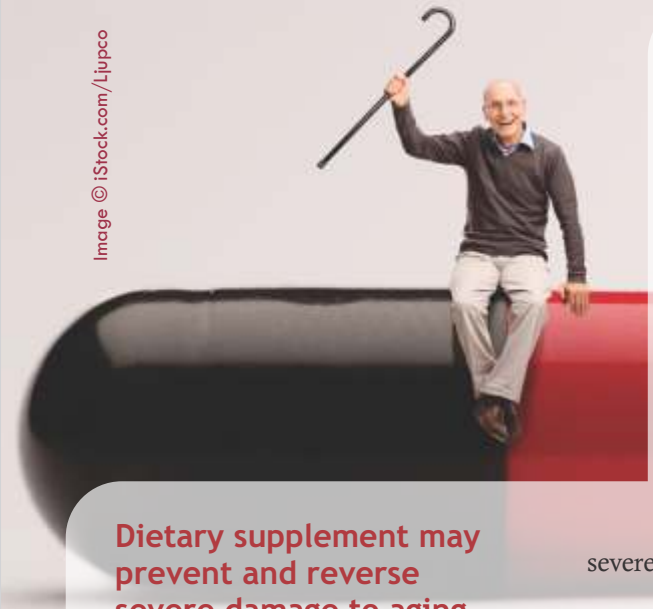
The results prompted the researchers to conduct cell culture analyses to clarify the mechanism by which copper influences lipolysis. The researchers used inductively coupled plasma mass spectroscopy (ICP-MS) equipment at Berkeley Lab to measure levels of copper in fat tissue. They found that copper binds to phosphodiesterase 3, or PDE3, an enzyme that binds to cAMP, halting cAMP's ability to facilitate the breakdown of fat. "When copper binds phosphodiesterase, it's like a brake on a brake," said Chang. "That's why copper has a positive correlation with lipolysis."

Hints from cows

The connection between copper and fat metabolism is not altogether surprising. The researchers actually found hints of the link in the field of animal husbandry. "It had been noted in cattle that levels of copper in the feed would affect how fatty the meat was," said Chang. "This effect on fat deposits in animals was in the agricultural literature, but it hadn't been clear what the biochemical mechanisms were linking copper and fat."

The new work builds upon prior research from Chang's lab on the roles of copper and other metals in neuroscience. In support of President Barack Obama's BRAIN Initiative, Berkeley Lab provided Chang seed funding in 2013 through the Laboratory Directed Research and Development program. Chang's work continued through the BRAIN Tri-Institutional Partnership, an alliance with Berkeley Lab, UC Berkeley and UC San Francisco.

Of the copper in human bodies, there are particularly high concentrations found in the brain. Recent studies, including those led by Chang, have found that copper helps brain cells communicate with each other by acting as a brake when it is time for neural signals to stop. While Chang's initial focus was on the role of copper in neural communications, he branched out to investigations of metals in fat metabolism and other biological pathways. This latest work was primarily funded by the National Institutes of Health.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Dietary supplement may prevent and reverse severe damage to aging brain, research suggests

Medical News Today 3 June 2016

A dietary supplement containing a blend of thirty vitamins and minerals - all natural ingredients widely available in health food stores - has shown remarkable anti-aging properties that can prevent and even reverse massive brain cell loss, according to new research from McMaster University. It's a mixture scientists believe could someday slow the progress of catastrophic neurological diseases such as Alzheimer's, ALS and Parkinson's.

"The findings are dramatic," says Jennifer Lemon, research associate in the Department of Biology and a lead author of the study. "Our hope is that this supplement could offset some very serious illnesses and ultimately improve quality of life." The formula, which contains common ingredients such as vitamins B, C and D, folic acid, green tea extract, cod liver oil and other nutraceuticals, was first designed by scientists in McMaster's Department of Biology in 2000.

A series of studies published over the last decade and a half have shown its benefits in mice, in both normal mice and those specifically bred for such research because they age rapidly, experiencing dramatic declines in cognitive and motor function in a matter of months. The mice used in this study had widespread loss of more than half of their brain cells, severely impacting multiple regions of the brain by one year of age, the human equivalent of severe Alzheimer's disease.

The mice were fed the supplement on small pieces of bagel each day over the course of several months. Over time, researchers found that it completely eliminated the severe brain cell loss and abolished cognitive decline.
"The research suggests that there is tremendous potential with this supplement to help people who are suffering from some catastrophic neurological diseases," says Lemon, who conducted the work with co-author VadimAksenov, a post-doctoral fellow in the Department of Biology at McMaster. "We know this because mice experience the same basic cell mechanisms that contribute to neuro-degeneration that humans do. All species, in fact. There is a commonality among us all."

In addition to looking at the major markers of aging, they also discovered that the mice on the supplements experienced enhancement in vision and most remarkably in the sense of smell - the loss of which is often associated with neurological disease - improved balance and motor activity. The next step in the research is to test the supplement on humans, likely within the next two years, and target those who are dealing with neurodegenerative diseases.

Could dietary fibre be key to successful aging?

Written by Catharine Paddock PhD **Medical News Today** 3 June 2016

Findings from a new study that followed older adults for 10 years supports the idea that eating a diet rich in fiber - such as found in breads, cereals, and fruits - is key to aging successfully; that is, reaching old age free of disease and disability.

A paper on the study, by researchers at the Westmead Institute in New South Wales, Australia, is published in The Journal of Gerontology.

Lead author BaminiGopinath, an associate professor in the Institute's Centre for Vision Research, says the study is the first to look at the link between carbohydrate intake and successful aging. She notes:
"Out of all the variables that we looked at, fibre intake - which is a type of carbohydrate that the body can't digest - had the strongest influence."

Dietary fibre is an indigestible substance found in plants like fruits, vegetables, and grains and is an important part of a healthy diet. There are two forms: soluble and insoluble fibre.


Image © iStock.com/KatarzynaBialasiewicz

Soluble fibre absorbs water and forms a gel. It slows digestion and there is evidence it lowers cholesterol, which helps prevent heart disease. It is found in oat bran, barley, nuts, seeds, beans, peas, lentils, and some fruits and vegetables.

Insoluble fibre appears to speed up passage of food through the gut and adds bulk to the stool. It is found in wheat bran, vegetables, and whole grains. Prof.Gopinath and colleagues defined successful aging as reaching old age disease-free and fully functional - that is, with "absence of disability, depressive symptoms, cognitive impairment, respiratory symptoms, and chronic diseases (e.g., cancer and coronary artery disease).

Fibre had the biggest impact on successful aging

For their investigation, the team used data from the Blue Mountain Eye Study (BMES), the first large population-based study to assess visual impairment and common eye diseases in a representative older Australian community sample.

Fast facts about fibre

☹ On average, Americans eat about 16 grams of fibre per day
😐 The daily recommended intake of fibre for older children, teens, and adults is 21-38 grams
☺ Because it makes you feel full faster, fibre can help with weight control.

Learn more about fibre

The data covered a total of 1,609 adults aged 49 years and older who were free of cancer, coronary artery disease, and stroke when the study started and who were followed for 10 years. The dietary information came from food-frequency surveys filled in by the participants, while information relevant to successful aging came from interviewer-administered questionnaires completed at regular follow-up visits. At the end of the 10 years, 249 (15.5 percent) of the participants achieved what the researchers defined as successful aging status.

Of all the dietary factors they examined - such as total carbohydrate intake, total fibre intake, glycemic index, glycemic load, and sugar intake - the researchers found fibre had the biggest impact on successful aging, as Prof.Gopinath explains: "Essentially, we found that those who had the highest intake of fibre or total fibre actually had an almost 80 percent greater likelihood of living a long and healthy life over a 10-year follow-up. That is, they were less likely to suffer from hypertension, diabetes, dementia, depression, and functional disability."

She and her colleagues note that participants who remained consistently below the mid-range of consumption of fibre from breads, cereals, and fruit, compared with the rest of the group, were less likely to age successfully.
They add: "These findings suggest that increasing intake of fibre-rich foods could be a successful strategy in reaching old age disease free and fully functional."

The researchers were somewhat surprised to find this strong effect from fibre - if anything, they were expecting to see sugar exerting a greater influence. However, Prof. Gopinath says the absence of a link with sugar could be due to the fact consumption of carbonated and sugary drinks was quite low in this group of older adults. The team suggests the findings should prompt similar studies in other groups to see if they find similar links, or discover which mechanisms might explain the connection.

Proper maternal folate level may reduce child obesity risk

Medical News Today 14 June 2016

NIH-funded study suggests an optimal level for pregnant women, particularly those who are obese.

Proper maternal folate levels during pregnancy may protect children from a future risk of obesity, especially those born to obese mothers, according to a study led by researchers funded by the National Institutes of Health. "Maternal nutrition during pregnancy can have long-lasting effects on child health, as well as the health of a mother after pregnancy," said the study's principal investigator, Xiaobin Wang, M.D., M.P.H., Sc.D., from Johns Hopkins University, Baltimore. "Our results suggest that adequate maternal folate may mitigate the effect of a mother's obesity on her child's health."

The study, published online in JAMA Pediatrics, was funded by NIH's Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD). Obesity (link is external) in children and adults is a serious health issue in the United States, contributing to such conditions as heart disease, stroke and type 2 diabetes. During pregnancy (link is external), maternal obesity also increases the risk for a range of pregnancy complications, such as stillbirth, birth defects and preterm birth. Furthermore, babies born to obese mothers have long-term health risks, including a higher risk of obesity in childhood.

Folate, an essential B vitamin, reduces the fetus' risk for neural tube defects, which are malformations affecting the brain, spine and spinal cord.

Image © iStock.com/AndreyPopov

The U.S. Centers for Disease Control and Prevention recommends that women of childbearing age take 400 micrograms of folic acid (a synthetic form of folate) daily to reduce their children's risk for neural tube defects. However, the role of maternal folate levels on a child's future obesity risk was not known, especially among those born to mothers who are obese during pregnancy.

In their study, the researchers investigated the health outcomes of mothers and children (ranging from 2- to 9-years-old) in the Boston Birth Cohort, a predominately low-income, minority population with a high prevalence of maternal and child obesity. The study team analyzed health records from more than 1,500 mother-child pairs, including information that was collected before, during and after pregnancy. To gauge a mother's folate level during pregnancy, the researchers measured folate from stored plasma samples that were collected two to three days after delivery.

The study team found a wide range of maternal folate levels, but observed an "L-shaped" relationship between maternal folate levels and child obesity. In other words, the lowest levels of folate correlated with the highest risk of child obesity. When folate levels reached approximately 20 nanomoles per liter (nm/L), which is within the normal range for adults, further increases in folate levels did not confer additional benefits, indicating a threshold or ceiling effect.

According to the researchers, this threshold is higher than the standard cutoff for diagnosing folate deficiency (less than 10 nm/L). Obese mothers in the study tended to have lower folate levels than normal weight mothers. However, when the researchers examined obese mothers only, they found that children of obese mothers with adequate folate levels (at least 20 nm/L) had a 43 percent lower risk of obesity compared to children of obese mothers with lower folate (less than 20 nm/L). The children in the latter group had higher body mass index-for-age z-scores (BMI-z) - a measure of body fat in children.

According to the authors, establishing an "optimal" rather than "minimal" folate concentration may be beneficial for women planning a pregnancy, especially obese women. "Folate is well-known for preventing brain and spinal cord defects in a developing fetus, but its effects on metabolic disorders, such as diabetes and obesity, is less understood," said Cuilin Zhang, M.D., Ph.D., NICHD senior investigator and a study co-author. "This study uncovers what may be an additional benefit of folate and identifies a possible strategy for reducing childhood obesity."

Could eating whole grains extend your life?

Written by Tim Newman
Medical News Today 14 June 2016

Recent research, carried out at the Harvard T.H. Chan School of Public Health in Massachusetts, supports and extends recent findings regarding the benefits of whole grains. The wide-scale study concludes that consuming whole grains regularly could extend our lifespan.

According to the Whole Grains Council, a whole grain food contains "all the essential parts and naturally occurring nutrients of the entire grain seed." Examples of whole grains include barley, corn, quinoa, rice, rye, and wheat. Whole grains naturally contain complex carbohydrates and a raft of beneficial vitamins and minerals, including selenium, potassium, and magnesium; also, whole grains have minimal fat content.

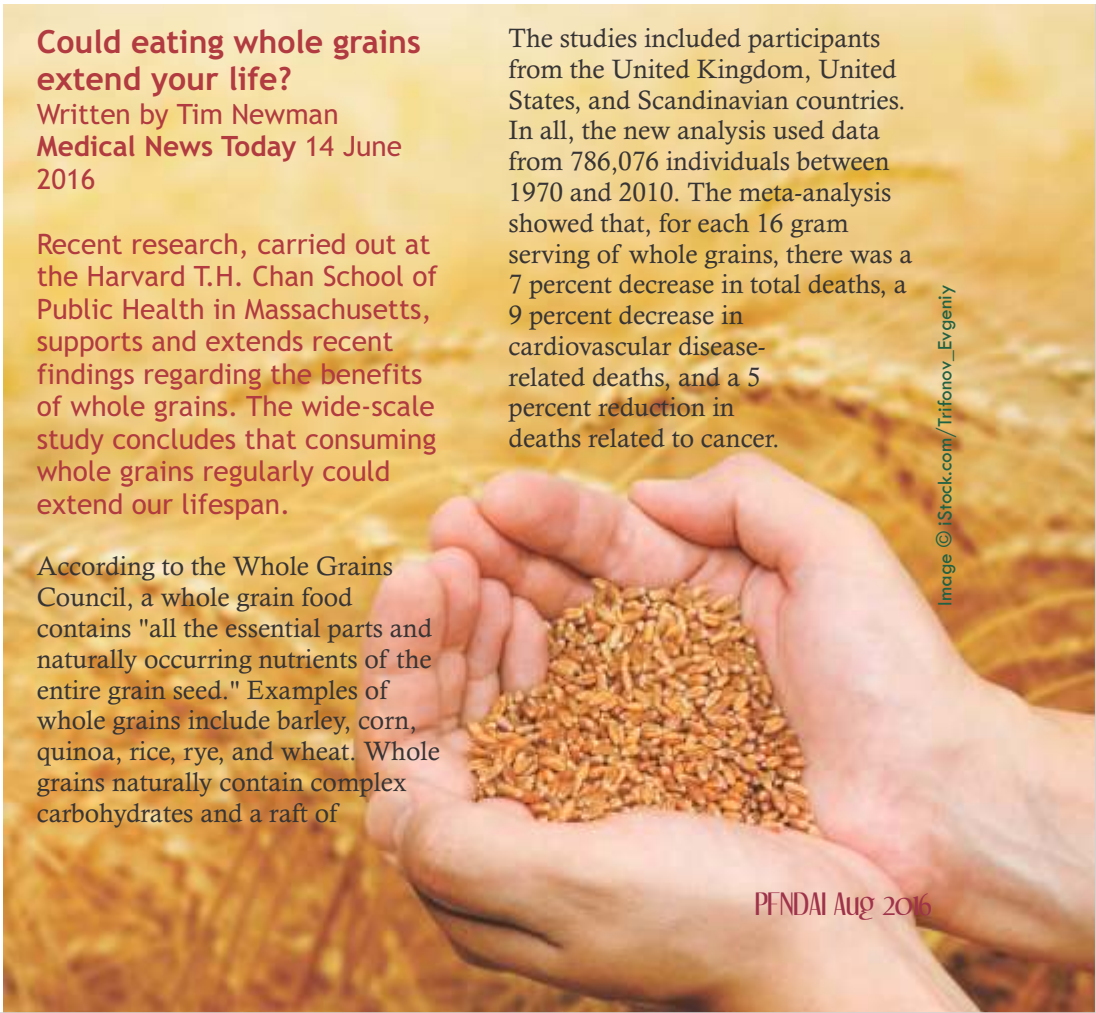
Much of the nutritional value of grains are lost during the refining process.

Findings from previous research infer that foods containing whole grains have a myriad of health benefits. These benefits include a reduced risk of certain cancers, diabetes, heart disease, and obesity, and they are thought to help maintain gut health.

Latest whole grain research

The research team, led by senior author Qi Sun, took an in-depth, large-scale look at dietary whole grains and their impact on longevity and disease. The team analyzed data from 12 already-published papers, alongside data from unpublished sources - the National Health and Nutrition Examination Survey (NHANES) III and NHANES 1999-2004.

The studies included participants from the United Kingdom, United States, and Scandinavian countries. In all, the new analysis used data from 786,076 individuals between 1970 and 2010. The meta-analysis showed that, for each 16 gram serving of whole grains, there was a 7 percent decrease in total deaths, a 9 percent decrease in cardiovascular disease-related deaths, and a 5 percent reduction in deaths related to cancer.



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The results, published this week in Circulation, showed that the effect was more pronounced as whole grain consumption increased. Those individuals who ate 48 grams of whole grain per day had a 20 percent reduced risk of mortality, a 25 percent reduced risk of cardiovascular mortality, and a 14 percent lower risk of cancer mortality.

Although the results show an impressive effect size, the authors admit some limitations. For instance, the earlier studies used in the analysis were conducted before a consistent definition of whole grain was designed; therefore, the lists of whole grain foods varied substantially between experiments. Additionally, the majority of participants were from Scandinavian countries and the U.S., so there is a possibility that the results are not relevant (or less relevant) for other populations.

How does whole grain stave off death and disease?

Despite the shortfalls mentioned above, the results are backed up by many previous trials. So, how do whole grains impart their impressive life-extending ability? There are a number of theories, but the likelihood is that a variety of mechanisms work together to produce the positive health outcomes. For instance, whole grains contain a variety of bioactive compounds, all of which could play their part.

Additionally, the higher fibre content of whole grains may lower the production of cholesterol and glucose. Whole grain's ability to induce a feeling of fullness might be one of the ways in which it helps stave off obesity and the conditions related to obesity. However the effects are produced, Dr. Sun believes it is time for healthcare professionals to sing the praises of whole grain foods:
"Based on the solid evidence from this meta-analysis and numerous previous studies that collectively document beneficial effects of whole grains, I think healthcare providers should unanimously recommend whole grain consumption to the general population as well as to patients with certain diseases to help achieve better health and perhaps reduce death."

Because this study used a huge amount of data and supports earlier research, the results are likely to spawn questions about how diets should be modified. Alice H. Lichtenstein, D.Sc., a spokesperson for the American Heart Association, suggests that refined grains should be replaced with whole grain products rather than added to the diet.

Many with migraines have vitamin deficiencies, says study

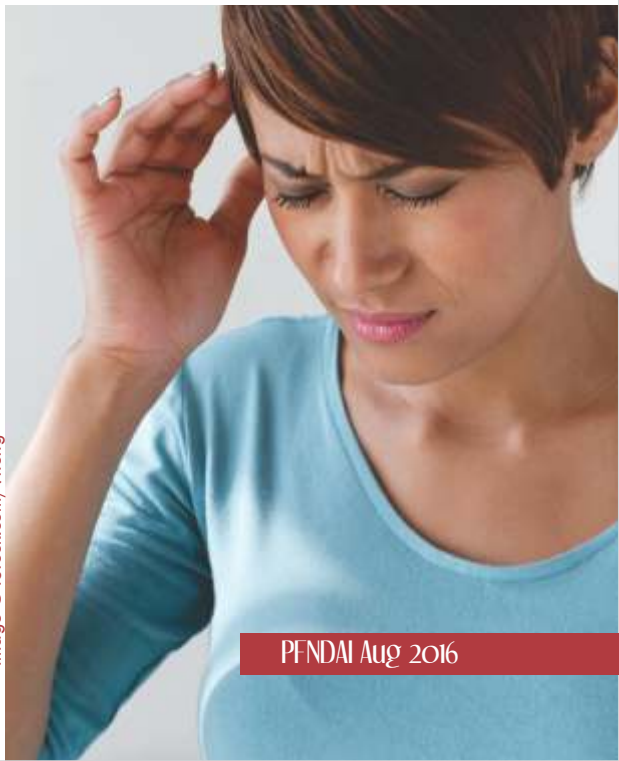
Medical News Today 13 June 2016

A high percentage of children, teens and young adults with migraines appear to have mild deficiencies in vitamin D, riboflavin and coenzyme Q10 - a vitamin-like substance found in every cell of the body that is used to produce energy for cell growth and maintenance. These deficiencies may be involved in patients who experience migraines, but that is unclear based on existing studies.

A high percentage of children, teens and young adults with migraines appear to have mild deficiencies in vitamin D, riboflavin and coenzyme Q10 - a vitamin-like substance found in every cell of the body that is used to produce energy for cell growth and maintenance. These deficiencies may be involved in patients who experience migraines, but that is unclear based on existing studies.

"Further studies are needed to elucidate whether vitamin supplementation is effective in migraine patients in general, and whether patients with mild deficiency are more likely to benefit from supplementation," says Suzanne Hagler, MD, a Headache Medicine fellow in the division of Neurology at Cincinnati Children's Hospital Medical Center and lead author of the study.

Dr.Hagler and colleagues at Cincinnati Children's conducted the study among patients at the Cincinnati Children's Headache Center. She presented her findings at the 58th Annual Scientific Meeting of the American Headache Society in San Diego. Dr.Hagler's study drew from a database that included patients with migraines who, according to Headache Center practice, had baseline blood levels checked for vitamin D, riboflavin, coenzyme Q10 and folate, all of which were implicated in migraines, to some degree, by previous and sometimes conflicting studies. Many were put on preventive migraine medications and received vitamin supplementation, if levels were low. Because few received vitamins alone, the researchers were unable to determine vitamin effectiveness in preventing migraines.



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She found that girls and young woman were more likely than boys and young men to have coenzyme Q10 deficiencies at baseline. Boys and young men were more likely to have vitamin D deficiency. It was unclear whether there were folate deficiencies. Patients with chronic migraines were more likely to have coenzyme Q10 and riboflavin deficiencies than those with episodic migraines. Previous studies have indicated that certain vitamins and vitamin deficiencies may be important in the migraine process. Studies using vitamins to prevent migraines, however, have had conflicting success.

Food's transit time is a key factor in digestive health

Medical News Today 28 June 2016

The time it takes for ingested food to travel through the human gut - also called transit time - affects the amount of harmful degradation products produced along the way. This means that transit time is a key factor in a healthy digestive system.

This is the finding of a study from the National Food Institute, Technical University of Denmark, which has been published in the renowned journal Nature Microbiology.

Food has to travel through eight meters of intestine from the time it enters the mouth of an adult person until it comes out the other end. Recent research has focused mainly on the influence of the bacterial composition of the gut on the health of people's digestive system.

Taking this a step further, Postdoc Henrik Munch Roager from the National Food Institute has studied how food's transit time through the colon affects gut bacteria's role in the activity and health of the digestive system by measuring the products of bacterial activity, which end up in urine.

The effect of food's transit time
Intestinal bacteria prefer to digest dietary carbohydrates, but when these are depleted, the bacteria start to break down other nutrients such as proteins. Researchers have previously observed correlations between some of the bacterial protein degradation products that are produced in the colon and the development of various diseases including colorectal cancer, chronic renal diseaseand autism.

"In short, our study shows that the longer food takes to pass through the colon, the more harmful bacterial degradation products are produced. Conversely, when the transit time is shorter, we find a higher amount of the substances that are produced when the colon renews its inner surface, which may be a sign of a healthier intestinal wall," Henrik's supervisor and professor at the National Food Institute, Tine Rask Licht, explains.

It is commonly thought that a very diverse bacterial population in the gut is most healthy, however both the study from the National Food Institute and other brand news studies show that bacterial richness in stool is also often associated with a long transit time. "We believe that a rich bacterial composition in the gut is not necessarily synonymous with a healthy digestive system, if it is an indication that food takes a long time to travel through the colon," Tine Rask Licht says.

Better understanding of constipation as a risk factor
The study shows that transit time is a key factor in the activity of the intestinal bacteria and this emphasizes the importance of preventing constipation, which may have an impact on health. This is highly relevant in Denmark where up to as much as 20% of the population suffers from constipation from time to time.

The National Food Institute's findings can help researchers better understand diseases where constipation is considered a risk factor, such as colorectal cancer and Parkinson's disease as well as afflictions where constipation often occurs such as ADHD and autism.

Influencing food's transit time
Tine Rask Licht emphasizes that people's dietary habits can influence transit time: "You can help food pass through the colon by eating a diet rich in fibre and drinking plenty of water. It may also be worth trying to limit the intake of for example meat, which slows down the transit time and provides the gut bacteria with lots of protein to digest. Physical activity can also reduce the time it takes for food to travel through the colon."

The study is based on urine and stool samples from 98 adult Danes and is partially funded by Danish Council for Strategic Research. The study has been carried out in cooperation with several institutes at the Technical University of Denmark, University of Copenhagen and Bispebjerg Hospital.

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For women, healthy diets may help with mobility when aging

June 22, 2016 Science Daily

In a large study conducted by at Brigham and Women's Hospital (BWH), researchers found an association between women who maintain a healthy diet and a reduction in the risk of developing impaired physical function as they age. The findings are published online and will appear in the July issue of the Journal of Nutrition.

"Little research has been done on how diet impacts physical function later in life. We study the connection between diet and many other aspects of health, but we don't know much about diet and mobility," says Francine Grodstein, ScD, senior author of the study and a researcher in the Channing Division of Network Medicine at BWH. "We wanted to look at diet patterns and try to learn how our overall diet impacts our physicial function as we get older."

Researchers examined the association between the Alternative Healthy Eating Index, a measure of diet quality, with reports of impairment in physical function among 54,762 women involved in the Nurses' Health Study. Physical function was measured by a commonly used standard instrument every four years from 1992 to 2008 and diet was measured by food frequency questionnaires, which were administered approximately every four years beginning in 1980.

The data indicate that women who maintained a healthier diet were less likely to develop physical impairments compared to women whose diets were not as healthy. They also found a higher intake of vegetables and fruits, a lower intake of sugar-sweetened beverages, trans-fats, and sodium, and a moderate alcohol intake, were each significantly associated with reduced rates of physical impairment. Among individual foods, the strongest relations were found for increased intakes of oranges, orange juice, apples and pears, romaine or leaf lettuce, and walnuts. However, researchers noted specific foods generally had weaker associations than the overall score, which indicates that overall diet quality is more important than individual foods.

"We think a lot about chronic diseases, cancer, heart disease, and tend not to think of physical function. Physical function is crucial as you age; it includes being able to get yourself dressed, walk around the block, and could impact your ability to live independently," says Kaitlin Hagan, ScD, MPH, first author and a postdoctoral fellow at BWH. Future research is needed to better understand dietary and lifestyle factors that influence physical function.

Antioxidant therapy: Could polyphenols reverse endothelial dysfunction in diabetics?

Food Navigator Asia
08Jun2016

Polyphenols present a promising approach to restoring normal endothelial function in people with diabetes, according to a review calling for more research on this potential 'antioxidant therapy'. Writing in the British Journal of Nutrition, researchers from the SRM University in India called for more research on the "clinical acceptance of potent polyphenols" as well as risk assessments on safety.

The endothelium is the thin inner lining of cells in blood vessels that acts as an interface between the circulating blood and the vessel wall, making it a critical mediator within the vascular system. Endothelial dysfunction is common in people with diabetes and this is a key contributor to the development of diabetic complications.


Image © iStock.com/Valentina_G

Indeed endothelial dysfunction tends to be the first 'event' in macrovascular complications such as coronary artery disease, peripheral arterial disease, stroke and microvascular complications like kidney damage (nephropathy), nerve damage (neuropathy) and damage to the retina (retinopathy).

Polyphenols & endothelial dysfunction Chief mechanisms of endothelial dysfunction include the downregula tion of endothelial nitric oxide synthase levels, variance in expression of the vascular endothelial growth factor (VEGF), endoplasmic reticulum stress, inflammatory pathways and oxidative stress. The review funded by the Indian Council of Medical Research found overall there was evidence that polyphenols not only alleviate oxidative stress but also act on cellular signalling pathways, which impact these chief dysfunctional mechanisms and thereby prevents vascular complications in diabetes.

Evidence around polyphenol antioxidants and the endothelium has been mounting, with green tea, cocoa, red wine and citrus fruit highlighted as sources. They found in vitro and in vivo evidence for the benefit of 30 different compounds including alphalinolenic acid, curcumin, quercetin and resveratrol.

A call to arms

A report from the World Health Organisation (WHO) in April this year said the number of adults living with diabetes globally had almost quadrupled since 1980 to reach 422 million. With diabetes causing 1.5 million deaths in 2012 alone, the report called for action from all stakeholders on the crisis. "From the analysis it is clear we need stronger responses not only from different sectors of government, but also from civil society and people with diabetes themselves, and also producers of food and manufacturers of medicines and medical technologies," WHO's director general Dr Margaret Chan said at the time. "The report reminds us that effectively addressing diabetes does not just happen: it is the result of collective consensus and public investment in interventions that are affordable, cost effective and based on the best available science."

Calcium linked to reduced breast cancer rates: Meta-analysis

NutraIngredients, 09Jun2016

A review of 26,000 cases has found consuming more calcium-rich foods such as milk and cheese as well as supplements may slightly reduce the risk of developing breast cancer. However researchers at the departments of nutrition, and endocrinology at Soochow University, also note that there is some possibility of publication bias, and that other dietary co-variables, such as vitamin D, may also have an effect on the observations.

Breast cancer is the most common cancer diagnosis in women, and ranks fifth for cancer mortality. The World Cancer Research Fund calculates that nearly 40 % of breast cancer cases could be prevented with changes to lifestyle. Established modifiable factors that increase the risk of breast cancer are greater intakes of alcohol and increased obesity. And decreases in risk are linked to breastfeeding and possibly to more exercise and being active.

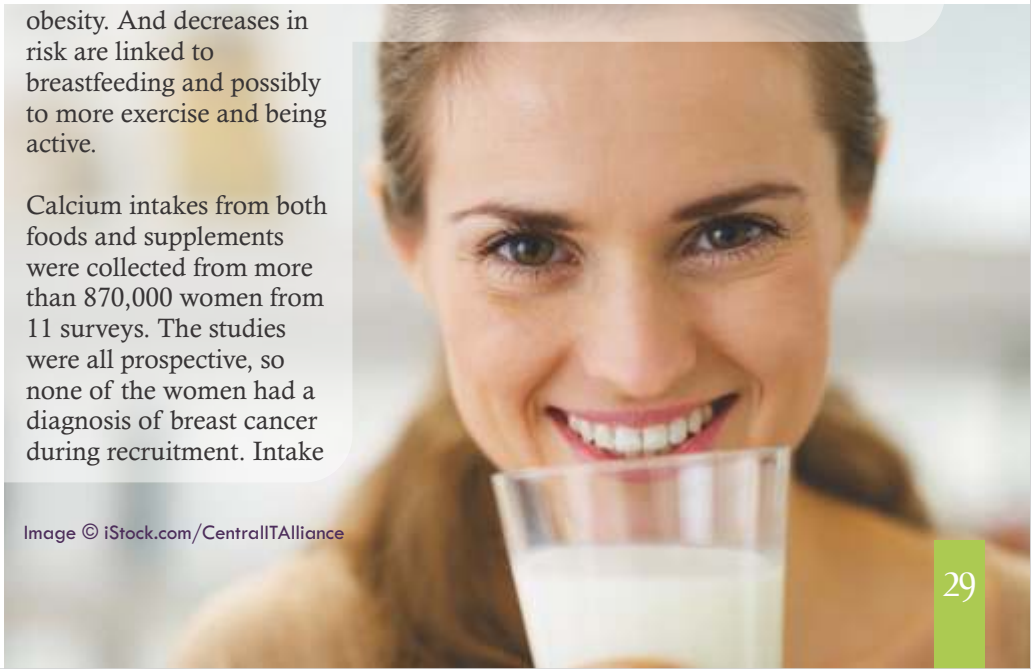
Calcium intakes from both foods and supplements were collected from more than 870,000 women from 11 surveys. The studies were all prospective, so none of the women had a diagnosis of breast cancer during recruitment. Intake of calcium was calculated either by a food frequency questionnaire, or by one or more 24hour food diaries.

Of the 11 studies selected for meta-analysis, five were based in the US, five were based in Europe, and one was based in Singapore. One of the European-based studies was part of the European Prospective Investigation into Cancer (EPIC) research programme.
The women recruited were monitored for a period of at least seven years, and during this time, more than 26,000 were given some diagnosis of breast cancer. The overall relative risk of breast cancer in women with high intakes of calcium (compared to low intakes) was 0.92. So high intakes of calcium from all sources suggested a reduced risk of diagnosis of breast cancer of about 8%.

Further subgroup analysis showed strongest protective effects of calcium intakes in diagnosis of breast cancer made prior to menopause associations between calcium and breast cancer diagnosed in postmenopausal women were weaker.

More is (a little) better

There was also a dose effect. The researchers revealed that each 300 mg* increase in calcium intake was associated with a 2% reduction in the total risk of getting the diagnosis of breast cancer. There was a slight



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trend of more benefit from additional calcium observed in women in the lower range of intakes (below 800 mg per day), whereas this was less strong in women in the higher range of calcium intakes. The population reference intake (PRI) figure for calcium in adults defined by EFSA is 950 mg per day.

Uncertainty

Fiona Osgun, senior health information officer at Cancer Research UK, said: "This study, which combined the results of other research, suggests that there may be a slightly lower risk of breast cancer in women having the most calcium, compared to those having the least.

But many of the studies included asked women to remember what they had eaten, which isn't always reliable, and it was hard to separate out the effect of calcium from other elements of people's lives, so we can't be sure that there's a real link between calcium and breast cancer."

*300 mg calcium would be obtained in 250 ml milk or 40 g semi hard cheese, such as cheddar or edam or 200g of yogurt or 120g almonds

Cellular data: Study suggests role for vitamin K2 in regulating inflammation

Food Navigator Asia, 06Jun2016

Vitamin K2 could block the production of pro-inflammatory molecules by human white blood cells, according to a new in vitro study.

The lab-based cellular research, backed with a grant from Norwegian vitamin K2 player NattoPharma, tested the potential for the firms' vitamin K2 as MK7 ingredient (MenaQ7) to modulate the immune system and inflammatory biomarkers. Published in the Journal of Medicinal Food, the study findings suggest that vitamin K2 can block the production of pro-inflammatory mediators like TNFalpha, IL1a, and IL1b by human immune cells known as macrophages.

"Our data show that vitamin K2 is effective to inhibit pro-inflammatory mediators in vitro. If the same effect can be seen in vivo, it will be very beneficial for people, who need to be on anti-inflammatory treatment," study co-author Dr KatarzynaMaresz, from The International Science and Health Foundation, Poland, told NutraIngredients. "However, efficacy and the dosage of vitamin K2 to inhibit inflammatory markers in vivo needs to established in future clinical trials," she said.

HogneVik, NattoPharma chief medical officer, added that the new data points to one possible mechanism for the clinical observations made for MK7 – "where positive health effects associated with the diseases in blood vessels, diabetes and in the muscle/joint system have been reported."

Vik told us NattoPharma do not have any plans for clinical trials specifically within the inflammatory field "but will welcome any new initiatives."

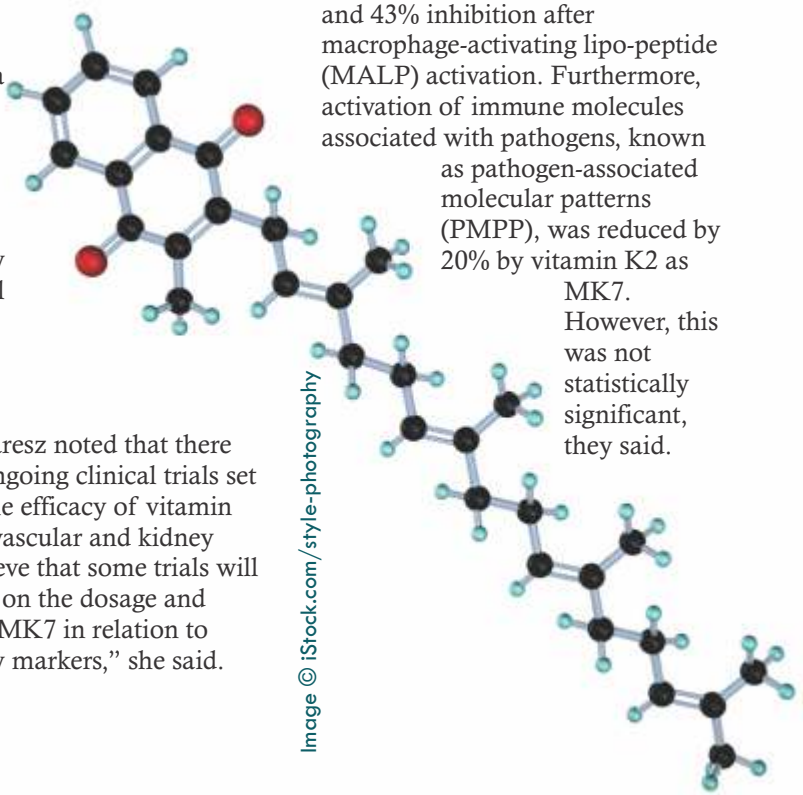
However, Maresz noted that there are 'many' ongoing clinical trials set to evaluate the efficacy of vitamin K2 in cardiovascular and kidney fields. "I believe that some trials will bring us data on the dosage and efficiency of MK7 in relation to inflammatory markers," she said.

In vitro data

In the current study, the team used a cell culture of human monocyte-derived macrophages (hMDMs) isolated from human white blood cells to test the potential immune-modulating effects of vitamin K2 as MK7. The cells were pretreated with a wide range of concentrations for between six and 30 hours before being 'stimulated' to produce an immune response by TLR agonists, and then the effect on immune biomarker production was measured.

"When the cells were pretreated up to six hours with MK7 before treatment with TLR agonists, MK7 did not inhibit significantly the production of TNFa after the TLR activation. However, 30 hours pretreatment of hMDMs with at least 10lM of MK7 effectively and dose dependently inhibited the pro-inflammatory function," wrote the team.

They added that pretreatment with 10 micromoles of MK7 for 30 hours resulted in 20% inhibition of TNFalpha production after lipopolysaccharide (LPS) activation, and 43% inhibition after macrophage-activating lipo-peptide (MALP) activation. Furthermore, activation of immune molecules associated with pathogens, known as pathogen-associated molecular patterns (PMPP), was reduced by 20% by vitamin K2 as MK7. However, this was not statistically significant, they said.



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FOOD SCIENCE & INDUSTRY NEWS

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X-rays reveal why fat is tasty

IFT Weekly June 1, 2016

Researchers from the University of Guelph in Ontario, Canada, are using X-rays to understand what makes chocolate and cheese taste so good and how the taste and "mouthfeel" of fats could be mimicked in healthier alternatives. To study the molecular structure of edible fats, the researchers are using X-rays at the Advanced Photon Source (APS)—a U.S. Dept. of Energy (DOE) Office of Science User Facility at DOE's Argonne National Laboratory in Illinois.

The basic molecules making up edible fats are triglycerides (TAGs), or three hydrocarbon chains known as fatty acids and a sweet-tasting glycerol molecule. While TAGs are essential to the body, excess build-up of TAGs can cause health problems, such as type 2 diabetes and obesity, which is why scientists are interested in learning what it is about their structure that makes them irresistible. In addition, understanding structural changes during food production could lead to more energy-efficient manufacturing and distribution practices or more cost-effective ingredient substitutions.

Most recently, the researchers investigated anhydrous milk fat, a product derived from cream or butter that is more than 99% fat, in addition to butter, cheese, and cream. Milk fat, which is present in dairy and a common additive to other products, has a wide melting range, making it a complex system to study.

X-ray scattering data taken with the ultra-small angle-scattering (USAXS) camera on APS beamline 9ID-D allows users to closely examine their samples in 3-D at different temperatures without altering those samples. Ultra-small-angle cameras provide a high contrast between solid and liquid components, and the USAXS instrument can determine the size or structure of a sample's components across multiple length scales. These techniques are well suited for probing the hierarchical structure of edible fats, going from crystalline nanoplatelets (CNPs) that form during cooling as TAGs aggregate together, to micro-range clusters of CNPs, to the crystal networks created by clusters.

In the recent milk fat study, published in Food Chemistry, the team measured the CNPs after the milk fat was melted at 70°C (158°F), cooled to almost 0°C (32°F), and stored in a refrigerator at 5°C (40°F) for two months prior to the study, replicating realistic processing and storage conditions from the processing of raw materials to consumption. The milk fat CNPs were observed to be smooth platelets composed of TAGs that melt at higher temperatures and are about three times as long as they are wide.

The team is using APS data to help develop and validate a computational model that predicts the formation of edible fat structures during cooling, heating, shearing (mixing), and other production processes. The next step is to analyze data from the more recent USAXS observations of products containing milk fat, such as butter and cheese. They are also exploring ways to collect data with the USAXS instrument at slightly longer spatial length-scales and replicate the impact of shearing to better understand how added non-fat ingredients and manufacturing practices could affect the morphology of CNPs and their aggregation.


Image © iStock.com/Zerbor

Plant-based sweeteners may help individuals control their blood glucose levels

Medical News Today 9 June 2016

A new study shows that it is possible to reduce the level of sugar in muffins without affecting their textural properties by replacing half of the sugar content with stevianna or inulin, which are plant-based sweeteners.

Also, after individuals consumed sugar-replaced muffins, their glycemic response - or the concentration of glucose in the blood - was lower than when they consumed regular muffins.

"We have applied our knowledge of food systems to investigate how food manufacturers can reduce the amount of added sugar in food products whilst still maintaining quality characteristics for the consumer," said Dr. Margaret Brennan, co-author of the International Journal of Food Science & Technology study. "Careful selection and incorporation of low calorific natural sugar replacers into foods can lead to improved dietary intakes and control of glucose metabolism, body weight gain, and diet-related illnesses such as diabetes."

The study is currently available online, and it will be featured in the August issue of the International Journal of Food Science & Technology, which will include additional papers on the potential of sugar replacers in foods as well as how food science research is tackling global food safety challenges.

Effects of UV light, HPP processing on cold-pressed juices

IFT Weekly June 15, 2016

An article published in Comprehensive Reviews in Food Science and Food Safety examines the effects of UV light and HPP processing on nutritional and quality-related compounds in juice products.

For a fast growing category of premium juice products such as cold-pressed juices, minimal-processing non-thermal techniques such as ultraviolet (UV) light and high-pressure processing (HPP) are expected to be used to extend shelf life while retaining physicochemical, nutritional, and sensory characteristics with reduced microbial loads. Also, UV light and HPP are approved by regulatory agencies and recognized as one of the simplest and environmentally-friendly ways to destroy pathogenic organisms.

However, a limitation to their more extensive commercial application lies in the lack of comparative effects on nutritional and quality-related compounds in juice products. In this review, the authors provide a comparative analysis using 92 studies (UV light: 42, HPP: 50), published between 2004 and 2015, to evaluate the effects of reported UV light and HPP processing conditions on the residual content or activity of bioactive compounds such as vitamins, polyphenols, antioxidants, and oxidative enzymes in 45 different fresh fruit and vegetable juices (low-acid, acid, and high-acid categories). In addition, the authors summarize and discuss the effects of UV light and HPP on colour and sensory characteristics of juices.


Image © iStock.com/trubavin

Through their review the authors determined that both processing methods—UV light and HPP—showed only minor degradation of juice physicochemical properties, vitamin content, and antioxidant activity at conditions required to achieve 5-log reduction of pathogenic microorganisms. However, over-processing was common among all the studies—often leading to an unnecessary decrease in quality and nutritional parameters.

Australian innovation makes raw milk safe to drink

Dairy Reporter, 07Jun2016

Made By Cow, an Australian company, says it has developed a safe way for people to enjoy untreated milk, without heat pasteurization or homogenization.

Made By Cow uses a new patented method that focuses on herd management and hygienic milking practices from a single Jersey herd on NSW's South Coast.

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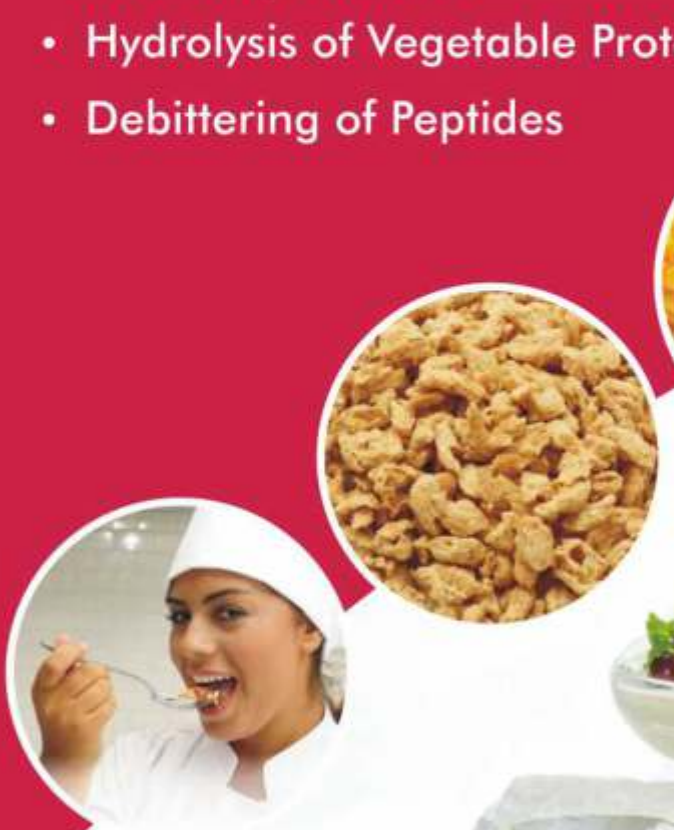

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The milk is then bottled straight from the cow within hours and put under intense water pressure, compressing both the bottle and milk inside for several minutes. This pressure eliminates any remaining harmful bacteria, whilst being gentler on the milk's natural nutrients.

Before the new method, untreated milk (also known as raw milk), needed to be heated to at least 72 degrees to destroy harmful bacteria. It is also often subjected to separation, homogenization, recombining and standardization, before being bottled and sold on shelf in supermarkets.

Approved for sale

The new method, which the company says is a world first, has been approved by the NSW Food Authority. Made By Cow founder Saxon Joye said that the company is able to pay supplier farmers more than 50% more per litre than some other processors. Made By Cow is available at all Harris Farm Markets, About Life stores and other stores in NSW.

Chaat takes Indian street food to US dairy aisle

Dairy Reporter 10Jun2016

The street food of India, called chaat, has inspired a newly launched US brand of healthy dairy products aimed at afternoon snacks. The Chaat Co produces three different flavors of savory yogurt cucumber and mint, mango and chili, and tamarind and date – and was noted as a company to watch by Canadean at its Dairy Summit conference recently.

AnshuDua, one of the cofounders of The Chaat Co, which is based in Manhattan, told DairyReporter that while the snacks on the streets of India might not be well known in the US, the ingredients are. "Most Indian food here is curry, naans and rice, and Indian snacks haven't been exposed to the American snacker. But Americans are snacking more frequently, they are using snacks to replace meals, and they are more receptive to global flavours in their snacks," Dua said.

Ingredients are familiar

He said that many of the key ingredients in chaat are highly popular ingredients in American snacking culture, however, lentils, chickpeas, and spices like turmeric. In order to make a product for the US, The Chaat Co decided to focus on the yogurt category. "It's a large category, it's grown over the last five or six years with the advent of Greek yogurt, folks like Chobani have helped fuel that," Dua said.

"But most of the yogurt in the US is sweet, and it's primarily focused on breakfast. "We thought we could extend this already popular yogurt category into later in the day snacking, to interesting flavour profiles and ingredients."

No added sugar

He added that, in many parts of the world, such as in India and the Mediterranean, yogurt isn't eaten with added sugar. "We decided to launch this line of savoury yogurt snacks, and they launched in January this year."

The products are already available in natural retailers such as Whole Foods, where it can be found in around 50 stores in the North East. "Our focus for this year is built out our distribution on the East Coast, the Boston down to Washington, DC, area," Dua said.

Consumers looking for a change

Dua said that consumers are looking for new flavours in the yogurt category, and they are looking to avoid sugar. "Part of our job is to raise the visibility of the category away from vanilla, blueberry, strawberry, and into different flavour profiles without the added sugar and into different day parts. We've been aggressive in doing that," he said.

Short ingredient list

He noted that all of the products have high protein lentil toppings to mix into the yogurt. "They have cumin and turmeric on top, so it really emulates the street snacking experience from India, but we put it in a format that the American snacker can understand," Dua said. "We wanted to have a very short ingredient label, for a small company like ours that's important. It goes with the trends, and we don't necessarily want to have to stand in front of customers and explain what's in it. We have very simple ingredients, and we have a blend of custom cultures that we've worked on, including the probiotics."

Power of turmeric

Turmeric may not have been high on consumers' ingredient agendas until recently, but it's now a spice that's in demand. "Turmeric growing up was a staple in all our dishes at mealtimes," Dua explained. "Over the last half a decade or so it's really been brought to the forefront, a lot of research is going into the health benefits of turmeric. It adds a nice flavor to our products."


Image © iStock.com/belchonock

Fermented milk market set for open heart innovation: Review

NutraIngredients, 31 May 2016

Antihypertensive fermented functional dairy products using novel lactic acid bacteria have a big future, a review has found.

The review said there weren't many heart health fermented milk products on the market and those that were tended to use the strain Lactobacillus helveticus. They encouraged research to find and evaluate new lactic acid bacteria (LAB) that possess the ability to generate this bioactivity. The overview, performed by researchers from the Center for Food Research and Development (ICAS) in Mexico, presented research on the efficacy of fermented milk containing antihypertensive peptides.

A range of studies

As well as in vitro and in vivo studies, clinical trials were undertaken in order for a fermented functional dairy product to be introduced to the market with Lb. helveticus and Sac. cerevisiae the most widely studied for their antihypertensive effect.

In one study of note the authors concluded that daily consumption of the fermented milk with Lb. helveticusand Sac. Cerevisiaeproduct for at least eight weeks was required for a statistically significant reduction in blood pressure.

Other research looked at the antihypertensive effect of fermented milk with Lc. lactisNRRLB50571. One study noted that by the end of the 8week intervention, systolic blood pressure (SBP) decreased by 13mmHg and was significantly different from the control group. Although a small reduction in diastolic blood pressure (DBP) was noted, the sample size was not large enough to give sufficient statistical power to detect significant differences between groups.

Current market brands

The review identified several fermented milk products are on the market, including Calpis in Japan and Valio'sEvolus brand in Finland. Although these products attribute their antihypertensive effect to peptides present in the fermented milk, they also contain minerals such as potassium and calcium, which have been demonstrated to have a positive effect on blood pressure , and are backed by EU-approved claims.

“These fermented milks can be considered as hypotensive agents because they can form part of the daily diet,” concluded the study. “Hence, the consumer may be willing to pay a premium for foods with important functional benefits.” Peptide or probiotic data have not as yet proved strong enough to win heart or other claims under the strict European Union nutrition and health claims regulation (NHCR).

Liquid nitrogen is the latest trend in the food industry

Food News Latam JUNE 2, 2016

Nitrogen is an odourless gas that is around us. It is an essential nutrient that makes up the protein in hair, muscles and skin.

It can be found in the air we breathe, our DNA, and now even in our food. As the amino acid, there are foods that are high in nitrogen. However, the latest trend in food is the use of liquid nitrogen to snap freeze foods and drinks.

The best restaurants have made this increasingly popular method throughout the food industry. Usually it is used to make desserts and drinks, such as ice cream, coffee and cocktails. Liquid nitrogen is produced when the nitrogen reaches its boiling point, which is 196 ° C have a wide range of uses, some more desirable than others. Before becoming the latest trend in the food, liquid nitrogen serving in different functions of the chemical, pharmaceutical, medical and oil. It could be used as a coolant for the computer, or medicine to freeze warts and pre-cancerous cells.

Because all of its different uses, consumers have been sceptical about the safety of liquid nitrogen in food. In 2012, the newspaper, The Guardian (http://www.theguardian.com/uk-news/2015/sep/17/oscars-wine-bar-lancastergaby-scanlon-stomach-liquid-nitrogen) , reported that the stomach of a young woman suffered an "explosion" after drinking a cocktail made with liquid nitrogen.

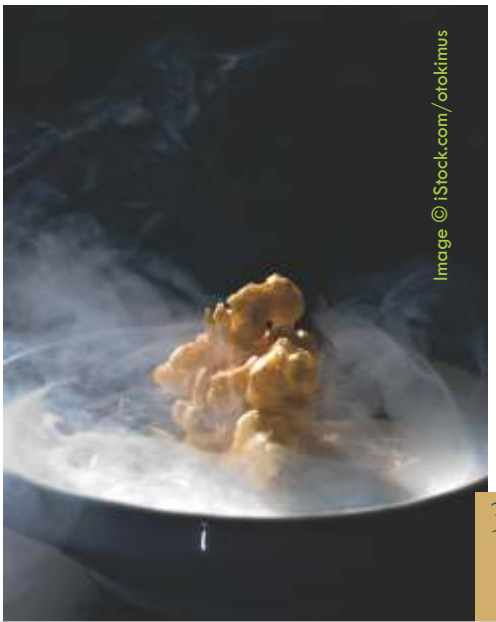


Image © iStock.com/otokimus

Chef Heston Blumenthal is made this unusual technique famous cooking for a long time and is known for its unique but delicious combinations, Blumenthal introduced its frozen nitrogen egg and bacon. One of the many benefits of nitrogenous ice cream is that the flavours can be made with fresh ingredients found in the home. The main difference between nitrogen ice cream is the texture; it is much creamier than its normal counterpart. Liquid nitrogen attracts consumers because it creates a show every time it is used, an impressive cloud of steam occurs once this chemical is exposed to air.

Since then, restaurants and shops have been incorporating this method for your recipes. On May 31, 2016, Starbucks (https://news.starbucks.com/news/starbucks-to-seize-multi-billion-dollar-cold-coffee-market)announced the new cold coffee Nitro Brew to your menu. According to Mintel, the popularity of cold coffee has skyrocketed in the last year in the United States, from 2010 to 2015 has been an increased growth of 339% . As a result, Starbucks has decided to expand its buffet menu bar during the summer. The new Nitro Cold Brew is made from liquid nitrogen and out of the tap.

"For over 40 years we have perfected the art of grilling and preparing infusion best hot coffee and while we have always offered our customers new options of cold coffee, nothing compares to the pace of taste, craftsmanship and innovation infusion will see in the coming years, "said Howard Schultz, Starbucks chairman and CEO. "The opportunity to create a new experience of cold coffee is unlimited and our customers and we are saying they want to join us on this journey of cold coffee while is becoming the preferred drunk."

By Victoria Weler

Winecream: An ice wine

Food News Latam JUNE 10, 2016

Life is full of simple pleasures; drinking wine and eating ice cream are just some of them. After a long day of work, many of us like to relax with a glass of wine.

Unlike wine, ice cream have earned a bad reputation among consumers because they can be considered unhealthy. However, it still remains the favourite dessert worldwide.

Now a company in Baltimore, Maryland, Crossroad Co., made it possible for you to enjoy both pleasures at the same time. They are the creators of "Wincecream- wine ice ." It's the best of both worlds. Now you can eat ice cream without feeling guilty, but relaxed instead.

It all started one Christmas Eve, where a family was enjoying the company of each other and eating snacks at night. They were satisfied eating ice cream and drinking wine - separately. Everyone agrees on two things; ice cream and wine, but not many can imagine the pairing of the two. After that night, Crossroad Co. was created with Winecream. This delicious parfait is made from a mixture of cream and flash freezing "artisan fruit wines" using the method of liquid nitrogen.

The wine is mixed with ice cream base. A customer should choose your wine from a wide range of home options such as strawberry, mixed berry, peach or pineapple. Consumers also have the option to add different ingredients like natural fruit purees, sliced fruit, nuts, candies, and pieces of cookies. After the customer chooses its ingredients, freezes all together. The interesting thing about the use of liquid nitrogen is that your ice cream is made fresh in a matter of minutes. Each serving only requires few ingredients. One of the many benefits of liquid nitrogen is that you know exactly what's in your ice cream. As a result, it is healthier than regular ice cream. It also has a softer and lighter than its regular counterpart texture. On the positive side, liquid nitrogen can be fun to see, because a vapour cloud surrounding the metal containers used to make ice cream is formed. It's like you're watching a science experiment.

Winecream even better with the delicious taste of ice cream is obtained while consumers enjoy the health benefits and fun of wine. Each serving of ice cream contains 10% alcohol by volume. This is the equivalent of a glass of wine. Moderate consumption of wine can provide numerous health benefits ranging from reduced risk of heart disease to promoting longevity. Now, Crossroad Co. made it possible for us to eat free ice cream consequences and guilt.

Winecream has been extremely popular in local festivals and private events. Fortunately, Crossroad Co. plans to expand the business. Soon people will be able to order this dessert online.

By Victoria Weler


Image © iStock.com/DragonImages

Mobile is valuable tool to reach cost-conscious Millennial grocery shoppers, poll finds

Food Navigator USA, 31May2016

Millennials may have an estimated $200 billion in annual buying power, but as a group that experienced the Great Recession at an impressionable early age, most take a "practical and cost-conscious approach to buying," new research reveals.

"Cost consciousness is not something that is right at the top when most people describe Millennials" or what influences their shopping decisions, but a poll of 1,000 millennials nationwide commissioned by the mobile marketing and promotion platform Retale found 18 to 34yearolds value cost above all else when it comes to buying groceries, said Pat Dermody, president of Retale.

Specifically, the poll, conducted between May 2 and 6, found 50% of Millennials said the most influential factor for determining where they buy groceries was "lower costs or opportunities to save," which beat out the availability of locally-grown or organic products (listed by 38% of respondents) and close proximity to their house or workplace, which was named by 34% of respondents. In addition, 34% of Millennials described their grocery shopping style as "thrifty," which edged out "local" and "foodie," which captured 24% and 23% of respondents respectively.

The lingering impact of the Great Recession

While Dermody said she was surprised by how price sensitive the poll found Millennials to be, she reasoned that they likely picked up cost-conscious habits in part due to their experiences during the Great Recession in 2008. "Plenty of Millennials lived in households where people lost their jobs or were directly impacted during the Great Recession, and they were old enough to know" how the loss of income impacted their daily lives then and that has stuck with them in the longterm, Dermody told FoodNavigatorUSA.

This is especially true of older Millennials aged 26-34, 64% of whom said that they felt the Great Recession personally affected them, compared to only 46% of 18 to 25-year-olds who also agreed, according to the study. Dermody also pointed to the Great Recession's ripple effect on the availability of jobs and ability for younger people to move out of their parents' home. And in light of those economic and societal impacts, she said it makes sense that Millennials would be price sensitive.

Responding to Millennials' price-sensitivities in a modern age

For grocers, this means evaluating how best to communicate deals, promotions and cost-savings to Millennnials to get them in the door, Dermody said. One way retailers have appealed to consumers' price-sensitivities is through loyalty programs, in which 59% of Millennials surveyed said they participated – a number that climbed to 64% among older Millennials aged 26-34 years, the report found.

The majority of participating Millennials said they signed up for loyalty programs not out of a sense of fealty, but because they wanted more discounts and coupons. A much smaller portion –39% – participated to build points for future deals, according to the survey.

Another way retailers can tap into Millennials thrifty nature is by offering deals and coupons to them through their mobile device, which 52% of respondents said they use before grocery shopping to manage their trip.

Primarily, Millennial shoppers use their mobile devices to "clip mobile coupons" and "browse weekly ads," according to the survey, which found this was the case for 43% of respondents. A much lower portion, 27%, use their mobile devices to create and manage shopping lists. Even fewer, 12%, use them for recipe inspiration or to find store locations and hours (10%), the survey found.

The big takeaway for retailers and brands from this insight is that mobile is an integral part of Millennial consumers' shopping habits, Dermody said. Indeed, the survey found 41% of Millennials would like more offers and coupons sent to their mobile device when they enter a store, 12% want to be able to scan an item on their mobile device for more information and 10% would like a mobile pay option at checkout, according to the survey.

Nanoemulsions may boost beta-carotene availability from supplements

NutraIngredients, 07Jun2016

The bioaccessibility of beta-carotene from commercial tablets and softgels is low, and could be significantly enhanced by using nanoemulsions, says a new study.

Scientists from the Department of Food Science, University of Massachusetts, Amherst report that excipient nanoemulsions formulated from long chain triglycerides (LCT) could significantly boost the bioaccessiblity of the carotenoid.

Data from an in vitro gastrointestinal tract (GIT) model – which included mouth, stomach, and small intestine phases – indicated that the bioaccessibility of the beta-carotene from the tablets and soft gels was found to be low, at 0.3% and 2.4%, respectively.

The LCT nanoemulsions, however, were found to increase beta-carotene bioaccessibility in tablets to 20% and in soft gels to 5%, according to findings published in the Journal of Agricultural and Food Chemistry .

"Our results may be useful in formulating dietary supplements with improved bioavailability characteristics," wrote Laura SalviaTrujillo and David Julian McClements. "For example, soft gels could be formulated to contain an LCT nanoemulsion (rather than bulk oil) inside the capsules, or tablets could be formulated to contain a spraydried LCT nanoemulsion within them."

Bioaccessibility

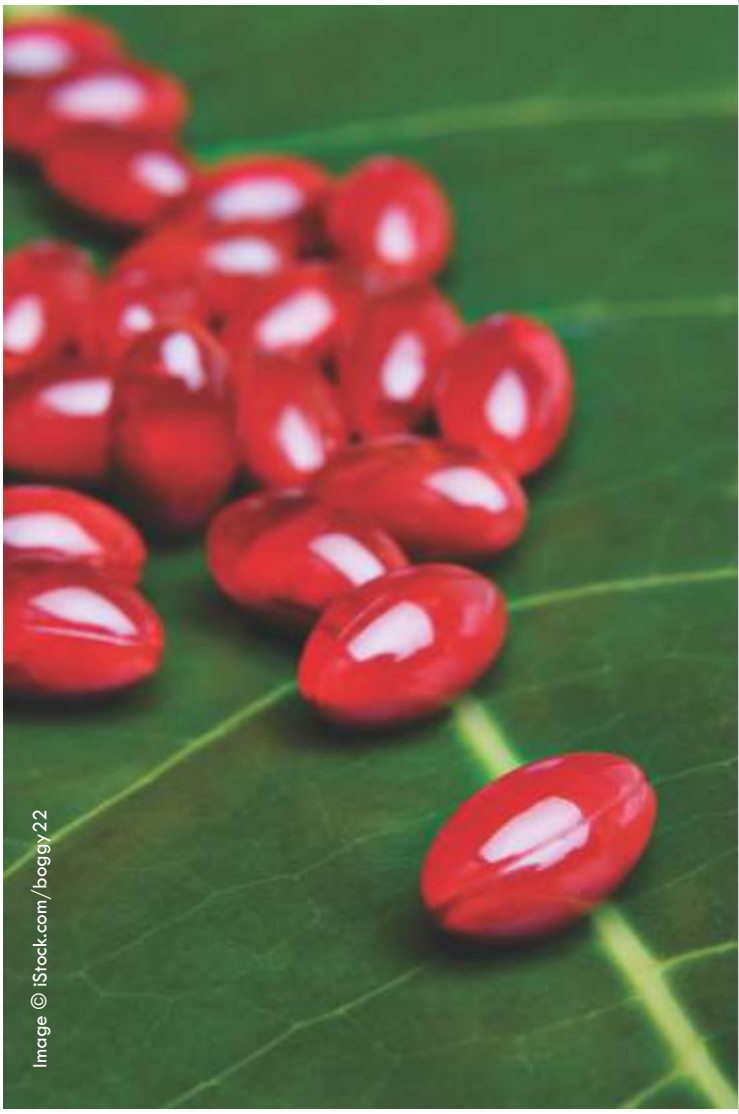
Salvia-Trujillo and McClements explained that the bioaccessibility of carotenoids – which are fat soluble molecules, is dependent on the type of oil used to deliver them. "Excipient emulsions are an effective strategy for improving the bioavailability of lipophilic nutrients and nutraceuticals," they wrote. "An excipient emulsion may achieve this goal by modulating the bioaccessibility, absorption, and/or stability of the co-ingested nutraceuticals in the GIT.

"In the current work, the focus was on the utilization of oil-in-water nanoemulsions as excipients for carotenoids delivered in the form of dietary supplements. These excipient nanoemulsions consist of small lipid droplets (diameter less than 200 nm) dispersed within an aqueous phase. An advantage of using nanoemulsions as excipients is their rapid digestion within the GIT due to their small droplet dimensions (high surface area), which can lead to rapid solubilization of any lipophilic bioactives into the mixed micelle phase."

The researchers tested the accessibilityof beta-carotene from tablets and soft gels manufactured by Whole Foods Market and Country Life, respectively. They also tested the accessibility of the carotenoid when long or medium chain triglycerides (LCT or MCT) were co-administered.

Results showed that the bioaccessibility of the beta-carotene from the tablets and soft gels was poor, and that the MCT nanoemulsions only slightly improved bioaccessibility. Significant improvements were observed for the LCT nanoemulsions, particularly from tablets.

"These results were attributed to the ability of large carotenoid molecules to be incorporated into large mixed micelles formed by LCT digestion but not by small ones formed by MCT digestion," wrote Salvia-Trujillo and McClements. "Our results indicate that excipient nanoemulsions have considerable potential for improving nutraceutical bioavailability from dietary supplements."



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REGULATORY NEWS

'Traffic-light' and numeric calorie labels cut calorie consumption by 10 percent

Medical News Today 15 June 2016

Colour-coded calorie indicators as effective as actual calorie numbers for online meal-ordering platforms

Imagine you're ordering lunch from your favourite online delivery spot, and just before submitting your order, you notice that the club sandwich in your cart is marked with a red stop light signifying high calorie content. Would you keep it in your cart? New research from the Perelman School of Medicine at the University of Pennsylvania suggests you might switch to a lower-calorie option. When researchers added colour-coded or numeric calorie labels to online food ordering systems, the total calories ordered was reduced by about 10 percent when compared to menus featuring no calorie information at all. The study is the first to evaluate the effect of "traffic-light" calorie labelling - where green labels signal low calorie content, yellow labels signal medium calorie content, and red labels signal high calorie content - in the increasingly common setting of ordering meals online. Results are published online in the Journal of Public Policy & Marketing.

"Calorie labelling appears to be effective in an online environment where consumers have fewer distractions, and the simpler traffic-light labelling seems as effective as standard calorie numbers," said lead author Eric M. VanEpps, PhD, a postdoctoral researcher at the Center for Health Incentives and Behavioral Economics at the Perelman School of Medicine at the University of Pennsylvania.

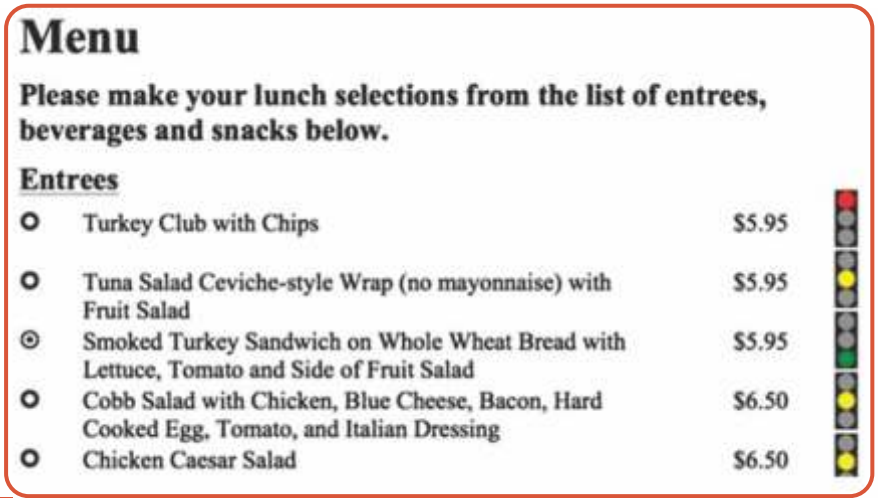
The U.S. Food and Drug Administration has said that in May 2017 it will begin mandating numeric calorie labelling for restaurants, movie theatres, vending machines, and food delivery services - including delivery services with online ordering. States such as Vermont and cities including New York and Philadelphia also have begun to implement broad calorie-labelling mandates.

For the study, VanEpps and colleagues from Carnegie Mellon University set up a system in which corporate employees ordering lunch from a cafeteria via a newly-developed online portal were presented with the calorie information for menu items via numeric or traffic light calorie labels, both together, or none at all.

Over the six week study period, 803 orders were placed by the 249 study participants.

The team found that each of the three calorie labelling conditions - numbers alone, traffic lights alone, or both labels together - reduced calories ordered by about 10 percent, compared to orders involving no calorie labels. "The similar effects of traffic light and numeric labelling suggests to us that consumers are making decisions based more on which choices seem healthier than on absolute calorie numbers," VanEpps said.

As expected, the simple traffic light labelling of calorie content had a particularly strong impact among the subset of participants who scored poorly on a simple test of math ability (numeracy). Calorie labelling overall also had a stronger impact among obese participants than among non-obese participants. Results of the study add to ongoing research from the team examining calorie labelling's impact in different meal-ordering settings. "Future studies looking at different menu types and sets of participants are necessary, but this study on its own provides clear evidence that both calorie labelling methods can be effective when ordering meals online," VanEpps said. "It's important that research be conducted in all ordering contexts where calorie labelling mandates might be applied."



Menu

Please make your lunch selections from the list of entrees, beverages and snacks below.

Entrees

○	Turkey Club with Chips	$5.95
○	Tuna Salad Ceviche-style Wrap (no mayonnaise) with Fruit Salad	$5.95
◉	Smoked Turkey Sandwich on Whole Wheat Bread with Lettuce, Tomato and Side of Fruit Salad	$5.95
○	Cobb Salad with Chicken, Blue Cheese, Bacon, Hard Cooked Egg, Tomato, and Italian Dressing	$6.50
○	Chicken Caesar Salad	$6.50

Image © iStock.com/blueboy2014

Image © iStock.com/Roxiller

Fraud prevention guide unveiled for herbs and spices

Food Manufacture UK, 10Jun2016

A guide to protect manufacturers from buying adulterated or substituted herbs and spices has been launched in a landmark joint industry initiative.

The paper is aimed to provide food firms with industry best practice guidance on the assessment and protection of the authenticity of culinary dried herbs and spices. It was developed by the British Retail Consortium (BRC), Food and Drink Federation (FDF) and the Seasoning and Spice Association (SSA) in liaison with the Food Standards Agency (FSA) and Food Standards Scotland (FSS). Central to the guide is a decision-tree, which navigates producers through a series of specific vulnerabilities in the supply chain.

Appropriate measures

KerinaCheesman, policy and food integrity manager at the FDF, said the practical guidance will help food companies ensure they have the appropriate measures in place. She said: "Culinary dried herbs and spices are widely used ingredients. This guide, developed in partnership with regulators, draws on industry expertise to provide food businesses across the supply chain with practical guidance so that they can confidently play their part in assuring the integrity of these ingredients."

Elizabeth AndohKesson, food policy advisor at the BRC, said: "This is a really important, practical guide for all food businesses to improve the way they manage a potentially vulnerable supply chain. "It was great to collaborate with experts from manufacturers and suppliers to make a positive contribution to securing the supply chain and reinforcing consumer confidence."

Growing concern in the US

The trade bodies came together following growing concern in the US and Canada that certain batches of ground cumin and paprika were being tested positive for undeclared peanut protein. The level of contamination suggested that the products had most likely been adulterated with cheaper materials for financial gain. As a consequence, both industry and the FSA launched sampling programmes in the UK. While the programmes uncovered no evidence of large scale adulteration of herbs and spices, the FSA – recognising the severity of the situation in North America – decided to meet with representatives from across the food industry at a specially organised workshop. A key recommendation arising from this workshop was that an expert joint industry working group should be established to develop best practice guidance for UK businesses.

New sugar labelling a boon for alternative sweeteners

Food Navigator USA, 06Jun2016

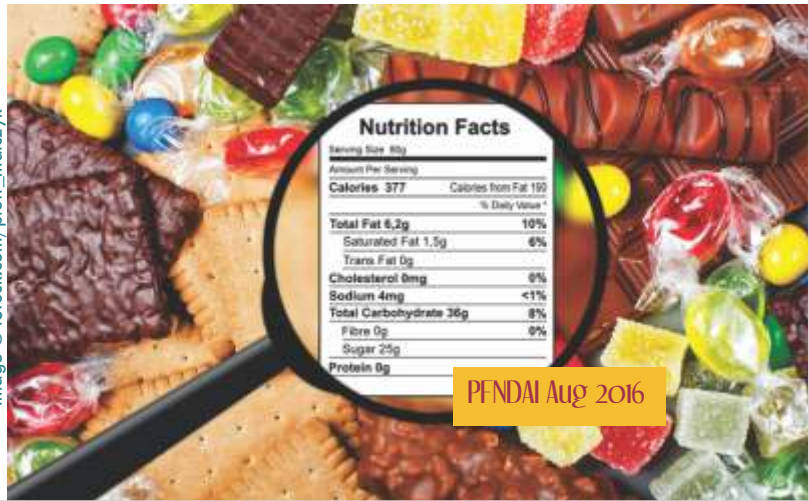
The added sugars portion of the newly revamped nutrition facts labels for food products will provide a significant opportunity for purveyors of alternative sweeteners, an industry expert says.

The changes to the nutrition facts panel that were recently finalized by the US Food and Drug Administration have been criticized by industry sources as adding detail at the expense of consumer understanding. Some changes have sparked little argument, such as the modification in portion sizes to reflect how consumers actually consume food products.

Energy beverages that divided the bottle up into two servings were an obvious example from the past that called out for a change as the percentage of consumers who actually used them this way—drinking half of the bottle and saving the rest for later—probably figured in the single digits.

Added sugar angst

But the way that sugars will now be denoted when the labels take effect in late July 2018 (small manufacturers with less than $10 million in sales have an additional year to comply) had caused much consternation in industry when it was first proposed. Total sugar is now called out with a subset of sugars added in the formulation stage. Added sugars, it has been feared, could become the bogeyman of the new age, an age in which one can easily foresee social media influencers who are blasting products that rely on sugars that 'they' added, sugars that were



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added because 'they' were too lazy or incompetent to make the food palatable in any other way.

For sweetener expert John Fry, PhD, what FDA did was merely to codify what consumers are already worried about. "Sugar reduction is already a big deal—it is one of today's main themes in food processing. The FDA's proposal merely underlines that sugars content is a matter of consumer concern that won't go away," Fry told FoodNavigatorUSA.

And to some degree, Fry, who since 1997 has directed Connect Consulting, a technical resource for sweetener manufacturers and users, said he agrees with the spirit of the change in that food processors had taken to using a blizzard of verbiage to camouflage to some extant that sugar was being added to processed foods. One of the more creative of these, "evaporated cane juice," was the subject of an FDA guidance issued in late May. The agency said this ingredient should be labeled for what it is—sugar.

"The changes proposed by the FDA to the nutritional fact panel as well as serving size have certainly caused product formulators to look at how their new label will look to consumers. For some this is likely causing great angst. There are multiple synonyms for 'added sugars' that are used in products (The US Dept. of Health and Human Services has noted 23 different names for what are in effect, added sugars). The FDA proposal will provide a single number that will allow consumers a clearer view of what all these names actually mean in the product they eat or drink," Fry said.

Alternative opportunity

These changes come at a propitious time for the purveyors of alternative sweeteners, Fry said. The formulation challenges presented by these products, stevia in particular, have been mostly surmounted in a serious of progressive steps to where the sweet-but-metallic-tasting stevia formulations of the past are becoming a thing of the past and only show up in products like multi-ingredient powder formulas where a commodity ingredient choice might make sense.

"Stevia and monk fruit are the most popular high potentcy sweeteners of natural origin partly because they are the only ones available. Both work well, although complete replacement of sugars (in, say, beverages) by these two alone remains technically challenging. Stevia has a leading position because there is a wide range of different leaf extracts for different purposes, and more research has been done on stevia, resulting in ever-improvingtaste qualities. Monk fruit is also relatively-expensive," Fry said.

Fry said stevia has carved out a market niche in which consumers are familiar with the ingredient and are choosing it in increasing number. Fry credits Cargill, a company with which he has consulted for a number of years, for much of this market push with its Truvia brand of table top sweeteners and baking ingredients.

"I think consumers are always ready to look at new products, especially if they chime with today's priorities for reduced sugar and nature-based ingredients. And if they try the latest products they'll find that stevia really has moved on since the early days. The huge success of Truvia table top sweeteners also shows that the taste of stevia is here to stay, while continued growth in the stevia ingredient market points to a rosy future for the sweetener," he said.

Can less sugar mean thinner consumers?

The goal of the labelling change is to make the content of food more immediately clear to consumers so that they can make better choices.

Obesity and its assorted ailments such as type 2 diabetes is a rising tide around the world. A recent study published in The Lancet journal found that the number of obese people around the world now outnumbers the number of underweight people—a first. This looming public health crisis—the potential health care costs alone are staggering not to mention the harder-to-quantify, hidden costs such as lost productivity from premature disability and death—have sounded alarm bells among a number of governments. Mexico, for instance, last year instituted a stiff tax on sugar sweetened beverages in an effort to stem the tide in that country, which along with the US, New Zealand and some of the states around the Persian Gulf account for the fattest counties in the world among more developed nations. (Some Pacific Island nations rank up near the top on this list, too, but in those cases prevalent genetic factors are at play in addition to lifestyle considerations.)

The question is, is just reducing sugar the answer? After all, drastically reducing fat was at one time thought to be the answer to stemming the obesity tide, and now that notion no longer carries much weight. Fry agrees with many researchers that obesity is a complex phenomenon that does admit to a single, simple answer. But sugar reduction can be a part of the answer and has been shown to help in reducing overall energy intake, he said. "Alternative sweeteners are not pharmaceuticals. They won't magically make you thinner (or fatter) and their consumption is not a license to overindulge in energy-dense foods. What they will do, as part of a calorie-controlled diet, is add great taste

that makes adherence to that diet easier and more enjoyable," Fry said.

Obesity: Blame game holds no weight as collective efforts are favoured

Food Navigator, 30May2016

Obesity cannot be solved by pointing fingers at consumers, industry or governments, but all parties must demonstrate accountability and responsibility in solving this public health crisis.

Hosted by FoodNavigator and NutraIngredients, the debate bought consumer, industry and academic voices together to assess the scale of the problem, and consider ways to tackle a global public health crisis the McKinsey Global Institute says costs roughly €1.75 trillion annually, or 2.8% of global GDP.

"We as adults have accountability for what we eat," said Tim Rycroft, director of corporate affairs at the UK Food and Drink Federation (FDF). "But there's also responsibility for organisations, governments, parents, local authorities, farmers, food and drink manufacturers and retailers."

Rycroft and fellow panellist Pauline Castres, food policy officer at the European Consumer Organisation (BEUC), identified reformulation as an area where inroads could be made. "Stricter reformulation means having clearer targets to reduce sugar, salt, and fat in foods," she said. "We need the industry to come up with reduction targets and we need governments to be in the driver's seat."

Major food firms have responded to calls in reformulating products to help cut sodium, sugar and fat from its brands. For example, Nestlé cut sodium 22.7% in its portfolio between 2005 and 2012. Mars said it has removed at least 15% of saturated fats from its Mars, Snickers, Milky Way, and Topic bars in the UK and Europe. Mars claimed that these products now had 35-45% less saturated fat per 100 g than the average of the top 25 chocolate brands in each market.

Image © iStock.com/CreativaImages

Food labelling

Food labelling and how consumers interpret the information was also identified as an area where long-term behavioural changes could be made. "For all the benefits that they bring, we know that not enough consumers read the label," said Rycroft. "And we have to find a way to cut through that and implement long-term behavioural changes. That's the big challenge."

He referred to the UK's 'traffic light' scheme introduced by the UK Food Standards Agency (FSA), in which the fat, sugar, and salt content of packaged food was labelled and colour-graded. Although it is voluntary, more than 75% of packaged foods feature the label.

However, Carrie Ruxton, dietician & nutrition consultant for Nutrition Communications, argued manufacturers would find it difficult to change the colour coding after reformulation of a product had occurred. "The amber colour is very broad and it is very difficult to get into green," she said. However, I don't think there is one perfect system and I do believe it, at a glance, gives the consumer some important information."

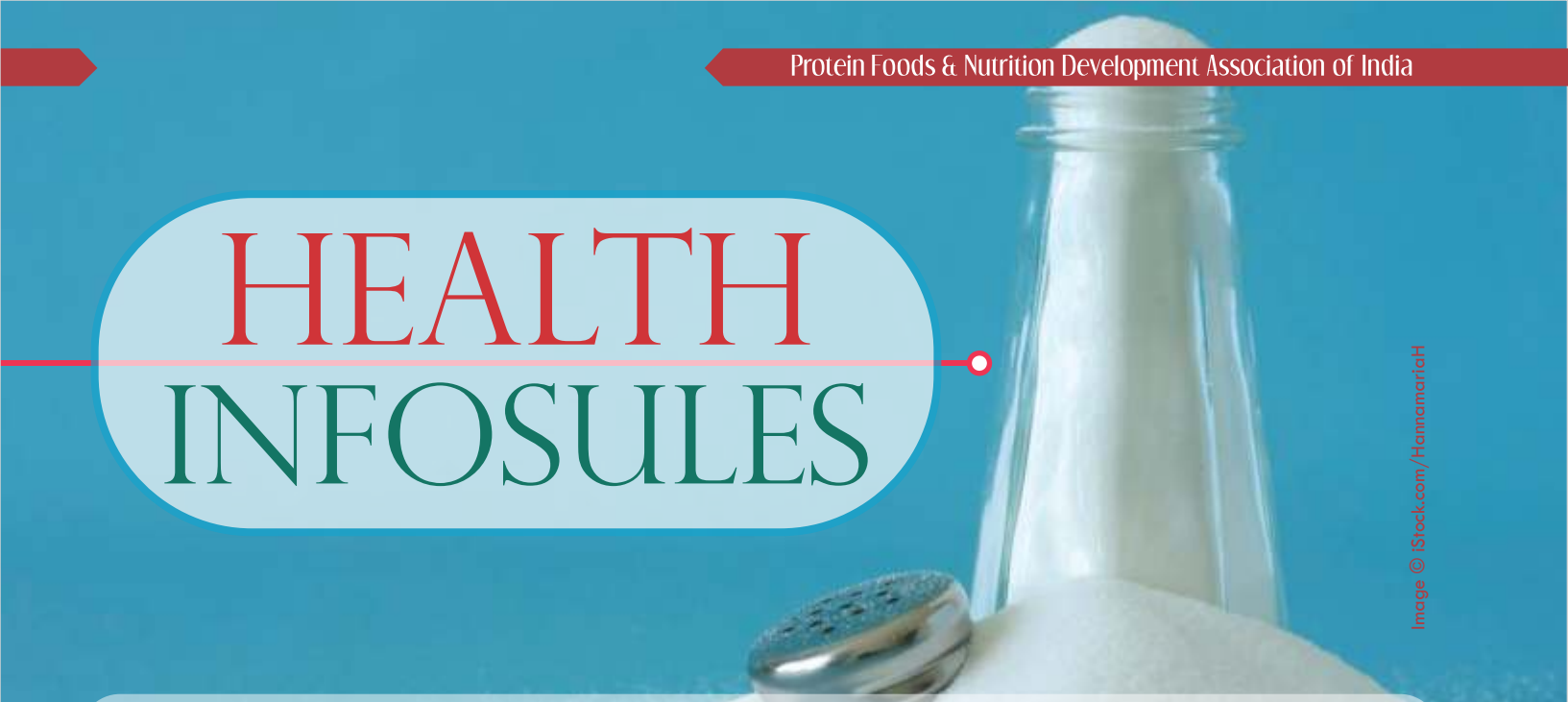
One obvious determinant of how the fight against obesity would pan out is cost. Dr Andrew Shao, vice president for global nutrition policy at supplement maker Herbalife pointed out nutrient-dense foods were more expensive to produce. "Empty calories cost very little as opposed to nutrient dense foods such as fresh fruits and vegetables. This issue I believe is a huge reason that has contributed to the explosion of the obesity epidemic." He emphasised the role supplements could play in boosting nutrient-poor diets.

Food marketing

Despite voluntary industry efforts to restrict marketing and advertising of less healthy foods especially to children Castres urged greater government action. "In cases where voluntary initiatives have not delivered, we need to get governments to state the rules and industry to be involved in the dialogue otherwise regulation is the only option. A World Health Organisation (WHO) nutrient profile model that restricts marketing to children and is adhered to by the 28 EU membership states is a matter of urgency for the industry to endorse."

Rycroft said regulations in the UK that controlled advertising to children on television were strict enough.
"I agree that we need to make sure regulation of advertising to children keeps up with the debate. But I think the record of that in the UK is strong."

HEALTH INFOSULES



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Salt: How much is too much?

Written by Honor Whiteman
Medical News Today 15 June 2016

Salt intake has become a major health concern in the United States. An array of studies have claimed too much salt in the diet can increase the risk of serious illness, such as heart disease and stroke, prompting recommendations to lower salt intake. But how much is "too much" when it comes to salt consumption?

The Dietary Guidelines for Americans recommend that adults consume less than 2,300 milligrams of sodium each day - the equivalent to around 1 teaspoon of salt - as part of a healthy diet. A report from the Centers for Disease Control and Prevention (CDC) released earlier this year, however, found that around 90 percent of adults and children in the U.S. consume more than the recommended sodium intake, with most adults consuming more than 3,400 milligrams daily.

CDC Director Dr. Tom Frieden branded the report findings "alarming," noting that more needs to be done in order to reduce the salt intake of Americans and "save lives." And it seems the U.S. Food and Drug Administration (FDA) agree; earlier this month, the organization issued draft guidelines for the reduction of sodium in processed foods, which account for around 75 percent of all salt consumption. The aim of these guidelines is to lower salt intake among consumers to the recommended level of 2,300 milligrams daily, in order to reduce the health risks associated with high salt consumption.

However, some researchers suggest that such a level is too low. In fact, some say that consuming salt in such small amounts may even do more harm than good.

Salt intake: The benefits and risks
According to the American Heart Association (AHA), around 90 percent of Americans' sodium intake comes from sodium chloride, found in table salt and often added to processed foods for preservation and flavour.

How much sodium is in your food?

- A single slice of bread contains anywhere from 80-230 milligrams of sodium
- Some breakfast cereals can contain up to 300 milligrams of sodium before milk is added
- One slice of frozen pizza can contain 370-730 milligrams of sodium.

Learn more about salt

It is well known that the body needs some salt; it is important for nerve and muscle function, and it helps regulate bodily fluids. One study, published in the journal Cell Metabolism last year, even suggested that salt consumption can stave off harmful bacteria and reduce the risk of infection. However, numerous studies have indicated that consuming too much salt can increase the risk of serious health problems, particularly when it comes to cardiovascular health, with research linking high salt intake to hypertension, stroke, and heart disease.

A study published in the Journal of Agricultural and Food Chemistry earlier this year also suggested a high-salt diet may cause liver damage, while another study linked high salt intake to increased risk of multiple sclerosis (MS). The basis for which high salt intake can cause bodily harm is a feasible one; too much salt can cause the body to retain water, which can put additional strain on the heart and blood vessels, raising blood pressure and increasing the risk of cardiovascular diseases. But at what point does salt intake stop helping and starting hindering our health? This remains a subject of debate.

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Are current salt intake recommendations too low?

While current guidelines recommend consuming less 2,300 milligrams of sodium daily, a study reported by Medical News Today last month suggested that even 3,000 milligrams of sodium daily may be too little and could put health at risk. Led by researchers from McMaster University in Canada, the study found that adults who consumed less than 3,000 milligrams of salt a day were at greater risk of heart attack, stroke, and premature death than those with an average sodium intake.

What is more, the team questioned the health risks of high salt intake, finding that it was only adults who already had high blood pressure who were at greater risk of heart disease and stroke with high salt intake - defined as 6,000 milligrams daily. "While our data highlights the importance of reducing high salt intake in people with hypertension, it does not support reducing salt intake to low levels," concluded study leader Andrew Mente, of McMaster's Michael G. DeGroote School of Medicine.

This is not the first study to question the current salt intake guidelines; a 2014 study conducted by Michael H. Alderman, of the Albert Einstein College of Medicine in New York City, found that reducing salt intake to less than 2,500 milligrams a day was not linked to reduced risk of the health conditions associated with high salt consumption.

'The science is clear - reducing salt lowers blood pressure'

Despite such findings, the FDA conclude there is an "overwhelming body of scientific evidence" that reducing daily sodium intake to less than 2,300 milligrams can prevent the health risks of a high-salt diet. "Experts at the Institute of Medicine have concluded that reducing sodium intake to 2,300 milligrams per day can significantly help Americans reduce their blood pressure and ultimately prevent hundreds of thousands of premature illnesses and deaths," notes Susan Mayne, Ph.D., director of the FDA's Center for Food Safety and Applied Nutrition.

Additionally, the organization points to previous studies that have suggested lowering sodium intake in the U.S. by around 40 percent over the next 10 years can save around 500,000 lives and reduce healthcare costs by around $100 billion. The CDC echo the FDA's view on reducing salt intake. "The science is clear - reducing salt lowers blood pressure," says Dr. Frieden, "and high blood pressure is a major risk factor for cardiovascular disease."

Speaking to The New York Times earlier this month, Dr. Frieden acknowledged that there are a number of researchers who disagree that reducing salt intake improves health outcomes, but he claims the studies they cite have "fatal flaws." Explaining what flaws Dr. Frieden is referring to, nutritionist Cheryl Anderson, member of the 2015 Dietary Guidelines Advisory Committee, told The Washington Post that many of the studies citing the negative effects of low-salt diets have only used a small number of urine samples to reach their conclusions, meaning the findings could be misleading.

Additionally, Anderson said some of these studies might be subject to "reverse causality," where instead of low-salt diets causing cardiovascular diseases, it could be that such diseases cause people to consume low-salt diets.

Further investigation into salt consumption is needed

While it seems many health experts are in support of government strategies to reduce salt intake among the general public, others say more research should be conducted on the long-term health effects of low-salt diets before making recommendations.

Additionally, many researchers and organizations - including the Grocery Manufacturers Association (GMA) - believe further research is required to pinpoint the exact salt intake that is most beneficial for health.

"Like others inside and outside of government, we believe additional work is needed to determine the acceptable range of sodium intake for optimal health," says Leon Bruner, chief science officer of the GMA.

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"This evaluation should include research that indicates health risks for people who consume too much sodium as well as health risks from consuming too little sodium."

Based on the current evidence, it seems following the current dietary guidelines for salt intake is the best way to reduce the health risks associated with high salt consumption. Whether such recommendations will ever be proven wrong, however, remains to be seen.

Written by Honor Whiteman

Is Okra Good for Diabetes?

Written by ZawnVillines
Medical News Today 9 June 2016

According to a handful of recent studies, okra may reduce symptoms of diabetes - a group of diseases that includes type 1 diabetes, type 2 diabetes, and gestational diabetes.

Diabetes claimed the lives of 75,578 Americans in 2013, according to the United States Centers for Disease Control and Prevention (CDC). In 2014, 8.5 percent of adults worldwide had the condition, the World Health Organization (WHO) report. By 2030, diabetes may be the seventh leading cause of death.

A number of factors increase a person's risk of developing diabetes, including a family history of the disease. Lifestyle factors also play a role, so doctors routinely recommend diet changes and increased exercise to reduce blood sugar levels.

Okra may help reduce blood sugar levels in some people with diabetes. Research into the effects of this seedy vegetable is still in the early stages, but the results are promising.

What is okra?

Okra thrives in temperate climates, producing large hibiscus-like flowers that eventually give rise to green seed pods. It is a member of the mallow family, which includes a number of other popular plants, including hibiscus, cocoa, and cotton. Scientifically known as Abelmoschusesculentus, okra may have been grown as long ago as 2000 BCE in Egypt.

Okra's flavour is mild, and the entire seed pod can be eaten. This vegetable-like fruit also has a long history in traditional medicine. Kew Royal Botanic Gardens report that in Eastern traditional medicine, okra leaves and fruit were used as pain relievers, moisturizers, and to treat urinary disorders. In Congolese medicine, okra is used to encourage a safe delivery during childbirth.

Can okra help with symptoms of diabetes?

Diabetes can often be well-managed with increasing a hormone called insulin and other medical therapies. However, some people with diabetes wish to avoid regular insulin injections. Others experience blood sugar dips and other unpleasant side effects, and diabetes medications do not work for everyone.

The possibility that a readily available seed pod could help control diabetes is an exciting one. But there is no evidence yet that okra can cure diabetes. So far, the research on okra has only looked at its effects on animals. Human bodies are similar to animals, but not all research on animals has worked out in humans.

Increased absorption of sugar by muscles

A 2005 study published in PlantaMedica investigated the effects of okra on rats with diabetes. A substance called myricetin is present in okra and some other foods, including red wine and tea.

Researchers isolated myricetin from okra, then administered it to the rat. The treatment increased absorption of sugar in the rats' muscles, lowering their blood sugar. A 2012 Food Science and Human Wellness review points to a number of other laboratory and animal studies that have linked myricetin to lower blood sugar. The study argues that myricetin may also reduce other risk factors for diabetes.

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Reduction in blood sugar spikes after eating

A 2011 study published in ISRN Pharmaceutics found a link between okra and decreased blood sugar spikes after eating. Researchers fed rats liquid sugar as well as purified okra through a feeding tube. Rats who consumed the okra experienced a reduction in blood sugar spikes after feeding. The study's authors think this is because the okra blocked the absorption of sugar in the intestines. The study also explored possible interactions between okra and metformin, a drug that can reduce blood sugar in type 2 diabetes. Okra appeared to also block absorption of metformin. This suggests that okra could reduce the effectiveness of metformin, and should therefore not be eaten at the same time as the drug.

Lower blood sugar levels

A 2011 study published in the Journal of Pharmacy and Bioallied Sciences points to a link between eating okra and lower blood sugar. The researchers allowed the blood sugar of rats with diabetes to stay level for 14 days. They then gave the rats powdered okra peel extracts and seeds dosages of up to 2,000 milligrams per kilogram of body weight.

There were no poisonous effects linked with these relatively high doses of okra. The rats that ate okra had reduced blood sugar levels after up to 28 days of eating okra. The study ended on day 28, so it is unclear if the effects on blood sugar levels would have lasted longer.

Considerations for using okra

Few studies have linked okra to negative side effects, but some negative side effects are possible:

☹ Okra may make the drug metformin less effective.

☹ Okra is high in substances known as oxalates. Oxalates may increase the risk of kidney stones in people vulnerable to kidney stones.

☹ Okra can contain bacteria, pesticides, and other dangerous substances if it is not thoroughly washed. People should never consume rotten okra, frozen okra that is past its expiration date, or okra that has not been thoroughly washed.

☹ People with an okra allergy should not consume okra. Those with an allergy to other plants in the mallow family, such as hibiscus or cotton, may also be allergic to okra.

Okra: Nutrition facts and other benefits

Even if okra proves to be ineffective in fighting diabetes, it remains a safe snack for people with diabetes. A single serving of 100 grams contains just 30 calories, but offers a number of nutritional benefits:

✓ Okra contains no saturated fats or cholesterol

✓ Okra is rich in fibre, containing 9 percent of the recommended daily value (RDV)

✓ Okra contains 8 percent of the RDV of calcium, 43 percent of the RDV of manganese, 10 percent of the RDV of iron and copper, and 44 percent of the RDV of vitamin K

Okra is rich in protective substances known as antioxidants, including myricetin. According to the National Center for Complementary and Integrative Health, antioxidants may reduce oxidative stress, a process that damages cells in the body. Oxidative stress plays a role in the development of diabetes, as well as diseases such as:

⊙ Parkinson's disease
⊙ Alzheimer's disease
⊙ Cataracts
⊙ Macular degeneration
⊙ Heart and blood vessel disease
⊙ Cancer

In addition to its antioxidant benefits, okra may also reduce tiredness. A 2015 study published in Nutrients found that substances found in okra seeds known as polyphenols and flavonoids could reduce fatigue.

Growing and cooking okra

Okra thrives when the soil temperature is above 65°F and is heat-tolerant throughout the summer. The OldFarmer's Almanac report that the first harvest is about 2 months from the date of planting. The plants are tall, growing at least 2 to 3 feet, and so need space to grow. They may also need to be staked. Okra is safe to eat raw or cooked. In some regions, fried okra is a popular side dish. Okra also goes well with some soups like gumbo, salads, and can be pickled.

Written by ZawnVillines

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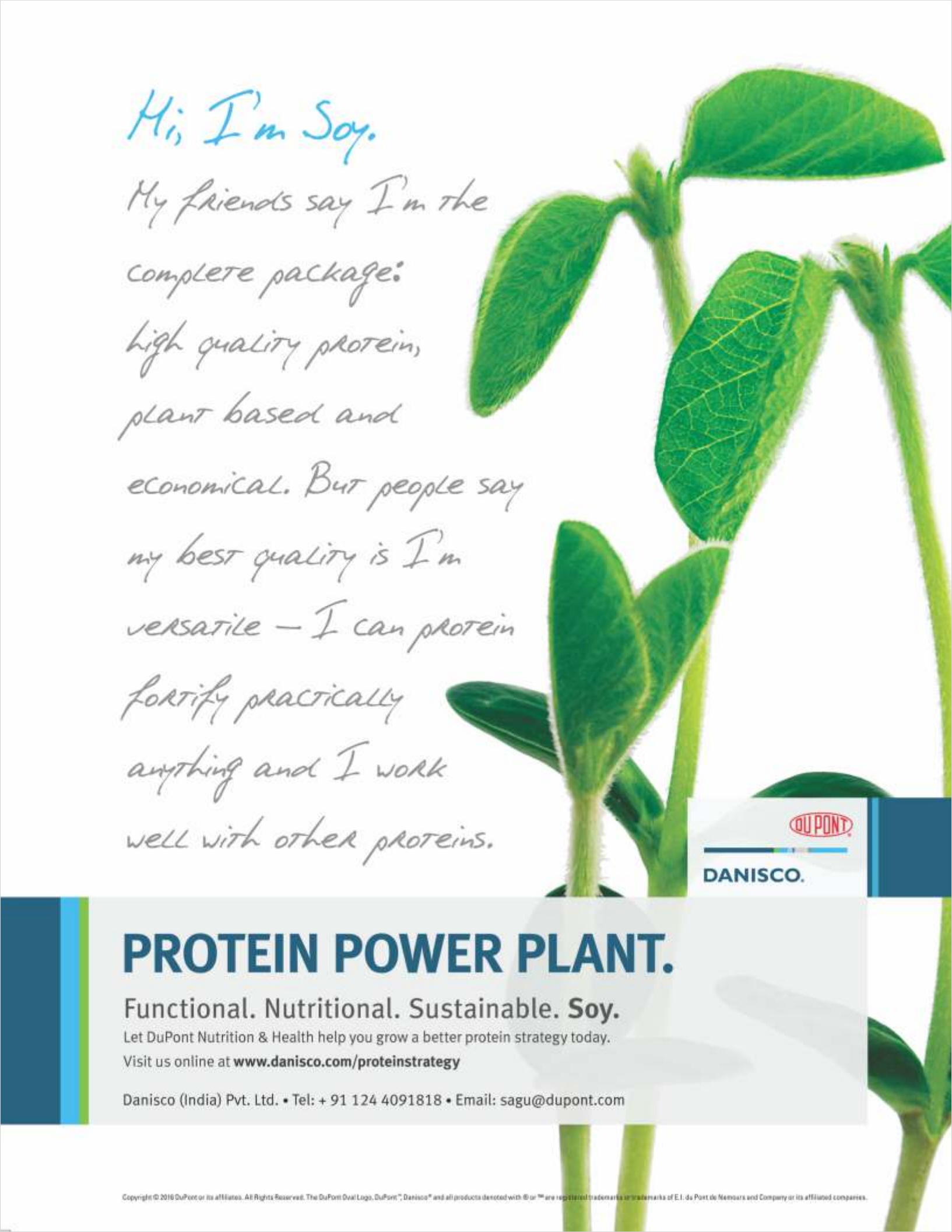

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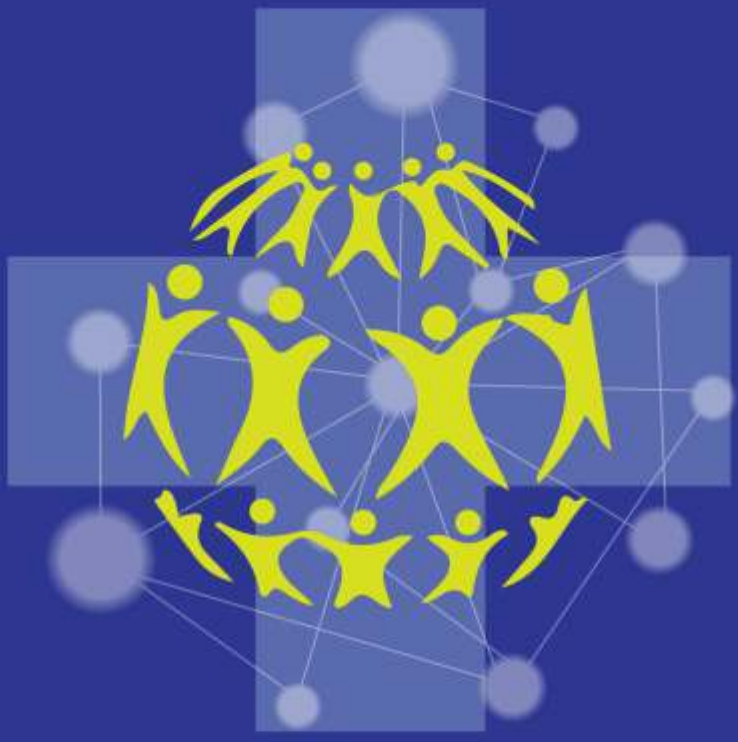

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