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PFNDAI Bulletin

FOOD, NUTRITION & SAFETY MAGAZINE

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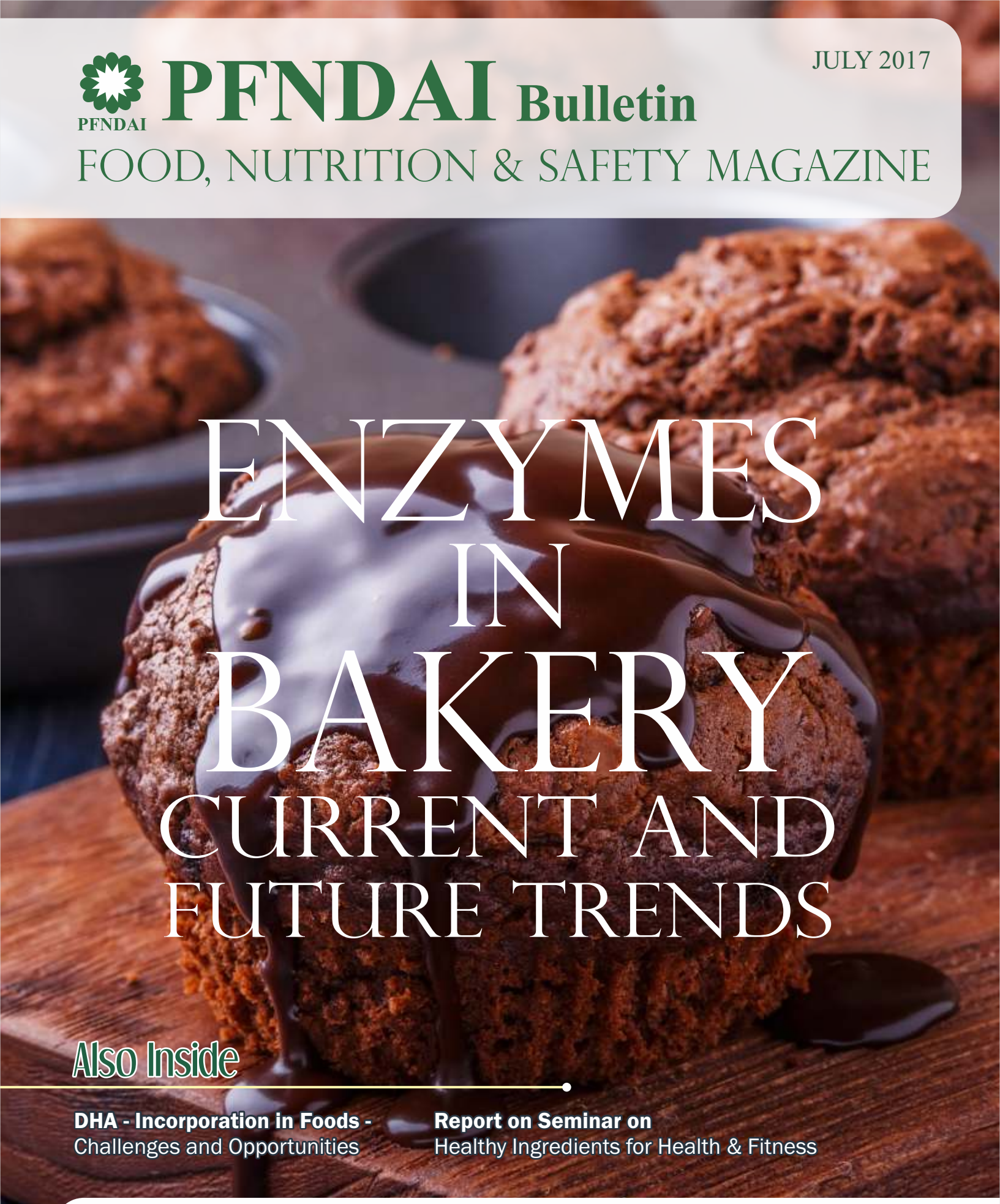

ENZYMES IN BAKERY CURRENT AND FUTURE TRENDS

Also Inside

DHA - Incorporation in Foods - Challenges and Opportunities

Report on Seminar on Healthy Ingredients for Health & Fitness

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EDITORIAL

In the US, every state has Department of Motor Vehicles and it publishes Driver's Manual. Anyone can download it. It gives the necessary rules governing driving of a motor vehicle on the roads including rules about how to drive and stop at signals and meaning of different signals and signs and how to drive cautiously during rough weather or negotiating on a slippery or icy roads. It also guides and gives tips about parking. In short it provides necessary guidance for a new driver. The booklet is usually about 100 pages and gives pictorial representation as well. Learner's license test usually requires study of this manual before taking this test.

We did not have this kind of manual until one of Mumbai's learned Traffic in-charge Dr. Pasricha wrote one very nice manual. Unfortunately it was not made compulsory for learners to study it, so after some time of its publication it was forgotten. Dept of Transport does not much bother about safety as it only publishes rules about driving on roads but whether they are understood by people or not is not a worry. They would only worry about enforcement.

It is observed that we only talk about safety when there is a seminar or conference or when there is a safety related problem like derailment, accident, fire or food poisoning case. We talk endlessly on the subject and then forget it. We never bother about it until the next mishap occurs and we repeat the same thing.

When we make rules about food safety, labelling etc. we must ensure that everyone understands and especially the person who manufactures food. There are safety boards developed which are posters which include very brief guidelines for consumers, retailers and manufacturers. These may be good as a beginning but if a person is interested in setting up a manufacturing facility these are not adequate. The next step is directly the rules and regulations which are quite difficult to understand.

US FDA gives very nicely guidance to consumers as well as industry and these are separate ones. They explain in easy terms the meaning of such things as what is Principal Display Panel and how to provide Nutrition Fact information with examples. There is no ambiguity. We don't know why it is difficult for our regulators to provide such simple guidance documents which are more than just the display boards.

The boards are very nice but that should be the starting point and not the end. The next step should be guidance booklet prepared with some examples in order to make people understand. This would go a long way to ensure compliance and safety of food products.

US FDA also provides safe food handling guidance which is a 2-page poster. It includes not only what to do but in short how to do. Also this is the beginning and then it goes further in the next step to explain more on safe food handling on another website FoodSafety.gov which gives more details. These are extremely useful directives and easy to understand. That is what should be the next step.

We hope that we also have such guidance booklets and website help in more details and in easy manner so not only it will help consumers keep food safe but also manufacturers prepare and deliver the products safe and of high quality. With season's greetings!

Prof. Jagadish S. Pai,
Executive Director
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ENZYMES IN BAKERY: CURRENT AND FUTURE TRENDS

Introduction

Enzymes have been used in food preparation much before they were recognized as catalysts. They have been used in cheese making, bread and wine making. Some of them were used within intact microbes like in wine and bread making using yeasts. Rennet was the first enzyme preparation used in making cheese. Malt is another enzyme preparation used in beer making. While rennet is protease, malt contains both protease and amylase. Today not just the enzymes have been characterized but are highly purified and manufacturers know how they catalyse so they can precisely control their action. More and more food companies are using enzymes because of their several benefits so their usage is increasing.

Global enzyme market was estimated to be over $ 8 billion in 2015 while the value of enzymes used in food processing is almost $ 3 billion. Market is constantly increasing especially in food processing, germination in breweries, pre-digestion of baby food, fruit juice clarification, meat tenderisation, cheese manufacture and conversion of starch to maltodextrin and glucose. Some of the prominent non-food applications are detergents, textiles, laundry, tanning, pharmaceuticals, cosmetics and fine chemicals industries. These applications are also growing rapidly.

The food applications are very attractive because enzymes work at ambient conditions so mild conditions are necessary so nutrients are not degraded very much during enzymatic action. Also unlike chemicals catalysts enzymes do not leave any residues or by products which may be toxic or hazardous. Using temperature, pH and inhibitors their activity could be precisely monitored and controlled. Enzymes could be prepared from microbes at very reasonable prices. Also some could be immobilised so could be reused so their effective costs comes down even more. Among the food industrial applications, application in Bakery Industry has been quite prominent. Enzyme market for baked goods is also rising along with other applications and is expected to rise from over 400 million dollars in 2010 to almost one billion dollars in 2020.

Main constituents of baked products

Bakery industry makes all kinds of baked goods such as bread, cake, pastries, biscuits, crackers, cookies, pies and tortillas, where wheat flour is an essential ingredient as well as substrate for the enzyme. Other cereal products such as rye bread and some gluten-free products are also considered in this category made by bakery industry. Formulations vary significantly depending on the final product and typical ingredients may include wheat flour, fats, sugars, starch, eggs, emulsifiers, milk and water.

Bread is made commonly using wheat flour which contains starch, gluten, lipids, non-starch polysaccharides and naturally present enzymes. After flour is mixed with yeast and water, many processes start which are catalysed by wheat enzymes and by added yeast. These processes go on as dough is made until baking giving rise to bread. Extra enzymes added improve the baking process, allow use of variation in baking process, reducing time, slowing down staling, compensating for flour variation and for substituting


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chemical additives.

Starch is the glucose polymer in the forms of amylase (linear molecule of about 6000 glucose units joined together by α-(1,4) bonds) and amylopectin (highly branched molecule with short chains of α-1,4 bonds of 10 – 60 glucose units and α-1,6 bonds side chains with 15 -45 glucose units and averaging 2 million glucose units) .

Although many components like starch, fibre and lipids affect dough rheology, gluten affects it the most providing extensibility, viscosity, elasticity, cohesiveness and water absorption capacity. Ability to form visco-elastic dough with gas-holding property is due to gluten made up of gliadin and glutenin proteins which have a critical role in breadmaking. They interact in presence of water to form gluten whose quality depends on ratio of gliadin and glutenin which in turn provides breadmaking potential.

Although fibre constituents in wheat are many, arabinoxylans have the capacity to significantly affect properties of dough and final baked properties as they can improve dough development and dough stability by enhancing the water absorption capacity of the dough. Additionally during breadmaking they improve loaf volume, crumb firmness, reduce retrogradation and so delay staling to enhance shelf life of bread.

Baking process

Breadmaking has three steps namely mixing, fermentation (resting and proofing) and baking. During baking fluid dough or batter is transformed into a predominantly solid baked product. Baking alters sensory properties, improving palatability and extending range of tastes, aromas and textures of foods. Although baking has been practiced for a long time, the process is not completely understood due to the many coupled complex physical and molecular processes. It is a result of a series of physical, chemical and biochemical changes in the product, which include volume expansion, evaporation of water, formation of porous structure, denaturation of protein, gelatinization of starch, crust formation and browning reactions. The nature and properties of final product are influenced by mixing, chemical reactions (including enzyme-catalysed) and thermal effect of baking.

Of the three breadmaking processes, the simplest is straight-dough system where all ingredients are mixed to make dough. The second is sponge and dough method where mixing is done in two steps. Leavening agent is prepared first by mixing yeast and part of water and flour. After leaving it for a few hours remaining ingredients are added. Third process is Chorleywood method wherein all ingredients are mixed for a short time in ultrahigh mixer.

The most common leavening agent used in breadmaking is yeast Saccaromyces cerevisiae but other species like S. cariocanus, S. mikatae, S. paradoxus and S. kudriavzevii may also be employed. Lactic acid bacteria mainly species of Lactobacillus are used in sourdough bread making.

Breadmaking begins with forming dough by mixing flour, water, yeast, sugar, salt, shortening and other ingredients. Flour particles are hydrated and sheared during mixing and dough develops when gluten forms continuous cohesive network with starch dispersed in it. Incorporation of air during dough mixing is important which affects final crumb structure because CO2 formed by yeast during fermentation diffuses into these air bubbles. After resting dough is divided into loaf-size pieces, rounded, moulded, proofed and baked.

During baking combined effect of heat, moisture and time induced starch gelatinisation and pasting together with heat-setting of gluten occur with the formation of solid foam structure of baked bread. The dough expands due to expansion of air bubbles and vaporisation of ethanol and water increasing the volume. Crust formation and browning occur simultaneously. Crust browning is due to reducing sugars (glucose, fructose, maltose etc.) formed by hydrolysis of starch and sugar during dough making and leavening. Sugars caramelise and also reducing sugars react with amino acids of proteins. Besides brown colour, flavours are formed giving appealing smell and taste.

Fresh bread presents an appealing brownish and crunchy crust, a pleasant aroma, fine slicing characteristics, a soft and elastic crumb texture and a moist mouthfeel. However, when after removing it from oven after baking, a series of undesirable changes called staling starts leading to deterioration of quality making shelf life short for fresh bakery products.

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Loss of freshness accompanies increase in crumb firmness and reduced flavour and aroma making it less appealing to consumers.

Loss of moisture and starch retrogradation are the basic mechanisms causing firming of crumb. Consumer demand for consistent product quality and longer shelf life of baked goods including delayed staling have led to the use of many additives and bread improvers in the baking industry which include emulsifiers, soy flour, chemical redox agents and enzymes. Consumers would not like to have many chemical additives so enzymes are becoming a very attractive inclusions in the process of baking.

Enzymes used in baked products

Enzymes come into baking operations from three sources: those present naturally in flour itself; those present in microbes used in fermentation and those added in the dough. Adding enzymes to flour and dough in the form of improvers is a usual practice for flour standardisation as well as for baking aids. Enzymes are added to modify dough rheology, gas retention and crumb softness in bread manufacture, to modify dough rheology in pastry and biscuit manufacture, to change product softness in cake making and to reduce acrylamide formation in many bakery products. Enzymes may be added individually or in complex mixture for specific application in a particular product.

AMYLASES AND OTHER STARCH-CONVERTING ENZYMES

Malt and microbial α-amylases have been used extensively in baking industry. These are usually added to optimise amylase activity of flour, aiming to increase fermentable and reducing sugars. Due to their lower heat stability, fungal amylases are more appropriate than malt for flour standardisation. While α-amylases break down starch into lower molecular weight dextrins during dough stage, β-amylase converts these into maltose which is used as fermentable sugar by yeast or sourdough microbes. Higher level of reducing sugars leads to formation of Maillard reaction products, increasing bread flavour and crust colour. These enzymes also improve gas-retention property of fermented dough and lower dough viscosity during starch gelatinisation, with improvements in product volume and softness.

Some amylases also decrease the firming rate of bread crumb, acting as anti-staling agents. These commonly use bacterial or fungal enzymes with intermediate stability to heat. Their action if attributed to the modified retrogradation behaviour of the hydrolysed starch. Some scientists ascribe the effect to the interference of the low molecular weight dextrins with starch-starch and gluten/starch interactions.

PROTEASES

Proteases are divided into two groups: exopeptidases which hydrolyse proteins near the end of the chain whereas endopeptidases hydrolyse them away from the end or within the middle of the chain of amino acids. Proteolytic activity of sound, ungerminated grain is normally low so proteases are added in the commercial production of bread, baked goods, crackers and waffles. They are added to reduce mixing time, to decrease dough consistency, to assure dough uniformity, to regulate gluten strength in bread, to control bread texture and to improve flavour. Proteases are largely replaced bisulphite, which was previously used to control consistency through reduction of gluten protein disulphide bonds, while proteolysis breaks down peptide bonds. In both cases, resultant effect is similar weakening of the gluten network.

In bread production, protease is used to modify mixtures containing high gluten content. After enzyme treatment, partial hydrolysis causes dough to be soft and easy to pull and knead. These enzymes are also used in making pastries, biscuits and cookies. They reduce gluten elasticity and thus reduce shrinkage of dough or paste after moulding and sheeting.

HEMICELLULASES

These hydrolyse hemicellulase, the polysaccharides in dietary fibre components in wheat including xylan, xylobiose, arabinoxylan and arabinogalactan. The enzymes include xylanase when added with other enzymes affect the rheological properties of dough and sensory properties of bread. These are also added to improve quality of biscuits, cakes and other baked goods. Insoluble fibre interferes with formation of gluten network. With these enzymes they are solubilised removing the interference increasing viscosity and enhancing dough stability. This results in improved oven spring, larger load volume and softer crumb. Converting insoluble to soluble fibre also is beneficial for human health.

LIPASES

Lipases hydrolyse fats or triglycerides producing monoglycerides, diglycerides, glycerol and free fatty acids. There are also phospholipases

and galactolipases. Even though they are present in all grains, lipase activity of white flour is usually low enough. Lipases are used in baking more recently to give better effect in high speed mixing and no-time dough processes. Some are used to reduce the risk of off-flavour formation on account of prolonged storage of baked goods and also due to use of butter or milk fat in baked products.

Improvement of dough rheology is due to lipases hydrolysing end fatty acids (from positions 1 & 3 on triglycerides) to increase dough strength and stability and improvement of machinability. Simultaneously it improves volume which gives better and more uniform and softer crumb structure. Some lipases are used to produce more polar lipids which also produce more volume and there are some which increase expansion of gluten network, increasing wall thickness and reduce cell density giving better volume and crumb for high fibre white bread.

Lipase action produces mono and di-glycerides and lysophospholipids which modify interaction between lipids and gluten as well as incorporation of air during mixing is improved which may explain larger bread volumes. Staling may also be reduced by adding lipases in baked products due to formation of mono-glycerides. Overall improvement of quality due to lipases is comparable to emulsifiers. In fibre enriched products lipases allow use of lesser emulsifiers.

LIPOXYGENASES

This enzyme is found in many plant and animal tissues with which cells oxidise polyunsaturated fatty acids (PUFA) like linoleic or linolenic with molecular oxygen to form fatty acid hydroperoxides. Initial application in doughs was due to their ability to bleach fat-soluble carotenoid flour pigments. Since wheat flour contains insufficient amounts to give proper bleaching commercial enzyme preparations are added.

GLUCOSE OXIDASE

This enzyme catalyses the oxidation of glucose to glucono-δ-lactone and hydrogen peroxide. Fungal sources are commonly used. The enzyme is used to remove residual glucose and oxygen in foods and beverages for increasing their shelf life. The peroxide formed has antimicrobial properties and can be easily removed by enzyme catalase. Glucose oxidase can be used instead of potassium bromate in breadmaking. Bromate is oxidising agent used to form disulphide crosslinks to improve machinability of dough, gas retention, high bread volume and fine crumb structure. Bromate is carcinogenic so restricted in many countries. Glucose oxidase can replace it and do improvement of dough and bread quality.

OTHER ENZYMES

Among other enzymes available for use in bakery is asparaginase. This enzyme does not improve bread volume, crumb softening or reduce staling. It has potential to reducing formation of acrylamide during baking. This enzyme catalyses hydrolysis of asparagine to aspartic acid and ammonia, removing the precursor of acrylamide formation. Acrylamide is formed in heated foods via Maillard reaction between asparagine and a carbonyl source and is considered as human carcinogen.

Transglutaminases have potential application in bakery products. This can modify proteins through cross linking in textured products, in which lysine can be protected from undesirable reactions, encapsulating lipids, forming heat and water resistant films, improving elasticity and water-holding capacity, modifying solubility and function properties and producing proteins of higher nutritive value.

Laccase enzyme can improve fibre network with resultant improvement in crumb structure and softness of baked products.

Future Trends

Consumers demand removal or reduction of chemical additives and use of natural ingredients. There is also need for preservation and improvement of food products with beneficial health effects. Use of enzymes in baked goods can allow dietary fibre enriched flour for making bread and other products. Increasing soluble fibre also has health benefits as being prebiotic. More and more enzymes and their greater quantities are being used for these reasons.

(Condensed from Chapter by Ângelo Samir Melim Miguel, Tathiana Souza Martins-Meyer, Érika Veríssimo da Costa Figueiredo, Bianca Waruar Paulo Lobo and Gisela Maria Dellamora-Ortiz (2013). Enzymes in Bakery: Current and Future Trends, Food Industry, Dr. Innocenzo Muzzalupo (Ed.), InTech, DOI: 10.5772/53168. Available from: https://www.intechopen.com/books/food-industry/enzymes-in-bakery-current-and-future-trends)

DHA- INCORPORATION IN FOODS- CHALLENGES AND OPPORTUNITIES

By
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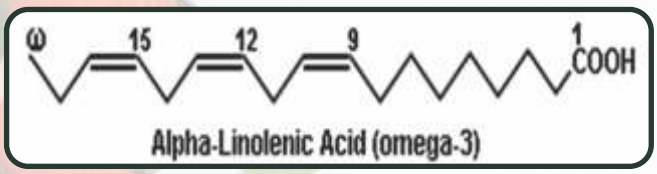
DHA (Docosa-hexaenoic acid) is the big brother in the family of omega 3 fatty acid. Omega 3 fatty acid are a group of fatty acids where the first double bond is in the 3rd position from the opposite of the carboxylic group as shown below

The above structure is that of Alpha Linolenic acid (ALA) where the double bond is in the 3rd carbon position. Omega 3 fatty acids are



essential fatty acids in the sense that they cannot be synthesized by the body and has to come from the diet. ALA is the basic omega 3 fatty acid which is elongated and desaturated to higher omega 3 fatty acids like Eicosapentaenoic acid - EPA (20 carbon atoms and 5 double bonds) and docosahexaenoic acid - DHA (22 carbon atoms and 6 double bonds).

ALA is present in edible oils like Soybean, flax seed oil, etc. The in vivo conversion of ALA to EPA and DHA decreases with age and is maximum at 15% in infants which comes down to as low as 5% in elders. We all know too well the importance of DHA to be reiterated here. To get the required amount of DHA, one needs to consume large amount of ALA (almost 20 times) which may not be possible. To circumvent the problem of low conversion in in vivo, DHA supplementation route is taken to meet the daily requirements. This assumes greater importance in case of vegetarians who do not have any ready source of direct DHA.

The two main sources of DHA are the marine algae and fish. In India algal source will get the green logo. Marine algae contains DHA which is consumed by the fishes and which gets accumulated in the fat portion. The DHA is extracted from the sources through conventional solvent extraction process. DHA is now a FSSA recognized ingredient. Algal sources Crypthecodinium cohnii, Mortierella alpina, Schizochytrium sp. are permitted in infant formulations, proprietary foods, health supplements, etc. Fish oil is also recognized as a nutraceutical.

Incorporation of DHA in foods poses challenges on account of its following difficult properties

- Oil Solubility
- High unsaturation
- Marine /Fish odour depending on the source

Its oil solubility requires the presence of oil / fat as an ingredient or emulsifiers and stabilizers for its incorporation in foods. High unsaturation makes it very susceptible to oxidation and rancidity. The characteristic marine odour makes it difficult to produce a product of acceptable taste. I have personally faced this challenge.

Commercially, DHA is available both as oil and also as an encapsulated powder. The oil could be either from fish or the marine algae.

Parameter	Algal oil	Fish Oil
Type of Omega 3	DHA	EPA and DHA
DHA content	30 to 35%	50 to 70%
Origin	Plant source	Animal source
Odour	Fishy	Marine

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Nutrela Soya Chilly

Ingredients

• ½ cup **Nutrela Soya Chunks** • 2 tbsp Soya Sauce • 2 tbsp Corn Flour/Corn Starch • 5-6 Chopped Green Chilies • 2 Spring Onion Chopped • 1 tbsp Garlic Paste • Salt to taste • ½ tbsp White Pepper Powder • ½ tbsp Sugar • 2 cups Water • 1 tbsp **Nutrela Refined Soyabean Oil** to fry

Method

- Start by marinating **Nutrela Soya Chunks** in a mixture of 1 tsp of soya sauce, corn flour, salt & pepper for about 10-15 mins.
- Heat **Nutrela Refined Soyabean Oil** & deep fry the marinated **Nutrela Soya Chunks** till golden brown.
- Then heat oil in a pan and add garlic paste, green chilies and cook for few seconds, then add 2 cups of water and bring it to boil, to this add sugar, pepper powder, salt and remaining soya sauce. Now add fried Nutrela pieces to it
- Dissolve the remaining corn flour in ½ cup water and add to the curry stirring constantly to avoid lumps.
- Cook for few mins. Serve Nutrela Soya Chilly hot & garnish with chopped Spring onions.

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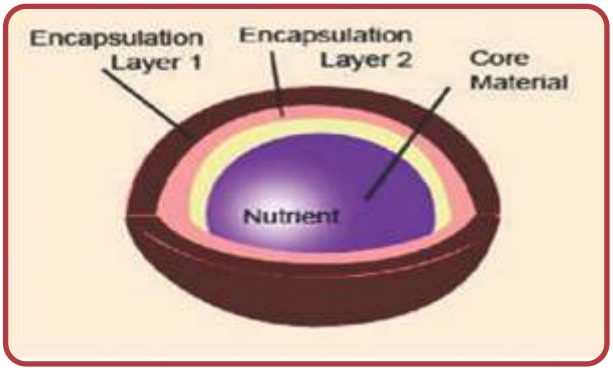
Fish oil is not used as a source of DHA in foods as its use requires the declaration of the non-vegetarian logo (hence putting off the vegetarian consumers) and also the challenge of masking the fishy odour. Fish oil is normally consumed in the form of soft gelatine capsules circumventing the problem of odour. As it is in a form which is considered as "medicine", the non-vegetarian status is not a show stopper.

Algal oil is the source of DHA for incorporation into regular foods, nutraceuticals, foods for special dietary uses and medical purposes. Algal oil may be directly used in products like flavoured milk, flavoured yoghurt, smoothies, ice cream & frozen desserts, fat spreads, emulsified dips and sauces like mayonnaise which contain fat or fat emulsion as an ingredient. All these products are allowed to contain flavours which makes life easier. The miscibility problem of DHA in water based beverage like energy drinks, fruit beverages can be addressed by the use of appropriate type and grade of hydrocolloid like pectin.

The products containing DHA are very susceptible to rancidity on account of high unsaturation. The use of a type of antioxidant and its level will depend on the product category as per Annexure A of FSS (Food Products Standards and Food Additives) Regulations 2011. In case of water based beverages, water soluble Vitamin C will be more effective. Rancidity in oils are also initiated by the presence of divalent ions like copper, Iron when present in ionic form especially in foods with high moisture content like beverages. Many foods especially under the genre heath foods are expected to contain DHA along with minerals as nutrients. The initiation of rancidity due to divalent ions can be controlled/minimized by the use of chelating agents like EDTA or by the use of metal – amino acid complexes like glycinates.

While incorporating DHA oil in liquid medium, processing steps like homogenization and de-aeration would help in improving the shelf life. Homogenization would reduce the particle size of the oil thus preventing from coalescing and rising to the surface. De-aeration would eliminate the dissolved oxygen and thus reduce rancidity and enhance shelf life.

Incorporation of DHA oil in solid food has its own unique challenges. The oil has to be encapsulated either during the manufacture of the product itself or use an encapsulated format for incorporating into food. The process of encapsulation involves packing DHA in multi-layered secondary materials to make it free flowing and keep it protected from outside atmosphere as shown in figure below



The secondary or encapsulating material is a mixture of proteins, emulsifiers, stabilizers like hydrocolloids, starch derivatives, etc.

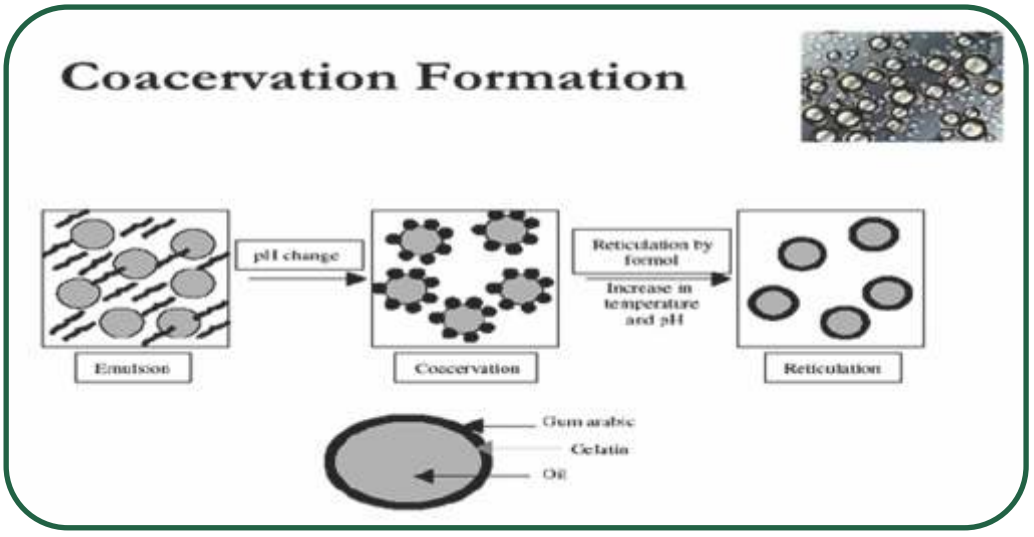
Conventionally, the encapsulation is achieved through spray drying process which involves the following steps

- An oil in water emulsion stabilized by protein and hydrocolloids
- Homogenization
- Spray drying

The spray drying process does not completely encapsulate the oil. Oil does remain on the surface which is a measure of encapsulation efficiency. In spray dried product, the surface fat could be high leading to higher exposure to oxygen and also making the flavouring job tougher.

Coacervation is a recent method to encapsulate material. In this method oil – water emulsion is formed in presence of a cationic protein and anionic (gum) polymer.

After the emulsion is formed, the pH is altered to form the coacervate which is subsequently spray dried. The following figure depicts the process



The resultant powder is a hard, fine insoluble material which retains its structure even when dispersed in a liquid medium. This leads to better protection of the sensitive DHA oil without releasing it into the liquid medium. With no surface oil, coacervation has higher oxidative stability. Other methods of encapsulation include cyclodextrin complexation and nano capsulation.

Though encapsulated DHA has advantages in terms of stability and ease of use in powdered formulation, the DHA pay load is less. Encapsulated or coacervate powder normally contains around 10 to 15 % DHA as against 35 % in oil. Unit cost of DHA will be higher in case of powder. This will require addition of higher level to get the desired level of DHA thereby pushing the cost. Notwithstanding the above disadvantage, encapsulated DHA is the answer to its incorporation in products like nutritional and functional Bars , dry blended powders which are reconstituted and consumed. The release of DHA on reconstitution will depend upon the type of encapsulation. Encapsulation by coacervation will be preferred if no release is required in the reconstituting medium. This will make the flavouring work comparatively easier. This assumes greater importance in case of infant formulation where flavours are not permitted. Coacervate DHA can also be added to soya and other protein based or other clouded beverages. Here the insoluble nature of coacervate is of no consequence as the beverage is clouded. It may be inappropriate in clear beverages.

Powder form opens up opportunities for DHA supplementation in chocolates, coated nuts, muesli, Bars. In case of formulation, where there is a spray drying process, the DHA in oil form may be incorporated in the slurry, prior to spray drying. Such health foods normally contain protein which can double up as emulsifying agent. This will preclude the use of encapsulated product there by reducing the cost of the product.

Newer vehicles for DHA are available now like small and soft elastic chewable forms. The soft capsules could be made of gelatine or other proteins which contains the fatty acids. The capsules offer high protection and can be incorporated in tablets, gummies, Bars, etc.

DHA incorporation is a challenge but surmountable. While deciding the source of DHA - oil or encapsulated powder, one needs to answer the following questions

- Does it have fat?
- Can flavour be added?
- Are anti-oxidants permitted?
- The process involved - Dry blending or spray dried or others?

COMING EVENTS

Bakery Business 2017
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REPORT ON SEMINAR ON HEALTHY INGREDIENTS FOR HEALTH & FITNESS

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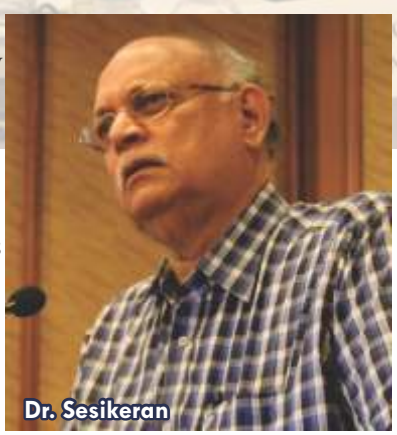
Ms Swechha Soni, Intern, PFNDAI,
MSc student, Nirmala Niketan College

A seminar on Healthy Ingredients for Health and Fitness with special emphasis on Proteins and Fibres was organized by the Protein Foods & Nutrition Development Association of India on 8th June, 2017 at Hotel Orchid, Mumbai. The seminar was sponsored by Pulse Innovation Platform India launched by McGill University, Canada, Co-sponsored by DUPONT and supported by IDA Mumbai Chapter. The souvenir and teas were sponsored by the following Givaudan Hexagon Nutrition, Mead Johnson, and Ingredion


Mr. Bhupinder Singh

Mr. Bhupinde Singh, Chairman PFNDAI and CEO Vista Processed Foods welcomed all by inaugurating the session. He also outlined the objectives of the seminar. Dietary proteins & fibre are the most important aspects of a healthy diet and this seminar was organized to address the knowledge on various aspects of dietary proteins & fibre , to interact with eminent speakers and get a thorough understanding about how these nutrients work together to help prepare balanced meal plans to either achieve a healthy & fit body free from diseases.


Dr. Sesikeran

Dr. Sesikeran, Ex-Director, NIN, addressed the crowd about the Importance of Proteins & Dietary Fibre. He focused on the bioactive protein peptides and their sources, bioavailability and their various roles. He also added about the immune-modulatory peptides and their effects. He mentioned about the Dietary Fibre Constituents and their sources with their physiological health benefits. A keynote about the importance of breast feeding emphasizing on the colostrum and the microRNAs present in them that regulate the gene expression, was made.

Dr. Valerie Orsat, Chair & Associate Professor, Dept Bioresource Engg, Mcgill University, Canada, briefed everyone about Incorporating Pulse Ingredients into Newer Products. She shared the health, nutritional and sustainability benefits of the Pulses. A point about the world's biggest problem of Malnutrition was raised which is the consequence of an unhealthy diet.

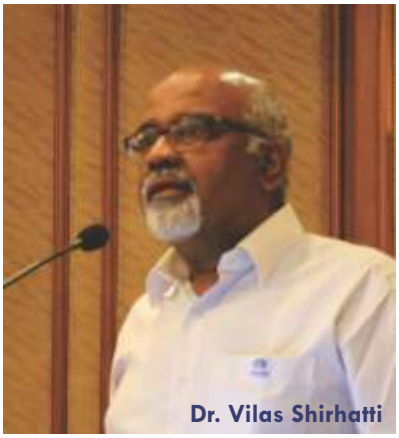

Dr. Valerie Orsat

She furthermore, shared the importance of legumes. She gave an insight of the Global Crop Production. She also raised the issue of the knowledge gap of sustainability metrics to food systems. Finally the development of High protein Content Products, Low Glycemic Index & Gluten-free products was motivated. Incorporation of pulses must be carried out in food formulation which would have the potential to raise significantly the profile of pulses as highly nutritious and globally available protein source.

The inaugural session came to an end following the felicitation of the speakers with the token of appreciation & a tea break of 25 minutes wherein the tea was sponsored by Ingredion India.

The session 1 commenced focusing on the Nutritional Applications which was chaired by Dr. Sesikeran.

Dr. Vilas Shirhatti, Chief Advisor, Nutraceuticals, Tata Chemicals gave a brief account on Relevance of Pulses in Health & modifying traditional diet using Pulses. He introduced Pulses as smart foods of Future which would contribute to the Health of People, Health of Planet and Health of Economy. Benefits of Dietary Pulses in decreasing Diabetes, CVD, Obesity and Cancer were discussed. He mentioned about the varied chemical compositions of pulses that give rise to variety of textural & sensorial variations.


Dr. Vilas Shirhatti

He furthermore added that the functional properties of pulses mimic many of the functional properties of egg & dairy proteins. He graphically explained the effect of cooking and various processes on mean protein & starch digestibility. He concentrated on the pulse based snack in Indian menu & its nutritional importance. Use of pulse based ingredients for Innovation, was motivated.


Dr. Sheela Krishnaswamy

Dr. Sheela Krishnaswamy, President IDA & Nutrition Consultant gave a keynote address about the Benefits of Dietary Fibre for Cardiovascular Health & in Diabetes. She shared the prevalence of Diabetes & CVDs stating that CVDs are the number 1 cause of death globally. She discussed about the Dietary factors that influence various pathways & mechanisms in the body. She shared some of the fibre facts stating that consumption of fibre rich foods can reduce the risk of CVD & Diabetes. She encouraged consuming plant foods that are rich in dietary fibre to be taken in appropriate amounts on a daily basis.

Dr. Swati Gupte, Nutrition Consultant shared the Importance of Proteins & Fibre in Sports Nutrition where she mentioned about the nutrition recommendations for active adults & competitive athletes. She added a point on energy requirements and actions that increase or decrease the energy needs. Certain sport foods were brought into focus which is used as Dietary supplements & Ergogenic aids.


Dr. Swati Gupte


Dr. T.S. Murali

Dr. T.S. Murali, Chief (R&D), Mother Dairy, chaired the session 2 which was based on Industrial Applications.

Ms. Karuna Jayakrishna, DuPont Nutrition & Health, talked about Newer Ingredients with high protein &fibre products. She gave an outline about the proteins in our diet, emphasizing more on soy protein & their health benefits. She talked about PDCAAS which is the globally recognized method for determining protein quality based on amino acid profile and digestibility. Soy is a high quality protein& helps in weight management , healthy aging, child nutrition & sports nutrition. Blending soy, whey & casein proteins may increase the anabolic window for increased growth & maximize muscle building.


Ms. Karuna Jayakrishna

Mr. Shiva Prasad, Ingredion, talked about Plant protein for new Applications. He discussed about the types of resistant Starches & their sources. He shared the Unique Digestive Profile of High-Amylose Maize Starch. He gave an insight into Ingredion's resistant starches portfolio. Types of pulses and their composition were covered. One in three consumers prefers non-animal protein. Vegetable-based proteins experienced 61% growth from 2010. Pulse based ingredients such as pulse seeds, splits & hulls can be used for innovation.


Dr. Shiva Prasad

Mr. Saugat Banerjee, Givaudan, discussed about the trends & challenges in Making New Ingredients More Acceptable. He gave a justification on the protein claims trending worldwide. Certain facts about a high protein diet are driving Protein Interest which includes specific benefits such as weight and satiety, energy and muscle health. He stated that Indian Protein dependency is largely on Dairy. For formulating Food & Beverages with


Dr. Saugat Banerjee


Mr. Suresh Annapure, FDA Chief with Mr. Bhupinder and Dr. Sengupta

protein, Specialized & cross-functional expertise need to overcome the challenges being the solubility, texture, flavour/taste and lastly the cost with certain analytical methods & approach.

Mr. Suresh Annapure, Jt. Commissioner (foods) FDA Maharashtra State, Dr. Valerie Orsat, Mr. Bhupinder Singh & Dr. Shatadru Sengupta, Hard castle Restaurant launched the White Paper on Eating & Exercising Right for Good Health which was followed by a tea.

A panel discussion was set on Changing Diets & how to ensure adequate nutrition having the following members: Dr. Valerie Orsat, Mcgill; Mr. Sujith Sathyadas, Dupont Nutrition & Health; Ms. Naaznin Husein, Nutritionist; Dr. Jix Anthony, ITC Foods; Mr. Sachin Saxena, Marico; Mr. Sanjay Singh, Ruchi Soya; Dr. N. Ramasubramanian, VR FoodTech

The discussion covered many doubts on healthy protein diet & high fibre foods. Each member expressed their thoughts & gave individual opinions as to how can pulses be incorporated in our daily diets leading to a healthy & fit body. A very interesting point on energy balance in regard with energy intake & energy output was discussed. An issue of lack of awareness among the population in India as well as in other countries that is one of the major causes of protein deficiency was raised. Certain other problems regarding the pulse production were brought into consideration, to which various solutions were suggested to overcome the lag in the protein intake as per the recommendations. The panel discussion came to an end, motivating & spreading awareness about the importance of the pulse protein & dietary fibre. The members were felicitated with the token of appreciation.

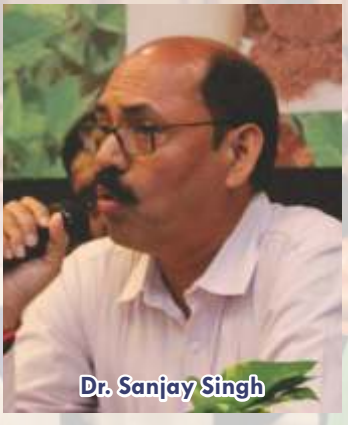
Ms. Anuja, Food Scientist, PFNDAI, took the opportunity of proposing a Vote of Thanks following the closure of the seminar.


Dr. Jix Anthony


Dr. Ramasubramanian

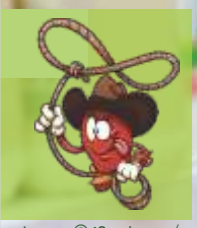

Dr. Rohit Kulkarni


Dr. Sachin Saxena


Dr. Sanjay Singh


Dr. Sujith Sathyadas


Dr. Naaznin Husein



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REGULATORY ROUND UP

By
Dr. N. Ramasubramanian,
VR Food Tech Private Limited
n.ram@vrfoodtech.com

Image © iStock.com/sergeyryzhov

A few interesting regulations and guidelines were put out by FSSAI in October. Please read on for a snap shot.

Standards

An important final notification on General Standards for Milk and Milk Products is published. This regulation replaces the present chapter 2.1 of the FSS (Food Products Standards and Food Additives) Regulation 2011. All food business operators (FBOs) must comply with the standards by 1st July 2018. The replaced standard would be valid till 30th June 2018 and the new standards can be adopted after 12th October 2017. The new regulation introduces many new definitions, redefines standards for milk and milk products. The standard also specifies conditions under which the term "milk" can be used. Standards of Identity for Dairy whitener, lactose, etc. are the new introductions.

Final notification on the standard of oils. Here standard for virgin coconut oil, peanut butter, renaming of linseed oil to, now exotic, flax seed oil. There has also been amendments in free fatty acid and acid value of a few common oils.

Draft Food Safety and Standards (Packaging) Regulations, 2017 has been published. It appears that the present Packaging and Labelling regulation is likely to be split into two different regulations. In that process the first part on packaging is published. The regulation gives cross references to Bureau of Indian Standards for food contact surfaces. It also suggests a list of packaging material for different food products. Some new aspects like specific requirements of migration limits for plastic materials in contact with food, permitted pigments and colours in plastics in contact with food, standard for printing ink on packaging materials are included. Please give a thorough reading. The comments and suggestions can be sent to FSSAI in the prescribed format.

Draft Food Safety and Standards for fixation of limits of aflatoxin in arecanut.

Draft standards for spring water

An important draft regulation on complimentary foods for older infants (18 to 24 months) and younger children (2 to 5 years) has been put out for comments from stakeholders. Complementary foods are those which complements the diet during and after breast feeding. The draft describes requirements for protein, carbohydrates, fat, vitamins and minerals. The calorie density, quality of protein in terms of PDCCAS are defined. Microbial requirements and permissible additives are listed. The standard also has a positive list of ingredients that can be added which includes different cereals, pulses, oilseed flours, protein isolates, meat and milk products. An attempt is made to indigenize infant and complementary foods.

In September 2016, a regulation covering the category of products and permissible additives under each category was published. This replaced the Section 3.1 of the standard along with the 14 tables. FSSAI in deference to the wishes of the stakeholders, have extended the deadline for a few provisions in the regulation. Requires a careful reading.

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For details, please contact our India partner VR Food Tech Private Limited, Mumbai.
Dr. Ashlesha Parchure: ashlesha.parchure@vrfoodtech.com

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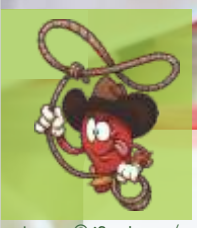

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General

AFSSAI is going beyond merely setting standards. It is donning and rightfully the facilitator's role. Guidelines for establishing FSMSin Edible oil and Bakery industry has been published. It is very useful for FBOs for establishing FSMS in these industries and if established, can improve on. It will be a handy guide or checklist for FSMS auditors.

Inspection and auditing of FBOs is part of the issuance and renewal of licenses. In a country as vast as India and with food industry growing, auditing for food safety compliance can be very daunting. FSSAI, in order to meet this huge challenge of ensuring safe food to Indians, has decided to rope in private agencies. In the recently published draft on Food Safety and Standards (Food Safety Auditing) Regulations, 2017 describes the process for recognizing agencies which would audit FBOs on behalf of FSSAI. It is also a great employment opportunity to food technologists.

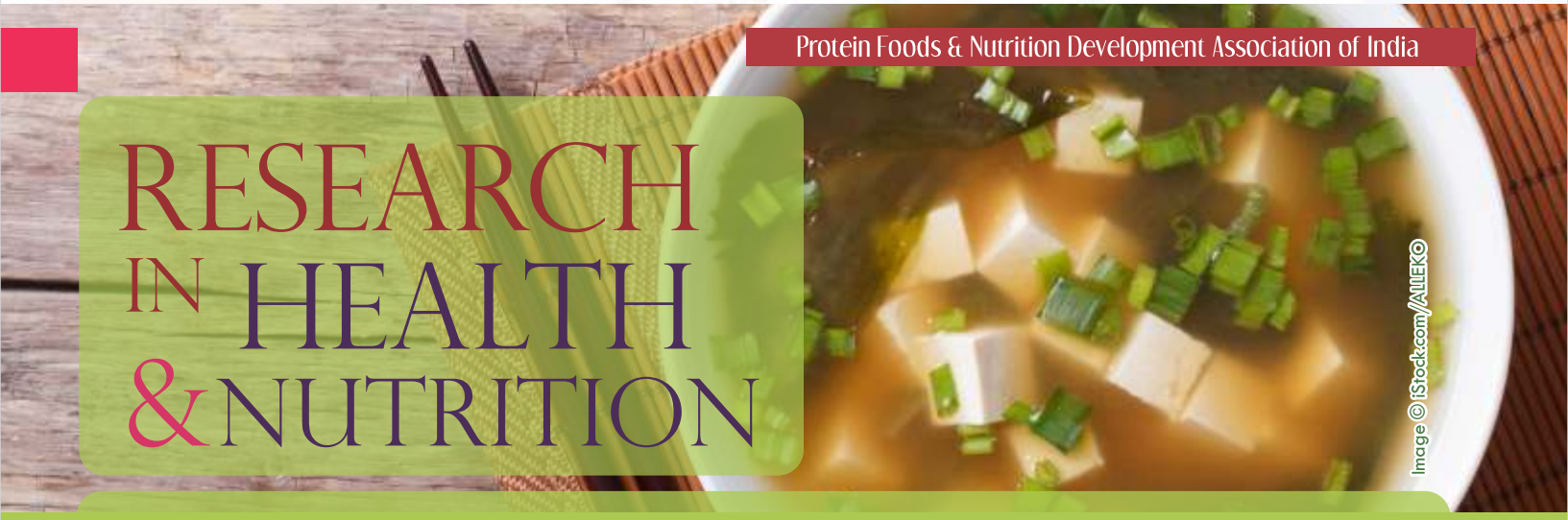
A few more laboratories have been recognized by FSSAI

FSSAI has banned the manufacture, import and sale of hemp seed and products made from hemp seed vide the order dated 17.10.2017

Direction with regard to exemption from FSSAI clearance in case of import of raw cashew nuts

Image © iStock.com/sergeyryzhov

RESEARCH IN HEALTH & NUTRITION



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Soy protein may improve symptoms of inflammatory bowel disease

Medical News Today 30 April 2017
By Hannah Nichols

Researchers from Pennsylvania State University have discovered that adding soy protein to the diet alleviates symptoms associated with inflammatory bowel diseases, such as colon inflammation and the loss of gut barrier function. The mouse study could pave the way for human studies to develop effective treatment strategies for the condition.

Substituting other protein in the diet with soy protein may help to improve symptoms of inflammatory bowel disease, find researchers.

Researchers Zachary Bitzer and Amy Wopperer, former graduate students in the Department of Food Science at Pennsylvania State University (Penn State), conducted the research alongside Joshua Lambert, associate professor of food science in the College of Agricultural Sciences, and colleagues.

Inflammatory bowel diseases (IBD), such as Crohn's disease and ulcerative colitis, has affected an estimated 3.1 million adults in the United States. Finding ways to mitigate symptoms of IBD is of importance because the chronic inflammation that characterizes the disease is a major risk factor for colon cancer. Colonic inflammation is also responsible for the loss of gut barrier function and increased gut permeability.

Previous studies have explored the preventive effects that soybeans may have on cancer. While some studies have shown that consuming soy may reduce the risk of cancer, other studies have yielded mixed results. Recent studies have uncovered that soy protein has promising outcomes in animal models of IBD. However, many questions about the underlying mechanisms behind the anti-inflammatory effect remain.

Soy protein concentrate triggered inflammation-moderating effects
The Penn State team examined the impact of soy protein concentrate on inflammation and gut barrier function in mice in the new study. They replaced 12 percent of other sources of proteins in the diets of the mice with soy protein concentrate. The doses of soy protein concentrate substituted were equivalent to the amount that could potentially be used in humans.

"We didn't want to get carried away with using doses that were really high and would crowd out all the other protein that was there," explains Bitzer. "Instead, we wanted to find a scenario that was going to fit into a more human-relevant situation."

The researchers found that soy protein concentrate has an antioxidant and cytoprotective effect in human bowel cells cultured in a laboratory. Furthermore, in the mice with induced IBD, substituting just 12 percent of other protein with soy protein concentrate was enough to stop body weight loss in its tracks and improve spleen swelling, reveals Lambert. This evidence indicates that soy protein concentrate might be able to moderate the severity of inflammation.

"Soy protein concentrate mitigates markers of colonic inflammation and loss of gut barrier function in the mice with induced IBD," says Wopperer. Future studies by the investigators will try to determine whether their findings could be replicated in humans. Soy protein is a readily available food ingredient that is already used as a substitute for meat. Lambert believes that because of this, human studies could be just around the corner.

"Since it is already out there commercially, that makes it more straightforward. But practically speaking, the actual clinical studies are a little bit out of our area of expertise. I think the most likely thing to happen will be for us to try to identify a collaborator either through the Clinical Translational Science Institute on campus or with someone at the Penn State College of Medicine Inflammatory Bowel Disease Center." Joshua Lambert

Lambert and collaborators are currently evaluating whether the inflammatory-moderating effects they have observed in mouse colons are due to the soy protein or whether soy fiber may play a part. While soy protein concentrate contains around 70 percent protein by weight, it is also comprised of soybean fibre, Lambert concludes.

Cinnamon and diabetes: Effect on blood sugar and overall health

Medical News Today 28 April 2017 By Zawn Villines

People with diabetes often face dietary restrictions to control their blood sugar and prevent complications. Although research is in a preliminary stage, cinnamon may help fight some symptoms of diabetes. It is also unlikely to cause blood pressure spikes, or disrupt blood sugar. So, people with diabetes who miss a sweet pop of flavour may find that cinnamon is a good replacement for sugar.

Can cinnamon affect blood sugar?
Cinnamon has shown promise in the treatment of blood sugar, as well as some other diabetes symptoms. Research on the effects of cinnamon on blood sugar in diabetes is mixed and in the early stages. Most studies have been very small, so more research is necessary. People with diabetes who are interested in herbal remedies, however, may be surprised to learn that doctors are serious about the potential for cinnamon to address some diabetes symptoms.

A 2003 study published in Diabetes Care, compared the effects of a daily intake of 1, 3, and 6 grams (g) of cinnamon with a group that received a placebo for 40 days. All three levels of cinnamon intake reduced blood sugar levels and cholesterol. The effects were seen even 20 days after participants were no longer taking cinnamon. A small 2016 study of 25 people, published in the Journal of Intercultural Ethnopharmacology, found that cinnamon may be beneficial for people with poorly controlled diabetes. Participants consumed 1 g of cinnamon for 12 weeks. The result was a reduction in fasting blood sugar levels.

However, a 2013 study published in the Journal of Traditional and Complementary Medicine had a different result. The study, which used a more reliable method, had slightly more participants, at 70. The researchers found that 1 g of cinnamon per day for 30 days and 60 days offered no improvements in blood sugar levels.

A 2016 analysis published in the Journal of the Academy of Nutrition and Dietetics, attempted to bring together existing research on the role of cinnamon in blood sugar reductions. The authors looked at 11 studies of cinnamon in the treatment of diabetes. All 11 produced some reductions in fasting blood sugar levels. Studies that measured HbA1C levels also achieved modest reductions.


Image © iStock.com/GooDween123

However, only four of the studies achieved reductions in line with the American Diabetes Association's treatment goals. This suggests that cinnamon may be a useful treatment tool, but is not a replacement for traditional diabetes treatments.

An earlier analysis published in 2011 in the Journal of Medicinal Food, also points to the potential for cinnamon to lower blood sugars. Researchers comparing the results of eight previous studies, found an average blood sugar level reduction of 3-5 percent. There is no research that suggests cinnamon negatively affects blood sugar. That means that it is a safe bet for people with diabetes who want a more healthful alternative to sugar, salt, and other diabetes-unfriendly flavouring agents.

Other health benefits of cinnamon for diabetes

Cinnamon has also shown promise in addressing other diabetes symptoms. The 2003 Diabetes Care study also found a reduction in blood fat levels and so-called "bad" cholesterol. The levels remained lower even 20 days after participants had stopped consuming cinnamon. A 2016 study published in Blood Pressure, compared the effects of various intake levels of cinnamon to cardamon, ginger, and saffron. Cinnamon and the other herbs did not affect blood pressure, body measurements, or body mass index.

Tips for using cinnamon

The studies done so far on cinnamon's effects on diabetes have used small quantities of cinnamon - usually a teaspoon or less. People interested in trying cinnamon as a supplement to traditional diabetes medication should start small, with about 1 g per day (about ¼ to ½ teaspoon). Just as different diabetes medications produce varying results and side effects in different patients, cinnamon won't work for everyone. Some people may even experience side effects. Some strategies to improve the chances of success while lowering risk include:

- Keeping a food log.
- Sticking with normal diabetes care plans. Cinnamon is not a substitute for blood sugar monitoring, a healthful diet, or diabetes drugs.
- Speaking to a doctor before trying any new diabetes remedies, including cinnamon and other herbal remedies.
- Using cinnamon as a flavouring agent for healthful foods, such as oatmeal and muesli. People should avoid eating cinnamon rolls, sticky buns, or other sugary foods that are rich in cinnamon.
- It's also possible for people who dislike the taste of cinnamon to purchase cinnamon herbal supplements.

Who should avoid cinnamon?

Cinnamon is a safe flavoring for most people with diabetes. However, people with liver disease or who believe they are at risk from liver disease may need to avoid cinnamon, particularly in large amounts. Cinnamon comes in two forms: Ceylon and cassia. Cassia is commonly used in the United States and contains small amounts of a substance called coumarin. Some people are sensitive to this chemical and, if they take it in large doses, they can develop liver disease. People who already have liver disease are especially at risk.

Most research on the role of coumarin in liver failure looks at significantly larger quantities of cinnamon than are recommended for diabetes management. This highlights the importance of starting with very small quantities of cinnamon. People should consider also using a Ceylon cinnamon supplement rather than the more readily available cassia cinnamon.

Interactions with other drugs and herbs

Cinnamon is safe to take with most drugs and herbal remedies. People taking another remedy should always consult their doctor first. Even natural remedies such as cinnamon can trigger negative interactions. People with diabetes who take a drug that can harm the liver should consult their doctor before using cinnamon. They should also consider Ceylon instead of cassia cinnamon. Cinnamon may also interact with anti-blood clotting drugs, such as warfarin, and some blood pressure medications.

To reduce the risk of negative interactions and other side effects, people with diabetes should keep a log of any new or unusual symptoms. People with diabetes should also report any side effects to a doctor as soon as they appear. This helps people with diabetes to make good medication decisions and avoid potentially serious side effects.

New enzyme blocks gluten, relieves symptoms of gluten intolerance

Medical News Today 8 May 2017 by Ana Sandoiu

New research may have found an enzyme that can relieve symptoms in gluten-sensitive people. The study shows that taking a tablet containing this enzyme can stop the gluten from reaching the small intestine, drastically reducing the symptoms of gluten intolerance.

Gluten is a protein mainly found in grains such as wheat, rye, and barley, as well as in certain medicines and supplements.

Image © iStock.com/CherriesJD

For some people, gluten can cause severe gastrointestinal problems. Some of these people have celiac disease, while others are simply gluten sensitive. Celiac disease is an inherited autoimmune disorder, in which the body's immune system will start to attack the small intestine when it detects gluten. Gluten sensitivity shares some of its symptoms with celiac disease, but unlike the latter, it does not harm the small intestine. Gluten intolerance can also cause additional symptoms, such as leg numbness or muscle cramps. Beyond Celiac estimate that approximately 18 million people in the United States are intolerant of gluten, without having celiac disease.

A new study suggests that an enzyme called Aspergillus niger-derived prolyl endoprotease (AN-PEP) can stop gluten from entering the small intestine, reducing the symptoms in gluten-sensitive patients. The findings were presented at Digestive Disease Week 2017, an international conference that gathers specialists in the fields of gastroenterology, endoscopy, hepatology, and gastrointestinal surgery.

Studying the effects of AN-PEP on gluten intolerance

The researchers - led by Julia König, Ph.D., postdoctoral research fellow at the School of Medical Sciences at the University of Orebro, Sweden - tested the enzyme on 18 patients that were self-reportedly gluten-sensitive. The participants consumed a portion of porridge with two wheat cookies that contained gluten, and they were then administered either AN-PEP or a placebo. The enzyme was administered in a high dose or a low dose. König and team monitored the levels of gluten in the stomach and small intestine over 3 hours.

The study found that both the high-dose and low-dose AN-PEP groups had 85 percent less gluten in their stomachs than the placebo group. In the duodenum - the first part of the small intestine - the level of gluten was lowered by 81 percent in the high-dose group, and 87 percent in the low-dose group, compared with the placebo group.

Significance of the study

Previous research had indicated that the enzyme can break down the gluten when infused in a liquid meal, but this is the first study to have confirmed these results using a normal, solid meal.
Dr. König explains the significance of the findings, saying, "This substance allows gluten-sensitive patients to feel safer, for example, when they are out with friends at a restaurant and cannot be sure whether something is 100 percent gluten-free."

"Since even small amounts of gluten can affect gluten-sensitive patients, this supplement can play an important role in addressing the residual gluten that is often the cause of uncomfortable symptoms," Dr. König adds.

The researchers note that the beneficial effects of AN-PEP may not apply to patients with celiac disease. In celiac disease, long-term damage can be triggered by even the smallest quantities of gluten - so König and colleagues could not test the enzyme in these patients, nor do they recommend it to celiac patients.

However, the results remain encouraging for patients with non-celiac gluten intolerance.
"Studies show that even when following a gluten-free diet, unintentional gluten intake can still occur, depending on how strict a gluten-free dieter is. Our results suggest that this enzyme can potentially reduce the side effects that occur when gluten-sensitive individuals accidentally eat a little gluten. We are not suggesting that AN-PEP will give these individuals the ability to eat pizza or pasta, sources of large amounts of gluten, but it might make them feel better if they mistakenly ingest gluten." Dr. Julia König

Yogurt Consumption Linked to Reduced Risk of Osteoporosis

Nutrition Insight 15 May 2017

A new study by researcher from Trinity College in Dublin has found positive correlation between yogurt consumption and bone health.

Considered the largest observational study of dairy intake and bone and health to date, the researchers found that higher hip bone density and a significantly reduced risk of osteoporosis in older populations was associated with increased yogurt consumption after taking into account traditional risk factors. The study is further evidence to support the idea that dairy products contain valuable nutrients for the maintenance of bone health.

The researchers focused on Irish adults and examined 763 men and 1,057 women who underwent a bone-mineral-density (BMD) assessment. They also looked at 1,290 men and 2,624 women who had their physical function measured. The participants' amount of yogurt consumption was determined by a questionnaire and adjusted for other factors including the consumption of other dairy products, meat, fish, smoking and alcohol and other traditional risk factors that affect bone health.

The lead author of the study, Dr. Eamon Laird, comments, "Yogurt is a rich source of different bone promoting nutrients and thus our findings in some ways are not surprising. The data suggest that improving yogurt intakes could be a strategy for maintaining bone health but it needs verification through future research as it is observational."

"The results demonstrate a significant association of bone health and frailty with a relatively simple and cheap food product. What is now needed is verification of these observations from randomized controlled trials as we still don't understand the exact mechanisms which could be due to the benefits of micro-biota or the macro and micro nutrient composition of the yogurt," adds Dr Miriam Casey, senior investigator of this study and Consultant Physician at St James's Hospital Dublin.

Zinc Acetate May Speed Up Recovery Rate from Common Cold

Nutrition Insight 12 May 2017

Zinc acetate lozenges may increase the rate of recovery from the common cold threefold, according to a meta-analysis of three randomized controlled trials published in Open Forum Infectious Diseases. On the fifth day, 70% of the zinc lozenge patients had recovered compared with 27% of the placebo patients.

The effect of zinc acetate lozenges was not modified by age, sex, race, allergy, smoking, or baseline common cold severity. Therefore the threefold increase in the recovery rate from common cold may be widely applicable. While some zinc lozenges have an unpleasant taste, the zinc acetate lozenges used in these three randomized trials did not suffer from such a problem.

The dose of zinc in the three studies was between 80 to 92 mg/day. Such doses are substantially higher than the recommended daily zinc intake in the USA, which is 11 mg/day for men and 8 mg/day for women. However, in certain other controlled studies, unrelated to the common cold, zinc has been administered in doses of 100 to 150 mg/day to patients for months with few adverse effects.

Furthermore, 150 mg/day zinc is a standard treatment for Wilson's disease that requires treatment for the rest of a patient's life. Therefore, it seems highly unlikely that 80-92 mg/day of zinc for one to two weeks, starting very soon after the onset of the first cold symptoms, might lead to long-term adverse effects. None of the three analyzed zinc lozenge studies observed serious adverse effects of zinc.

Even though there is strong evidence that properly formulated zinc acetate lozenges can increase the rate of recovery from the common cold by threefold, many zinc lozenges on the market appear to have either too low doses of zinc or they contain substances that bind zinc ions, such as citric acid. Therefore, the findings of this meta-analysis should not be directly extrapolated to the wide variety of zinc lozenges on the current market.

Although the lead author, Dr. Harri Hemilä from the University of Helsinki, Finland, suggests that the optimal formulation of zinc lozenges and the best frequency of their administration should be further investigated, he also instructs common cold patients to test individually whether zinc lozenges are helpful for them: "given the strong evidence of efficacy and the low risk of adverse effects, common cold patients may already be encouraged to try zinc acetate lozenges not exceeding 100 mg of elemental zinc per day for treating their colds."

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Research Institutes Explore Development of Microalgae as Source of Omega 3

Nutrition Insight 11 May 2017

Wageningen University & Research is working together with other research institutes and companies in the EU project PUFA Chain, to develop a robust scientific and technological basis for the industrial development of high-value products from microalgae.


Image © iStock.com/stocksnapper

Algae are an important source of omega 3 for fish, which cannot produce these fatty acids by themselves. Omega 3 fatty acids play an important role in our diets in the prevention of cardiovascular diseases and for normal vision and brain functions. We eat (oily) fish products or use pharmaceuticals, dietary supplements based on fish oil for this purpose.

PUFAs are poly unsaturated fatty acids or omega- 3 fatty acids. These PUFAs, in particular DHA and EPA, play an important role in our health. EPA and DHA are found in fish and shellfish. High levels can be found in fatty fish, such as anchovy, mackerel, herring and salmon. However fish cannot make their own DHA and EPA, they obtain them from algae.

DHA/EPA health claim approvals, improvement in standard of living and increasing health awareness made the DHA/EPA world market grow significantly. The same applies to the global fish production and consumption. At present, more than half of the fish consumption is from farmed fish instead of captured, but the fish feed for several farmed fish species also consists of fish meal and oil.

To meet this growing demand and to prevent overfishing and to avoid dependence on fluctuating catches by El Niño, other sources of omega 3 than fish or fish oil should be sought. In baby food for example DHA from algae is used. Not only for the DHA/EPA consumer market, but also for the fish feed market, for example for salmon farming, algae could be an interesting option. Reduction of production costs for DHA/EPA rich algae oil is needed to be able to compete with fish oil in these price-sensitive markets.

PUFA Chain is developing a robust scientific and technological basis for the industrial development of high-value products from microalgae. The main targeted application is the use of high purified omega 3 fatty acids (DHA/EPA) for nutrition and pharmaceutical products.

Lactose intolerance linked to lower vitamin D levels

Medical News Today 16 May 2017 by Honor Whiteman

A new study suggests that people with a genetic intolerance to lactose should increase their intake of non-dairy foods rich in vitamin D, after finding that they are more likely to have low levels of the essential nutrient.

Study co-author Ahmed El-Sohemy, a professor of nutrition at the University of Toronto's Faculty of Medicine in Canada, and colleagues recently reported their findings in the Journal of Nutrition.
Lactose intolerance is defined as the body's inability to effectively digest lactose, a sugar found in dairy products, including milk, butter, and cheese.

The condition occurs when the small intestine fails to produce sufficient amounts of lactase, which is the enzyme that breaks down lactose. If a person with lactose intolerance consumes dairy products, they may experience bloating, flatulence, diarrhea, nausea, and abdominal pain. These symptoms usually arise around 30 minutes to 2 hours after lactose consumption.

It is unclear precisely how many people are living with lactose intolerance, but estimates suggest that around 65 percent of the population experience a reduced ability to digest lactose following infancy. One cause of lactose intolerance is mutations in the LCT gene, which is the gene responsible for lactase production.

People with lactose intolerance should be aware of vitamin D intake From an analysis of 1,495 men and women who were a part of the Toronto Nutrigenomics and Health Study, El-Sohemy and colleagues found that people who possessed LCT gene mutations had a lower intake of dairy products, compared with the general population. Individuals with LCT gene mutations also had lower blood levels of vitamin D, which the team says is likely down to reduced intake of dairy products, since these are often fortified with vitamin D.

"We were not surprised that lactose intolerant people ate less dairy," says El-Sohemy, "but we were surprised that they did not compensate by supplementing or eating other foods fortified with this crucial nutrient."

Vitamin D is considered essential for the absorption of calcium in the gut, which is important for good bone health. The vitamin also aids nerve functioning and helps the body to stave off bacteria and viruses. Interestingly, the researchers found that people with LCT gene mutations were shorter than individuals in the general population, which indicates that reduced intake of vitamin D through lack of dairy consumption may be inhibiting bone growth.

El-Sohemy and colleagues say that their findings suggest that people with lactose intolerance should consider increasing their intake of vitamin D through non-dairy food sources. "These findings speak to the need for greater awareness for those who limit dairy because of lactose intolerance. They need to be mindful of getting enough vitamin D from other fortified foods like certain brands of orange juice, or to consider trying lactose-free dairy products." Ahmed El-Sohemy

Another finding of the study was that individuals with just one mutated copy of LCT demonstrated intolerance to lactose, but to lesser degree than those with two mutated copies; it was previously thought that two mutated copies of the gene were required for lactose intolerance to arise.

According to the researchers, this finding indicates that clinical definitions and genetic classifications for lactose intolerance may need to be reviewed.

Image © iStock.com/minoandriani

Between 2003 and 2005, the team collected information on the participantsnt implications for the prevesly test the health effects of tea's bioactive compounds.

Yogurt consumption in older adults linked with better bone health

Medical News Today 11 May 2017

The largest observational study to date of dairy intakes and bone and frailty measurements in older adults has found that increased yogurt consumption was associated with a higher hip bone density and a significantly reduced risk of osteoporosis in older women and men on the island of Ireland, after taking into account traditional risk factors.

Image © iStock.com/Minerva Studio

The study led by Trinity College Dublin in collaboration with St James's Hospital Dublin and co-investigators from Nutrition at Ulster University, Coleraine investigated participants from the Trinity Ulster Department of Agriculture (TUDA) ageing cohort study.

Total hip and femoral neck bone mineral density measures in females were 3.1-3.9% higher among those with the highest yogurt intakes compared to the lowest and improvements were observed in some of the physical function measures (6.7% better). In men, the biomarker of bone breakdown was 9.5% lower in those with the highest yogurt intakes compared to the lowest. This is an indication of reduced bone turnover.

To determine risk factors for being diagnosed as osteoporotic, the research team analysed a wide range of factors such as BMI, kidney function, physical activity, servings of milk or cheese, and calcium or vitamin D supplements as well as traditional risk factors for bone health (e.g. smoking, inactivity, alcohol etc.). After adjusting for all these factors, each unit increase in yogurt intake in women was associated with a 31% lower risk of osteopenia and a 39% lower risk of osteoporosis. In men, a 52% lower risk of osteoporosis was found. Vitamin D supplements were also associated with significantly reduced risks both in men and women.

Osteoporosis is a chronic condition associated with a reduction in bone strength and an increased risk of bone fracture. Over 300,000 people in Ireland are thought to suffer from the condition while the associated costs of osteoporotic fractures are estimated to be over €650 million annually in Europe.

Lead author of the study and research fellow at the Centre for Medical Gerontology, Trinity, Dr Eamon Laird said: "Yogurt is a rich source of different bone promoting nutrients and thus our findings in some ways are not surprising. The data suggest that improving yogurt intakes could be a strategy for maintaining bone health but it needs verification through future research as it is observational."

Dr Miriam Casey, senior investigator of this study and Consultant Physician at St James's Hospital Dublin said: "The results demonstrate a significant association of bone health and frailty with a relatively simple and cheap food product. What is now needed is verification of these observations from randomized controlled trials as we still don't understand the exact mechanisms which could be due to the benefits of micro-biota or the macro and micro nutrient composition of the yogurt."

The study included 1,057 women and 763 men who underwent a bone-mineral-density (BMD) assessment and 2,624 women and 1,290 men who had their physical function measured. Yogurt consumption information was obtained from a questionnaire and categorized as never, 2-3 times per week and more than one serving per day. Other factors examined included daily intakes of other dairy products, meat, fish, smoking and alcohol and other traditional risk factors that affect bone health.

The TUDA study was funded by the Irish Department of Agriculture, Food and the Marine Food Institutional Research Measure initiative and the Northern Ireland Department for Employment and Learning (DEL), Cross-Border Research and Development Programme: "Strengthening the all Island Research Base". The current research was a supported by the National Dairy Council, Ireland through a research award.

Functional foods have role in reversing 'thin outside, fat inside' phenomenon, paper's authors conclude

By Hank Schultz 11-May-2017 - NutraIngredients USA

Functional foods could have a key role to play in combating the global rise of the phenomenon of sarcopenic obesity, according to a published report of the proceedings of a recent scientific convention.

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Protinex

LOW PHYSICAL STRENGTH?

EASILY TIRED?

CONCERNED ABOUT YOUR WEIGHT?

#TAKETHEHINT

GET THE PROTEIN ADVANTAGE.

JOIN THE CONVERSATION

Protinex to be consumed as a part of balanced diet and healthy lifestyle

Ready to Serve Nutritional Beverage Mix


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Griffiths said the prevalence of sarcopenic obesity or SO is a malaise of the modern age. Before the advent of refrigeration, elevators, easy automobile travel or mass transit and the like, only a very few of the ultra wealthy could afford to live the kind of ultra-low energy lifestyle that is now available to most people in developed societies. Couple that with the changes in food moving toward more highly processed, highly refined and generally more calorie dense offerings and you create an ideal climate for the spread of this mostly self inflicted contagion. And the insidious thing about the condition is you don't have to technically obese to suffer from it.

"Another way to look at SO is 'thin outside, fat inside, '" Griffiths told NutraIngredients-USA. " These people might look the same on the outside as other people but inside it is like night and day in terms of fat and muscle distribution. " Griffiths said it is unclear if the modern diet has reset the metabolism of certain perhaps more susceptible people. What's more likely, he said, is that modern demographic trends account for the lion's share in the uptick in the prevalence of the condition. "We are all aging and we are all experiencing this problem with fat distribution. But in the past we either died too young, or we stayed more active later into life," he said.

Individuals in this state are in something of a chicken and egg position; is SO causative of other disease processes, or a symptom of underlying problems? "Subjects with SO are considered to be in a hyper-inflamed state, contributing to an increased risk for chronic disease . . . SO is associated with a higher risk of frailty, disability, morbidity, and mortality than obesity or sarcopenia alone," the authors wrote. "At the same time, SO subjects are metabolically compromised due to a decided decline in skeletal muscle mass, which in turn contributes to a reduction in the basal metabolic rate. "

Role of functional foods

What to do about this issue has confounded health authorities for decades. The rising tide of obesity earlier in life is an obviously intractable problem, with rates inching up steadily in almost every developed society and in almost every age group. But SO lurks out there among older populations, too, and combining the prevalence of this condition with the more obvious uptick in the number of overweight individuals could mean that despite all of the advances of modern health care, a big chunk of older individuals in developed societies are nowhere near as healthy as they could be. Griffiths noted that the given the nature of the meeting, the proceedings were aligned more with the role of foods, leaving supplementation more or less aside. Within the realm of macronutrients, getting enough protein is seen by the paper's authors as one potential way to address the SO issue. The authors noted that there is no data from large-scale trials to determine whether it's better to eat more protein at breakfast, or throughout the day. And there is not enough data to firmly support the notion that protein amounts in excess of common recommendations (the World Health Organization recommends consuming 0.8 grams of protein per kilogram of body weight) have an effect on restraining the development of SO.

"Enthusiasm for highly prescriptive use of high-protein diets (including within-day dietary patterning) to promote the retention of lean body mass, including muscle mass, and function in older adults (Paddon-Jones et al., 2008 ; Thalacker-Mercer and Drummond, 2014) must be supported by high-quality longitudinal research, not just theories, hypotheses or extrapolations from short-term studies," the authors wrote.

IMCL as a risk factor

There is some support for higher protein intakes in connection with physical activity, the authors noted. And another factor, the build-up of intra-myocellular lipid (IMCL) content in the skeletal muscle of older subjects, is an important risk factor (and one that is rarely mentioned in the popular press).

"Increases in IMCL content may play an important mechanistic role in the development of the muscle ' s resistance to anabolic stimuli and the progression of sarcopenia with aging and muscle atrophy in obesity, " the authors wrote. Indeed, IMCL content in skeletal muscle is a hot research topic; a search on the Pubmed database maintained by the National Institute of Health using "intramyocellular lipid" as a search term shows dozens of studies published since the Orlando meeting took place.

Omega-3s, green tea lead the way for bioactives Bioactives contained in foods, on the other hand, are better supported for their effectiveness on restraining the progression of SO. Among specific bioactives, the paper mentioned green tea catechins, resveratrol and soy isoflavones. While the paper repeated a call for more research on the role of bioactives in general, it mentioned omega-3s as having a body of evidence showing significant neuromuscular effects to go with their proven cardioprotective benefits. "These findings suggest fish oil-derived n-3 PUFAs as a potential novel nutritional strategy to counteract the age-associated decline in skeletal muscle mass and function without potential adverse or possibly even beneficial effects on cardiometabolic health," the authors wrote.


Image © iStock.com/Chiociolla

While high protein intake per se is not well supported by the evidence, Griffiths noted that many older adults don't consume enough, and emphasizing protein intake for these individuals in the context of a high quality diet and an exercise plan. "Protein is indeed an area that we don't eat enough of and as we age we need to focus on it," Griffiths said. " Consumption of diets rich in protein, bioactive food components, such as catechins from green tea and omega-3 fatty acids, along with resistance exercise have been studied as lifestyle approaches to prevent and combat SO, " the authors concluded.

Green tea consumption can lower rice-induced diabetes risk in women: Japanese study

By Cheryl Tay 16-May-2017 - NutraIngredients Asia

New research from Japan has shown that drinking green tea can reduce the risk of diabetes caused by rice consumption among women.

A Kyushu University study of more than 10,000 men and women in Fukuoka, aged 49 to 76, found that rice intake was directly associated with the risk of diabetes in women. However, daily consumption of seven or more cups of green tea reduced this risk.

The study stated: "The prevalence of type 2 diabetes mellitus (DM) has increased rapidly worldwide, with the prevalence of DM in Japan having doubled during the past two decades. Changes in lifestyle toward an excessive intake of energy and ins cient energy expenditure have been ascribed to the increase." Rice's higher glycemic index (GI) is thought to be responsible for the association between rice consumption and the risk of diabetes, with women more susceptible to hyperglycemia and therefore, glucose intolerance.

Prior research has explored the effects of coffee and green tea consumption on type 2 diabetes, with both beverages resulting in a decreased risk of the disease, the latter being one of Japan's most commonly consumed beverages.

In the current study, 11,717 subjects responded to a follow-up survey. By using multiple logistic regression analysis, cases of diabetes were calculated according to cereal food, green tea, and coffee intakes, while also examining also the effect modification of green tea and coffee.

Whole grain benefits

A total of 464 new cases of diabetes were identified. Women, but not men, showed a positive association of rice intake (trend p=0.008) and an inverse association of green tea intake (trend p=0.02) with incident diabetes. Coffee consumption was not found to have a positive effect on diabetes cases. The study also specified that "the type of rice consumed was not ascertained in the current study population. Although the consumption of whole grain — including brown — rice, has been shown to reduce the risk of DM, brown or unrefined rice is not typically consumed in Japan".

Just as women, but not men, were found to be at risk of diabetes due to rice intake, they were also the only ones whose green tea intake led to a lower risk of diabetes. The same could not be said of the men who participated in the study, but the reason for this remains unclear. "It is notable that the increasing trend of incident DM with higher intake of rice was nullified among women with the highest intake of green tea in the present study," wrote the researchers.

"There was a suggestive effect modification of green tea on the association between rice and DM in women. The incidence of DM did not increase with increasing rice consumption in women with the highest consumption of green tea (≥7 cups/d) while the positive association was observed in women consuming a lower amount of green tea," they added. A Kyushu University study of more than 10,000 men and women in Fukuoka, aged 49 to 76, found that rice intake was directly associated with the risk of diabetes in women. However, daily consumption of seven or more cups of green tea reduced this risk.

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Omega-3 could aid Alzheimer's prevention: Study

By Emma Jane Cash 22-May-2017 - NutraIngredients

People with high omega-3 intakes have an increased blood flow in the brain, according to research suggesting a link between omega-3 and Alzheimer's disease.

"What we observed was that higher EPA + DHA status as expressed by the Omega-3 Index is independently correlated with higher perfusion in brain regions important for cognitive function, including the para-hippocampal gyrus and precuneus," said the study authors of the new study, published in the Journal of Alzheimer's Disease.

Omega-3s have been suggested to protect the areas of the brain affected most by ageing – with previous research linking omega-3 fatty acids to anti-amyloid, anti-tau and anti-inflammatory actions in the brains of animal. As a result, research aimed at dietary approaches for the prevention of cognitive decline has become more popular.

The Omega-3 Index measures the percentage of EPA + DHA in red blood cells, with 8% being desirable and less than 4% being a danger zone. Previous studies have also suggested that high doses of omega-3 DHA are more likely to boost the Omega-3 Index than EPA. Led by Dr Daniel Amen of the Amen Clinic, the new research suggests a positive relationship between omega-3 EPA (eicosapentaenoic acid) + DHA (docosahexaenoic acid) status, brain perfusion and cognition.

Statistically significant relationships were found between omega-3 EPA +DHA levels in the blood and cerebral perfusion in the right parahippocampal gyrus (a region thought to play an important role in memory encoding and retrieval), the right precuneus (involved with episodic memory, visuospatial processing, and aspects of consciousness) and the vermis subregion (a region associated with bodily posture and locomotion).

The research looked at 166 randomly selected participants, drawn from clinics, and studied their brain function using single photon emission computed tomography (SPECT), which measures blood perfusion in the brain. Using the Omega-3 Index and SPECT imaging on 128 regions of the brain, researchers collected data on the correlation between omega-3 fatty acid blood levels and blood flow in the brain.

For 'resting-state' scans, participants were asked to sit in a dimly lit room with ambient noise, with their eyes open. Participants were then scanned for 30 minutes. For 'on-task' scans, participants completed Continuous Performance Tests (CPTs) whilst the scans were being made. No participants were taking omega-3 EPA + DHA supplements, nor were they on specialised omega-3 rich diets.

"Although we have considerable evidence that omega-3 levels are associated with better cardiovascular health, the role of the 'fish oil' fatty acids in mental health and brain physiology is just beginning to be explored," said study co-author William Harris, from the University of South Dakota School of Medicine.

"This study opens the door to the possibility that relatively simple dietary changes could favourably impact cognitive function." The authors also say the study "raises the possibility that higher omega-3 EPA + DHA fatty acid level can improve underlying brain physiology that may in turn translate to better cognitive reserve".

Polyphenol-rich extracts may improve physical performance during exercise: RCT

By Stephen Daniells 04-May-2017 - NutraIngredients

Image © iStock.com/ ArthurHidden

A polyphenol-rich combination of extracts from grape, pomegranate and green tea may boost power and performance during high-intensity, says a new study. Researchers report that a pre-workout dose of the polyphenol-rich formulation PerfLoad (Fytexia, France) resulted in a 5% increase in total aerobic work capacity and a 3.7% increase in maximal peak power output.

"This prospective clinical investigation on PerfLoad demonstrates that a natural and safe supplement is undoubtedly able to, similarly to training benefits, help improve metabolic and physiological pathways involved in the development of maximum metabolic power during high-intensity exercise," wrote the researchers in Nutrients.

"Indeed, supplementation is associated with a significant increase in total power output, maximal peak power output, and average power developed, without inducing either more fatigue or greater heart rate. The basis for the efficiency of the supplement appears to be the synergistic activity of bioactive natural compounds, mainly polyphenols and caffeine from the three botanical extracts."

Led by Fytexia's Dr Julien Cases, the researcher recruited 15 recreationally-active sportsmen to participate in their randomized, placebo-controlled, crossover study. Participants were randomly assigned to consume a 900 mg dose of PerfLoad or placebo prior to high-intensity anaerobic exercise. Results showed that the polyphenol-rich formulation was associated with 876 increase in total anaerobic work capacity, which was equivalent to a 5% increase.

The supplement was also associated with a 3.7% increase in maximal peak power output and a 5% increase in the average power developed. Blood pressure was significant lower post-exercise following PerfLoad supplementation, compared to the control intervention, while improvements in the activity of the antioxidant enzyme SOD were also recorded one hour post-exercise following the active supplement.

"Such results demonstrated that PerfLoad is a natural and efficient solution capable of, similarly to training benefits, helping athletes to improve their physical performance, while balancing their metabolism and reducing exercise-induced oxidative stress," wrote the researchers.

Endothelial function

"It appears that some of these polyphenols are linked to improved endothelial function," they wrote. "... further investigations will have to be conducted to elucidate the relationship between the bioavailability of polyphenol metabolites from PerfLoad supplementation and flow-mediated dilation, and especially its effects on stroke volume and the functionality of capillaries."

Vegetable consumption key to preventing metabolic syndrome in women

By Cheryl Tay 14-May-2017 - NutraIngredients Asia

Image © iStock.com/puhhha

Increased vegetable consumption could help prevent metabolic syndrome, especially in postmenopausal women, a new analysis of South Korean data has found.

The study used data from the fourth Korea National Health and Nutrition Examination Survey (KNHANES), in which 2,999 women between the ages of 40 and 64 had their total intake of fruits and vegetables from a 24-hour dietary recall estimated.

The results showed increased vegetable consumption to be associated with a decreased proportion of metabolic syndrome, central obesity and high blood pressure. This was the case especially for postmenopausal participants, particularly those whose vegetable intake was high.

Interestingly, while total fruit intake correlated with a lower risk of high blood pressure, total vegetable intake was inversely proportional to the risk of metabolic syndrome, which is characterised by impaired blood glucose, elevated blood pressure and abdominal obesity.

Central Obesity

Metabolic syndrome is also associated "with an increased risk of diabetes and cardiovascular disease, particularly in women" , its prevalence increasing signi_cantly in women aged 50 and above. In fact, postmenopausal women are twice as likely as premenopausal women to s er from metabolic syndrome, hypertension and central obesity.

The study noted: "The reason why the inverse association in postmenopausal women was found in vegetables rather than fruits can be because most food sources rich in phytoestrogens in (the) Korean diet are vegetables, such as soybeans and mushrooms."

Other factors, such as sodium intake, alcohol and tobacco consumption, and exercise frequency were also taken into account. It was observed that sodium intake ects the inverse relationship between fruit and vegetable consumption and the risk of metabolic syndrome. The study's authors acknowledged its 24-hour dietary recall as a limitation, and concluded that "further longitudinal studies are warranted to elucidate the associations".

Anthocyanin-prebiotic blend shows gut health benefits for obese

By Stephen Daniells 01-May-2017 – NutraIngredients USA

A combination of anthocyanins and prebiotics may improve the composition of the gut microflora and reduce bloating and abdominal pain in obese adults, according to data presented at Experimental Biology 2017.

Eight weeks of supplementation with the anthocyanin-prebiotic blend resulted in significant decrease in the phylum Firmicutes , a significant increase in the phylum Bacteroidetes, and a significant decrease in the ratio of Firmicutes to Bacteroidetes . The Firmicutes/Bacteroidetes ratio is reportedly a good biomarker for obesity, with data from a 2005 study by Jeffrey Gordon and his group at Washington University in St. Louis indicating that obese mice had lower levels of Bacteroidetes and higher levels of Firmicutes , compared with lean mice.

"We found that consumption of a supplement containing a blend of anthocyanins and prebiotics positively modulated the intestinal ecosystem, including the microbiome, and provided insights into the mechanisms of action of the anthocyanin prebiotic formulation and its impact on health benefits," wrote scientists.

The researchers recruited 51 healthy but obese men and women aged between 20 and 60 to participate in their open-label single-cohort study. All participants underwent an initial four week period to limit their consumption of anthocyanin-rich foods and prebiotic supplements before receiving the anthocyanin-prebiotic supplements for eight weeks. The supplement was formulated with 215 anthocyanins from black rice, black currant, and blueberry extracts and a blend of inulin and fructooligosaccharides.

Compared to data obtained at the start of the study (baseline), results obtained after eight weeks showed significant changes to the intestinal environment, with significant reduction in levels of the phylum Firmicutes and Actinobacteria , and increases in Bacteroidetes. The decrease in the ratio of Firmicutes to Bacteroidetes shifted the profile to be similar to lean individuals, said the researchers.

In addition, significant decreases in bloating, gas, and abdominal pain were reported by the participants, while scores on the Bristol Stool Form Scale significantly improved. "The supplement was found to be safe and well tolerated based on vital signs and blood parameters," added the researchers.

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FOOD SCIENCE & INDUSTRY NEWS

Extrusion may improve extractability of dietary fibre in bran

IFT Weekly May 17, 2017

Wheat bran and rye bran are mostly used as animal feed today, but their high content of dietary fibre and bioactive components are beneficial to human health.

Image © iStock.com/ cnamejia118

However, bran mainly contains unextractable dietary fibre and deteriorates the sensory properties of products. A study published in the Journal of Food Science suggests that processing bran products by extrusion may increase the extractability of dietary fibre and increase their sensory qualities.

The researchers extruded wheat bran and rye bran at different levels of moisture content, screw speed, and temperature to find the optimal setting for increased extractability of dietary fibre and positive sensory properties. The main dietary fibre component found in wheat bran and rye bran is arabinoxylan, with a content of 22%–30% of dry matter for wheat bran and 18%–25% of dry matter for rye bran. For wheat, the other main dietary fibre components are cellulose (9%–12%), Klason lignin (3%–5%), fructan (3%–4%), and β-glucan (2%–3%). For rye, they are fructan (5%–7%), cellulose (4%–6%), β-glucan (4%–5%), and Klason lignin.

The researchers found that extrusion of wheat bran and rye bran increased the extractability of dietary fibre, especially arabinoxylan. This increase may improve the nutritional properties of the bran, such as fermentability. The optimal extrusion conditions for increasing the extractability of dietary fibre were 24% water in wheat or 30% water in rye, a screw speed of 400 rpm, and a temperature of 130°C. The increased extractability of dietary fibre and arabinoxylan, in combination with maintained content of β-glucan, minimal effect on molecular weight, and a slight increase in extractability, makes extrusion a suitable process for increasing the use of bran for many different food products.

Modified soybeans may yield more in future climate conditions

By Emma Jane Cash, Nutra Ingredients 10-Mar-2017

By 2050, we will need to feed 2 billion more people on less land. Meanwhile, carbon dioxide levels are predicted to hit 600 parts per million—a 50% increase over today's levels—and 2050 temperatures are expected to frequently match the top 5% hottest days from 1950-1979.

A study published in the Journal of Experimental Botany suggests that genetically engineered soybeans may yield more when subjected to both increased temperature and carbon dioxide levels in 2050's predicted climatic conditions. However, the researchers found little to no difference between the modified and unmodified crops grown in increased temperature, increased carbon dioxide or today's climate conditions.

Researchers conducted a three-year field study at SoyFACE (Soybean Free Air Concentration Enrichment—a U.S. facility that emulates future atmospheric conditions to understand the impact on Midwestern crops. The results suggest that we can harness genetic changes to help offset the detrimental effects of rising temperature.

"Our climate system and atmosphere are not changing in isolation from other factors—there are actually multiple facets," said Carl Bernacchi, an associate professor of plant biology at the Carl R. Woese Institute for Genomic Biology at the University of Illinois. "The effect of carbon dioxide in and of itself seems to be very generalized, but neglects the complexity of adding temperature into the mix. This research is one step in the right direction towards trying to figure out a way of mitigating those temperature-related yield losses that will likely occur even with rising carbon dioxide concentrations."

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Improving the absorption, bioavailability of curcumin

IFT Weekly May 17, 2017

Curcuma longa L. (Zingiberaceae), known as turmeric, has been used in the traditional medicine in China and India for centuries.

Turmeric consists of natural bioactive hydrophobic polyphenols called curcuminoids of which curcumin is the main component derived from the rhizome of the herb. The optimal health benefits of curcumin are limited by its low solubility in water and corresponding poor intestinal absorption. Cyclodextrins have been widely used in pharmaceutical and nutritional formulations to form an inclusion complex on a molecular basis with lipophilic compounds thereby improving aqueous solubility, dispersibility, and absorption. A study published in the European Journal of Nutrition examines the bioavailability of a new γ-cyclodextrin curcumin formulation (Cw8).

Twelve healthy human volunteers participated in a double-blinded, cross-over study. The plasma concentrations of the individual curcuminoids that are present in turmeric (namely curcumin, demethoxycurcumin, and bisdemethoxycurcumin) were determined at baseline and at various intervals after oral administration over a 12-hr period. The new CW8 formulation was compared to a standardized unformulated curcumin extract (StdC) and two commercially available formulations with purported increased bioavailability: a curcumin phytosome formulation (CSL) and a formulation of curcumin with essential oils of turmeric extracted from the rhizome (CEO).

The researchers found that CW8 showed the highest plasma concentrations of curcumin, demethoxycurcumin, and total curcuminoids, whereas CSL administration resulted in the highest levels of bisdemethoxycurcumin. CW8 showed significantly increased relative bioavailability of total curcuminoids in comparison with the unformulated StdC. The researchers concluded that the "data presented suggest that γ-cyclodextrin curcumin formulation (CW8) significantly improves the absorption of curcuminoids in healthy humans."

Industry and Health Experts Join Forces to Tackle Obesity

Nutrition Insight 19 May 2016

Ahead of European Obesity Day tomorrow, the UN health agency launched a new publication at the European Congress on Obesity in Portugal earlier this week which revealed a rising number of obese adolescents in many countries across Europe.

The Health Behaviour in School-aged Children (HBSC) survey is a World Health Organization (WHO) collaborative cross-national study that monitors the health behaviors, health outcomes and social environments of boys and girls aged 11, 13 and 15 years every four years. HBSC has collected international data on adolescent health, including eating behaviors, physical activity, sedentary behavior and, more recently, overweight and obesity, for over a quarter of a century, allowing prevalence to be compared across countries and over time.

Obesity is one of the most challenging public health concerns of the 21st century. It is an epidemic that is sweeping Europe and about which not enough is being done, according to health professionals and organizations around the world.

Increasing Consumption of Fruit and Vegetables

Encouraging the consumption of fresh fruit and vegetables alongside improving physical exercise, reducing the overall calorie intake, especially cutting down on sugar, fat and salt as well breaking out of sedentary behaviour and obesogenic environments are some of the key factors that global health experts are calling for.

The release of the survey comes at the same time as new US research which finds that eating three or more servings of fruit and vegetables per day may lower your risk of developing peripheral artery disease (PAD), according to new research in Arteriosclerosis, Thrombosis and Vascular Biology, an American Heart Association journal. PAD narrows the arteries of the legs, limiting blood flow to the muscles and making it difficult or painful to walk or stand.

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Previous studies linked lower consumption of fruits and vegetables with the increased occurrence of coronary heart disease and stroke. However, there has been little research into the association of eating fruits and vegetables and PAD.


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However, after studying data from 3.7 million people, researchers found three key points; People who reported eating three or more daily servings of fruits and vegetables had 18% lower odds of PAD than those reporting eating less; when stratified by smoking status, the association of lower PAD and increased consumption of fruits and vegetables was present only among participants who were current or former smokers and overall, 6.3% of participants had PAD and 29.2% reported eating three or more servings of fruits and vegetables daily.

"Our current study provides important information to the public that something as simple as adding more fruits and vegetables to your diet could have a major impact on the prevalence of life-altering peripheral artery disease," says Jeffrey Berger, M.D., study coauthor and associate professor of medicine and surgery at New York University School of Medicine in New York City.

Using fermentation to remove cadmium contamination in rice

IFT Weekly May 24, 2017

A study published in the Journal of Food Science examines how to remove cadmium in rice by fermentation, the removal mechanisms, and the quality of fermented rice in order to utilize cadmium-contaminated rice.

At present, the prevention and control of cadmium pollution in rice is mainly focused on reducing cadmium pollution, repairing cadmium-contaminated soil, and screening of rice varieties that have low tendency to accumulate cadmium. Microbial adsorption is often used to treat heavy-metal-contaminated wastewater, but fermenting the grain to remove heavy-metal ions from grains has not yet been attempted. This work studied a method of reducing the cadmium levels in rice without affecting the quality of the rice in order to provide technical support in the utilization of grain resources.

The researchers varied the fermentation time, temperature, liquid ratio, inoculant levels, and number of washes to optimize the efficiency of cadmium removal. The optimum fermentation process, in which the rate of cadmium removal from the rice is 80.84%, required an inoculant amount of 0.1%, a liquid ratio of 1:1, a period of 60 hr at 37°C, and subsequently washed with water four times.

The researchers also studied the physicochemical properties of raw cadmium-contaminated rice and fermented rice. They found that the pasting temperature of the fermented rice became lower, and temperature at which pasting starts dropped, but the endothermic enthalpy increased, implying that the protein content in the rice decreased during the fermentation. It suggested that the crystal structure of rice starch changed and fermentation did not result in the formation of new chemical bonds or functional groups in the rice.

The researchers concluded that the microbial fermentation method can effectively limit the cadmium content to within the food safety limits of the Chinese national standard. However, higher levels of cadmium in rice still require better approaches to their reduction.


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Bread roll partially substituted with mango fibre flour

Food News
Latam 11 MAY 2017

The mango is a fruit of the Inter-tropical Zone pulpy fleshy and with threads, it comprises numerous varieties, reason why its flavour varies between one and another species.

The shape of the mango is generally ovoid-oblong or brindled, notoriously flattened, rounded, or obtuse at both ends, with a large, flattened central bone with a woody cover.

Approximately 4-25 centimetres in length and 1,5-10 in thickness, its weight varies from 150 gram to 2 kg, the colour can be between green, yellow and different shades of pink, red and violet, matte or glossy . Its flesh is intense yellow colour, exotic flavour, succulent, very sweet and aromatic.

Various investigations reveal the use of natural antioxidants from agro-industrial residual sources, as these sources highlight fruits that are not fully exploited and by-products such as the potential ingredient of nutraceutical antioxidants.

These by-products account for 35-60% of the total weight of the fruit. For the case of the mango, the husks and seeds contain high levels of bioactive compounds, such as phenolic compounds, carotenoids, vitamin C and dietary fiber.

The high potential of these residues can be used to obtain ingredients that can be used in different food products.

Because bakery products are consumed daily in relatively large amounts, they can provide a convenient means for the disposal of bioactive compounds that promote the health of consumers. Therefore, bolillo-type bread was chosen as a matrix to promote the intake of bioactive compounds in consumers.

The University of Guanajuato Campus Irapuato-Salamanca (http://www.fcb.uanl.mx) investigated and evaluated the total phenolic compounds, flavonoids and antioxidant capacity in a bakery product partially substituted with mango fibre our at different levels . In the study, both antioxidant activity and total phenolic compounds content was significantly increased by replacing wheat flour with mango fibre (HFM) flour.

After the roll loaf production, the samples were thinly sliced and allowed to dry for 3 h at 60 ° C, then milled in mortar and frozen. In the determination of total phenolic compounds sign cant differences were found among the evaluated samples. In the case of the treatments T1 and T2, which were partially substituted with the HFM, the increase in phenolic compounds was considerably high, while in the commercial product the amount of total phenolic compounds detected was lower. As for the content of phenolic compounds in bolillo-type bread, it is indistinct to partially substitute the wheat flour for HFM in either 10 or 20%.

Regarding the determination of total flavonoids (figure 2b), the results showed significant differences between the different samples evaluated. The most acceptable treatment being T2, i.e. bolus partially substituted with HFM in 20%, which proved to be the treatment with a greater effect by the substitution with HFM. Contrary to what occurred in the determination of total phenolic compounds, flavonoids were only affected by the level of substitution higher with the HFM. This level of substitution increases the content of total flavonoids in bobbin-type bread up to 2 times over the control or the commercial product. No significant differences were found for both T1, control and commercial product when determining the flavonoid content.

In the present study, both the antioxidant activity and the determination of total phenolic compounds were significantly increased due to the partial substitution of wheat flour with HFM at the lowest substitution level (10%). In the substitution with 20% of HFM it was possible to increase the levels of total flavonoids in bolillo type bread. In spite of this situation, the partial substitution with HFM in bakery products like the bolillo is attractive since the contribution that this substitution offers is directly reflected in the quantification of the total phenolic compounds and the antioxidant capacity measured as retention of the radical DPPH. Therefore, partial substitution with HFM in a high bakery product in antioxidants improves the quality thereof.

Shelf life of fortified moringa and spirulina crackers

Food News Latam 12 MAY 2017

The consumption of cookies has become very popular all over the world today. Cookies are products of dry cereals, consisting essentially of starch flour and appreciable amount of fat and sugar. There are many recipes for cookies but traditionally, cookies and bread are made from wheat flour, a grain grown in many parts of the world.

Addiction to wheat flour is an important limitation in the production of cookies. Therefore, the use of local cereal flour as a substitute for wheat flour is of great socioeconomic importance for countries. In fact, the potential for the use of gluten-free flour and cereals or legumes such as total or partial substitute of wheat flour in cookie production has been reported by several authors. In addition, the replacement of cereal meal replacement formulas with nutritionally interesting ingredients is an alternative to improve the nutritional value of cookies, with desirable organoleptic changes.

In strategies against malnutrition, fortification or supplementation of consumer products occupy a central place in industry. To this end, the development and use of enriched cookies, especially rich in protein, fats and some essential micronutrients such as iron, zinc or vitamin A may help reduce the risk of protein-energy malnutrition or nutritional deficiency, to improve the nutritional status and health of children, especially in developing countries. Recently, cookies are considered functional foods, that is, foods containing elements beneficial to health.

The evolution of the quality of the two types of sorghum biscuits fortified to 10% moringa and 4% Spirulina was studied in two types of containers, such as aluminum and plastic for 12 months and was compared with a cookie to determine their useful life. Several nutritional parameters of quality (moisture, fat, protein, carbohydrates, ash, iron, zinc) and oxidative rancidity (fat acidity,

Image © iStock.com/ BWFolsom

peroxide value) and microbiological parameters (total coliforms, fecal coliforms and total mesophilic aerobic flora) were analyzed during storage at room temperature using standard methods. The results show that there are no significant changes in nutritional parameters in each type of cookie for both types of containers examined during storage. For the types of microorganisms studied, the fatty acid rate and the peroxide index in the cookies were variable and particularly higher for the richer fat crackers such as Moringa enriched sorghum. However, the very high initial peroxide indices in the different types of biscuits suggest a start of oxidation by changing little during storage despite the packaging used.

The effect of heat treatments on vitamin C

Food News LATAM 10 MAY 2017

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L-ascorbic acid (AA) or Vitamin C is a lactone provided with an endiol group. Ascorbic acid is a white, stable, water soluble, crystalline substance that is readily soluble in solution, especially when exposed to heat.

Oxidation can be accelerated by the presence of copper or iron and an alkaline pH. Ascorbic acid is a hexose derivative and is classified as a carbohydrate closely related to monosaccharides. Ascorbic acid is essential for the life and development of the body, as it increases the intestinal absorption of iron and is necessary for the correct ossification of teeth and bones and for the integrity of the delicate walls of the capillaries. Intervenes in the healing of the wounds and increases the resistance of the organism to the aggressions that provoke in the infections. Ascorbic acid is easily absorbed from the small intestine and passes into the blood by an active mechanism and probably also by diffusion. The average absorption is 90% in ingestions between 20 and 120 mg; however, with very high intakes, such as 12 g, which self-prescribe frequently, only 16% is absorbed. Diets rich in Zinc or pectin can decrease absorption, while it can increase by substances in natural citric extract. Vitamin C is very sensitive to light, temperature and oxygen in the air. It is destroyed in cooking and by the effect of the air on it, therefore a citrus juice like orange, lemon or grapefruit, must be consumed immediately, otherwise loses its effectiveness. For a reaction to occur a sufficient amount of energy is required for this to occur. This reaction is facilitated to the extent that the temperature is higher (the temperature can give enough energy for a reaction to happen), in some cases it can be said that with an increase of 10 ° C centigrade temperature the speed with which performs a double reaction.

The main effect of heat treatment is to accelerate the rate of chemical reactions. The oxidation product of ascorbic acid, dehydroascorbic acid (DHA), is a 2,3-diacetal which in solution exists predominantly in the form of a dicyclohydrate. Both possess biological activity, and are found in redox balance (AA DHA).

During the processing of foods the losses of vitamin C due to the enzymatic destruction are minimal. These are mainly due to oxidative and nonoxidative non-enzymatic reactions. Non-oxidative reactions are comparatively slow. The pasteurization process determines losses of the order of 10-20% in the vitamin C content of milk, the higher the higher the heat treatment applied. In pasteurized milk it can be found that the ratio ascorbic acid / dehydroascorbic acid increases relative to that of raw milk as a consequence of the reduction of the dehydroascorbic acid to ascorbic acid by the oxidation of the sulfhydryl groups. The UHT treatment determines the destruction or transformation in ascorbic acid of all dehydroascorbic acid present.

Losses in ascorbic acid can range from 10-90%, depending on the amount of oxygen present in milk at the time of UHT treatment. Conventional sterilization processes determine the destruction of all vitamin C present in milk. During oxidative degradation, ascorbic acid oxidizes to dehydroascorbic, and by cleavage of the lactone ring gives the 2,3-diketogulonic acid, which no longer has biological activity. The analysis of vitamin C is one of the most used as an indicator of nutritional quality, since it is highly vulnerable to chemical oxidation, enzymatic and very soluble in water, making it a sensitive and appropriate indicator to evaluate the changes in quality during transport, processing and storage of vegetables and fruits.

India 'defying the odds' as a fast growing chocolate confectionery market, Mintel

By Douglas Yu 01-May-2017 - Confectionery News

Mintel has revealed India is "defying the odds" as one of the world's fastest growing chocolate confectionery markets, while the global market posts slow growth in recent years.


Image © iStock.com/vadimguzhva

Sales of chocolate confectionery in retail markets grew by 13% between 2015 and 2016 in India, followed by Poland, which saw sales growth of 2%, Mintel data showed.

India and Poland were the only two countries to see sales of chocolate growth in 2016, with sales in the US, UK, Germany and France flat over this period, while sales fell in Russia (-2%), Brazil (-6%), and China (-6%), according to Mintel. Data from Mintel also revealed that India's chocolate confectionery market has had a strong CAGR of 19.9%, in retail market value, between 2011 and 2015, and is expected to grow at a CAGR of 20.6% from 2016 to 2020. In terms of volume sales, India consumed 228,000 tons worth of chocolate in 2016, compared to France (251,000 tons), Brazil (236,000 tons), and China (202,000 tons), Mintel said. Meanwhile, Australia and Indonesia consumed 95,000 tons and 94,000 tons worth of chocolate in 2016 respectively.

Chocolate makers saw growth
Some of the major chocolate companies, including Mondeléz and Hershey, have seen revenue growth in 2016 despite the demonetization made by India, according to their most recent quarterly earnings results. Mondeléz's organic net revenue increased 0.6% during full year 2016, tempered by a negative impact of 60 basis points from India demonetization, while Hershey 's India business grew by 20% in Q4. In Q1 2017, Hershey's constant currency net sales in India increased by 16% driven by the company's investment in its branded syrup, spreads, milk booster as well as the introduction of Brookside chocolate brand, ConfectioneryNews recently reported.

What's driving the growth of India's chocolate market?

Health benefits and convenience are the key reasons behind the growth of India's chocolate confectionery market in both value and volume, Mintel's director of insights, Marcia Mogelonsky, said. On the benefits of chocolates, Mintel research shows over two in five Indian consumers (44%) find sweet or sugary snacks like chocolates and cakes to be healthy, while over one in three (35%) Indians believe these snacks provide them with energy.

Meanwhile, as many as one in two (49%) Indian consumers associate sweet or sugary snacks like chocolates with convenience, Mintel added. "Data from Mintel also reveals 43% of Indians consume sweet or sugary snacks like chocolate and cake between lunch and dinner, with over half (53%) of Indian consumers reporting that they tend to snack in between meals because they get hungry," Mogelonsky said. Additionally, as many as 19% of Indian consumers would like to see a wider variety of organic and natural snacks that have no additives or preservatives, according to Mintel. "As interest in healthy sweets continues to rise, the availability of chocolate that offers organic or all natural positioning will be desirable as consumers look for better-for-you options," Mogelonsky said.

Sports Nutrition scoring in the mainstream: The latest trends driving the sector's growth

Gary Scattergood 14 May 2017 - Nutraingredients Asia

The blurring of boundaries between sports nutrition and mainstream food and beverages is fuelling the sector's growth, alongside new product development (NPD) tackling consumer needs according to their age and lifestyle.


Image © iStock.com/Dirina

Information presented at this week's Vitafoods show in Geneva, where NutraIngredients staged its annual awards, highlighted how sports nutrition firms were increasingly targeting age and gender related performance, with NPD positioning featuring active ageing, sporty teens and health conscious women.

It was also revealed that performance products were increasingly being found in the mainstream, with launches in the dairy space growing by 45% in the last year. Other fast growing sectors with new product launches with active nutrition marketing claims include ready meals (up 32%) cereals (up 24%) and snacks (up 22%). Examples highlighted included protein pancake mixes launched in Australia, Protein Gusto cheese soup from the US and protein smoothies with raspberry and chocolate in Finland - which also tapped into the trend for products targeting active consumers also playing to indulgence demands.

Plant Protein Power

In terms of market positioning, 71% of products launched featuring sports-related claims last year emphasized protein power. Meanwhile 37% were positioned from a gluten-free perspective, 26% for recovery, 25% high fibre and 23% no additives/preservatives. The last year was also characterized by a surge in plant protein-based products, which increased by 17% in 2016, according to the numbers crunched by Innova Market Insights.

Within this, there was a 65% rise in sports nutrition launches featuring pea protein, a 43% jump in rice protein and a 25% increase in soy protein. The overall sports nutrition market saw the sports bar format achieve the biggest growth globally in 2016, up 17%. Sports powder launches increased by 12% and ready-to-drink goods by 11%.

REGULATORY NEWS

GM mustard moves closer to approval in India

IFT Weekly May 17, 2017

According to Science magazine, India's top biotechnology regulator has declared a transgenic mustard plant "safe for consumption."

Moving the plant into farmers' fields is now a political decision in the hands of India's environment minister, who may wait until the Supreme Court of India, resolves several long-pending related cases.

The GM mustard has been under development for almost a decade. A report assessing the plant's risks was released a year ago, drawing more than 750 comments that were reviewed by the Ministry of Environment's Genetic Engineering Appraisal Committee (GEAC). The report concluded the mustard was safe and nutritious, and GEAC chair Amita Prasad in New Delhi said the commission unanimously agreed on May 11 to recommend allowing farmers to plant the crop for the next four years. The final decision will be made by Environment Minister Anil Dave.

If approved, Dhara Mustard Hybrid-11 (DMH-11) will be the second GM plant—but the first food crop—to reach India's farmers. In 2004, India allowed commercial cultivation of GM cotton and it now accounts for more than 90% of the nation's harvest.

American Heart Association: A clean label doesn't necessarily make for a 'healthy' product

By Elaine Watson 15-May-2017 – Food Navigator USA

Consumer research indicates that for many shoppers, 'healthy,' is all about foods that are organic, minimally processed, natural, non-GMO, or free of artificial ingredients. But such factors should not be included in the legal criteria for 'healthy' claims on pack, argues the American Heart Association (AHA).

In comments submitted to the FDA as part of its probe into 'healthy' claims on food labels, AHA president Steven R. Houser, PhD, observed: "Consumers' views of health and wellness are becoming more inclusive as they are defined by more than nutrient content. For example, respondents in the IFIC 2016 Food and Health survey reported that a healthy food is defined, in part, by being organic, fresh, unprocessed, natural, free of artificial ingredients and additives, and having few ingredients."

But he added: "Definitions for many of these factors are not clearly defined in law nor agreed upon by stakeholders. Furthermore, and perhaps more importantly, there is not sufficient scientifically sound evidence linking them to health outcomes."


Image © iStock.com/djedzura

Criteria should not vary on a category-by-category basis That said, the FDA should move away from a 'healthy' definition that is narrowly focused on a handful of nutrients "to one that requires foods to meet both food and nutrient criteria," he said. "We support reserving 'healthy' for products that satisfy the 2015-2020 Dietary Guidelines for Americans' recommendation to consume a variety of nutrient-dense foods and beverages, i.e., those that 'provide vitamins, minerals, and other substances that contribute to adequate nutrient intakes or may have positive health effects, with little or no solid fats and added sugars, refined starches, and sodium…ideally…in forms that retain naturally occurring components.'

"We believe this to be distinct from products that may be 'better-for-you' choices (compared to other similar products within a given category, i.e., relative comparisons), but that do not have an overall composition and nutrient profile consistent with the intent of the dietary guidelines. If consumers selected foods only from the latter category, their overall eating patterns would likely fail to achieve recommendations."

AHA: Added sugars should be limited in products making 'healthy' claims

As for some of the main bones of contention highlighted in industry comments, the AHA believes that added sugars should be controlled in 'healthy' foods, and that limits on saturated fat should remain part of the criteria, although it recommends

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removing total fat limits. On the thorny issue of whether fortified foods should be able to make 'healthy' claims, the AHA believes that "the beneficial nutrients that establish a food's 'healthy' claim should occur intrinsically in food," but then goes on to add that exceptions can be made.

"This does not necessarily mean that fortified foods cannot bear the "healthy" claim, but rather that they could not rely on fortification to establish eligibility for the claim. For example, we support fortification of foods bearing the healthy claim to the extent that fortification is used to contribute shortfall nutrients to otherwise nutrient-dense foods (such as the addition of calcium to 100% orange juice, folic acid to whole-grain cereal, and vitamins A and D to non-fat milk) or to meet a standard of identity (such as products containing enriched grains).

"Any fortification should be in accordance with FDA's fortification policy which, among other provisions, does not consider it appropriate to fortify sugars or snack foods such as candies and carbonated beverages."

Food labelling regulations currently mandate that 'healthy' can only be used to describe foods with 3g or less total fat and 1g or less saturated fat per serving (excluding fish and meat), while there are also limits on cholesterol and sodium, and minimum requirements for nutrients to encourage (vitamin A, C, calcium, iron, protein, or fibre). There are no limits on sugar - added or otherwise.
However, FDA now says that it will not enforce current regulatory requirements for products that use the term 'healthy' if they:
(1) Are not low in total fat, but have a fat profile makeup of predominantly mono and polyunsaturated fats; or
(2) Contain at least 10% of the Daily Value (DV) per reference amount customarily consumed (RACC) of potassium or vitamin D.

Analysis: Can EFSA ever cut ties with industry?

By David Burrows 03-May-2017 - NutraIngredients

Image © iStock.com/ChesiireCat

The consultation for a new policy on independence at the European Food Safety Authority (EFSA) draws to a close this week and campaigners have told FoodNavigator that the final document won't be worth the paper it's written on "My problem is that they pretend to be independent from the food industry, but they're not," explained Martin Pigeon, researcher and campaigner on agribusiness issues at Corporate Europe Observatory (CEO). "You can spend ten minutes looking at a panel and come up with a scandal."

Pigeon has published a circumscribed list of them. It starts with the Bánáti affair in September 2010, in which the chair of EFSA's management board, Diána Bánáti, reportedly failed to mention that she was also on the board of ILSI, a non-governmental body largely funded by food, chemical and pharma companies. There was no evidence that the links with ILSI influenced her actions at EFSA, but it did raise a "perception issue", admitted the authority's executive director at the time, Catherine Geslain-Lanéelle. Lessons were learned, she said. "Public perception is important; we need trust." But since then, EFSA has found itself mired in scandal after scandal; and most involve industry ties that for campaigners – and increasingly the public and politicians – are too close for comfort. Consider the investigation by CEO in October 2013 – and picked up across the world – that showed almost 60% of EFSA experts have "at least one conflict of interest"; experts with conflicts of interest also dominated all but one of the authority's panels.

Claim and counterclaim

Some have suggested it's a witch-hunt. In April, the authority's executive director Bernard Uhl, told Reuters that his team is facing unprecedented criticism after concluding that glyphosate – the world's most widely used herbicide – was "unlikely" to pose a carcinogenic risk to humans. The European Agency for Chemical products (ECHA) has since agreed with this appraisal. However, it remains at odds with the findings of the International Agency for Research on Cancer – that glyphosate is "probably carcinogenic" Glyphosate is one of the very few scientific opinions EFSA has issued in the past 15 years that has been challenged (and there have been 8,000 or so of them), Uhl explained in the interview. Those attempting to discredit his agency over the assessment are thus undermining science to pursue a "political agenda".

Others maintain that there is no smoke without fire. Just last week, an investigation by EU Observer and Dutch magazine OneWorld revealed that EFSA's glyphosate evaluation relied on scientific evidence that was written or infiuenced by Monsanto, which uses the chemical in its leading weedkiller Roundup. EFSA played down the investigation, but with every negative headline trust in the authority erodes further. A 2010 Eurobarometer survey commissioned by EFSA found that 64% of Europeans were confident about the information issued by both EFSA and national food safety agencies. What would the result be today?

The European Commission is certainly aware of the challenge it faces to restore trust in 'the system' following controversies linked to just a handful of substances. In March, a group of green MEPs writing about glyphosate highlighted that the commission had held an internal expert meeting entitled 'possible improvements to the integrity of academic laboratory testing and reproducibility'. They also noted that the EU's executive branch "specifically referred to 'selective reporting of results, pressure of academics to publish, and lack of standardisation of reference measurement procedures and reference materials'."

There is little doubt some of the issues have become political. The assessments are also fiercely complicated and can be simplified and sensationalised by parts of the media – as the health and food safety commissioner noted in October. "I n most of these science-related issues, people tend to look for Uncertain science Improved communication and greater transparency would certainly help nip some of the criticisms and controversies in the bud; which makes EFSA's new policy on independence and scientific decision-making the perfect opportunity to kick-start a new era of openness.

An era of openness

The definition of conflict of interest, cooling off periods and transparency are all up for review; a public consultation is also open until the end of this week (May 5, 2017) and a draft proposal was published earlier this year. But campaigners have told FoodNavigator that they expect very little to change. "EFSA has to demonstrate some basic will [to cut its ties with industry], but I'm not very hopeful," explained CEO's Pigeon. On the plus side, the new draft does include a two-year cooling-off period for "all managerial roles, employment and consultancies, even of an occasional nature". However, this still leaves a gaping loophole, Pigeon explained: EFSA will only assess experts' interests according to the specific mandate of the panel they want to join or are already a member of.

This also puts it at odds with the European Parliament, which has repeatedly demanded a comprehensive cooling-off period for experts. Indeed, last week MEPs on the committee for budgetary control called on EFSA to " incorporate into its new independence policy a two-year cooling-off period for all material interests related to the companies whose products are assessed by the authority and to any organisations funded by them". The committee also said it "regrets" that the authority has not included research funding in the list of interests to be covered by the two-year cooling-off period and called on EFSA to "swiftly implement the measure in line with the discharge authority's repeated requests".

An EFSA spokesman told FoodNavigator that the authority has a "robust system in place to safeguard its independence" and "welcomes all contributions" to its policy review process. Some would argue that a more contributions from the EU's coffers wouldn't go amiss either. The European Border Agency, Frontex, has double the budget EFSA has, Pigeon explained, and is "paying the price of political priorities". This lack of resources explains why it is industry experts that often end up sitting on panels (positions are unpaid). MEPs last week said they were "convinced the authority should be endowed with a sufficient budget to hire independent in-house experts with no conflicts of interest". This would help develop a public interest ethos, cut ties with industry and remove EFSA from the public microscope. "The independence of experts that will look at data offered by industry is the only credibility EFSA has left," said Pigeon. "It has to get that right."

Chocolate to fall under FSSAI standards from 2018

22-May-2017 – Food Navigator Asia

Chocolate manufacturers will have to fall in line with the constraints of food safety and standards regulations after India's health ministry placed all types of chocolate under the regulator's purview.

The regulations, which come into effect on January 1, 2018, set the percentage of cocoa and sugar allowed in various kinds of chocolates. They also lay down the minimum percentage of cocoa solids, milk fat, milk solids and acid insoluble ash in different varieties of chocolates. Dark chocolate will be required to contain no less than 35% cocoa solids, including not less than 18% cocoa butter and 14% fat-free cocoa solids.

Pralines should be a single mouthful in size and have not less than 25% chocolate component in terms of weight. Edible salts, spices and condiments, and vitamins and minerals will be among permitted ancillary ingredients, as are emulsifying and stabilising agents, and sequestering and buffering agents. Manufacturers will be required to specify on labels the presence of vegetable fat in addition to cocoa butter. All varieties are required to have contained chocolate at least 25% of total weight.


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GST will 'make food cheaper', but drinks firms brace for price rises

By RJ Whitehead 22-May-2017 – Food Navigator Asia

Most food items will be cheaper with the introduction of GST on July 1, according to Harsimrat Kaur Badal, though drinks manufacturers are looking at increases of up to 10% on their products.

Speaking at a conference in Delhi, the food processing minister said her finance counterpart had agreed to keep foods in the lowest rate band: "I am happy that the GST rate [on food items] has been kept within the 5% range. Lots of things will be cheaper. Food items are definitely not going to be expensive." Four bands have been set, from 5% to 28%, while some staples have been exempted entirely, including milk, cereals and meat.

Processed food items will attract a 5% tax under GST—a drop from the current 15% rate. Also under this band, albeit from a current rate of 3-4%, tea, coffee and masala are expected to become more expensive. Restaurant bills will be cheaper, with their levy dropping from a current 22% to an 18% band. At the other end of the scale, sweetened beverages will attract the 28% GST bracket, along with an additional 12% sin tax. This has prompted manufacturers to plan price increases of 5-10% at a time when some international players are operating at under 40% capacity.

"The effective tax rate of 40% on these products under the GST regime is against the stated policy of maintaining parity with the existing weighted average tax which is significantly below 40%," the IBA said. The association also expressed its hope for the government to reconsider the levy and set a lower rate for non-sugar sweetened drinks, nutrition beverages and carbonated drinks that contain fruit juice. "[Otherwise] this increase in tax will further limit the growth of the beverage industry," it added.

FSSAI admits high-handed past, now seeks more industry collaboration

By RJ Whitehead 30-Apr-2017 – Food Navigator Asia

According to a senior official at the FSSAI, the food authority has now cast off its reputation as an impregnable fortress whose top-down approach risked alienating food players across India.

Speaking at Food Vision Asia in Singapore last week, Madhavi Das, the regulator's chief management services officer, said it "was fair to say " that the FSSAI had now come to embrace collaboration not just with food companies but with "all stakeholders ".

The adoption of this new mindset apparently began with the arrival of a new chief executive last year following the Maggi noodles affair in 2015, which left many companies wondering if the regulator had been working with them or against them. To many observers, the episode was seen as a farrago of unilateral actions and high-handed declarations by the FSSAI after samples of the Nestlé-manufactured noodles were found to contain illegal levels of lead and monosodium glutamate.

Though it was later revealed that the results did not stand up to further testing, the regulator found itself at "loggerheads with the food industry ," as one influential Indian columnist put it, and later on the wrong side of judicial rulings.

Until recently the FSSAI was also widely criticised mostly for employing a system whereby all but 377 non-standardised food items required prior approval, as did many "proprietary" foods, even though these had had a long history of consumption in India. It has since transformed this "approval system" approach to one that is much more international in its scope.

Recalling the FSSAI's attitudes at the time, one major ingredients player in India recently described to FoodNavigator-Asia how the authority had become accustomed to "taking a top-down approach to regulation ", and bemoaned a "lack of clarity" in its rulings. Now "there is more communication than in the past," the source told us.

Explaining the regulator's position before the arrival of Pawan Kumar Agarwal to the chief executive's desk, Das pointed out that the body, which was established in 2008, is very new by international standards. "The initial focus was obviously on traditional regulatory methods. We had to set in place


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standards and I would request for everybody to remember that we came from a prevention of food adulteration mindset and regime.

"And [now] we have moved to a more holistic mindset of ensuring safe and wholesome food. So there was a transition period; there was a period where standards needed to be set, where the entire focus was on standards and enforcement. I think it is fair to say that there has been a change; I would also attribute it to the CEO, I work with him very closely," Das added.

She also described the need to widen the collaborative net to include civil society organisation, school boards, municipalities and other government departments. "I think the entire feeling has been that until we get down to looking at every stakeholder and getting their buy-in, we are not going to get where we want, which is for safe and nutritious food for 1.3bn Indians ," she said, adding that it would be "presumptuous to say that the authority could do this alone. There is no way over 200 people sitting in the FSSAI are going to take care of a country the size of India without the buy-in of the stakeholders. So this is something that is here to stay, in my mind."

Hemp for human food consumption finally gets the green light in Australia and New Zealand

By Gary Scattergood 29-Apr-2017 - NutraIngredients Asia

Hemp foods are finally set to hit Australian plates after regulators approved legislation legalising low-THC hemp for human consumption as a food.

The decision has been welcomed by industry players keen to reap the rewards of the international market for hemp foods, which is currently estimated to be worth $1bn annually. The Australia and New Zealand Ministerial Forum on Food Regulation gave hemp seeds the tick of approval during last week's Council of Australian Governments (COAG) meeting.

Australia's largest manufacturer of hemp foods is Hemp Foods Australia, owned by long-time campaigner Paul Benhaim. He has repeatedly highlighted the nutritional, economic and environmental benefits of hemp consumption.

"Hemp seeds contain high quality protein and the good fats, as well as polyunsaturated fatty acids, and are the only food to contain Omega 3 and 6 in the correct amounts to meet our long-term nutritional needs," he said. "They are also a natural source of B vitamins, vitamin D3, minerals and magnesium, making them a nutritious food ingredient."

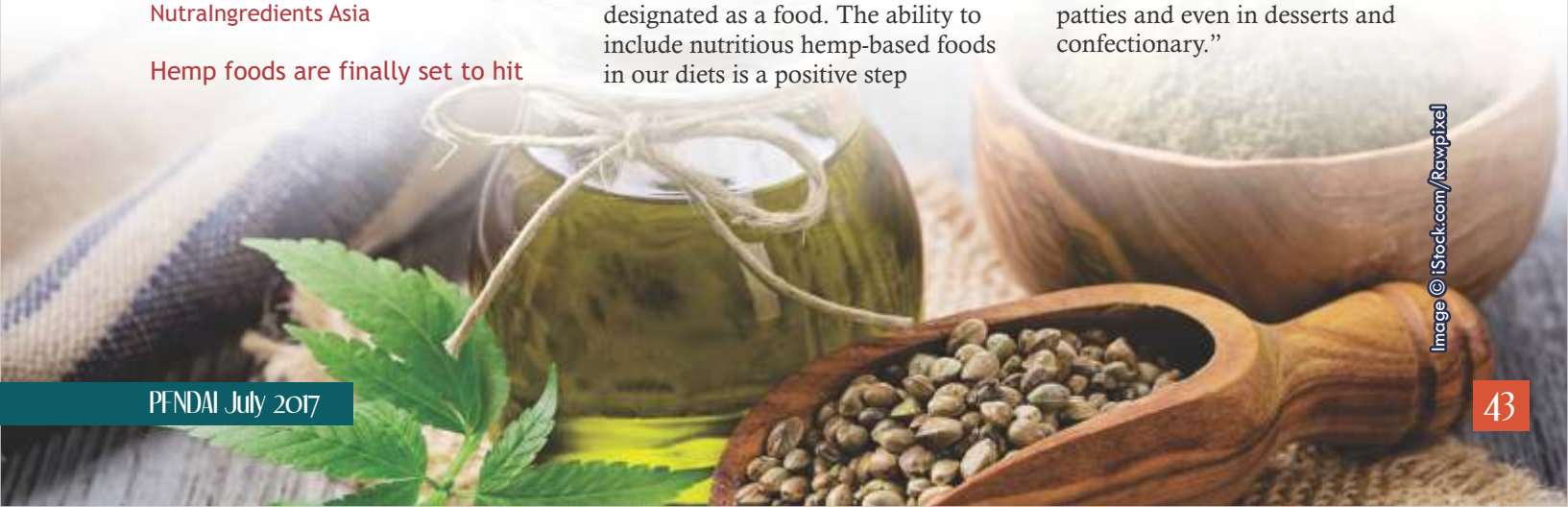
Industry trade body Complementary Medicines Australia (CMA) said the rule change would put the country on a par with Europe and North America. CMA CEO Carl Gibson said: "CMA has strongly supported that low-THC hemp be legally designated as a food. The ability to include nutritious hemp-based foods in our diets is a positive step forward for Australians. A healthy diet is a prerequisite for the prevention of many chronic diseases. Unfortunately, Australians are not consuming a diet that is high in quality nutrients and their health is suffering as a result."

Market boom

It has been acknowledged that the new rule will take effect six months after it has been gazetted because there is still some New Zealand and Australian state and territory legislation that will need to be amended. The market for Australian hemp foods is expected to quadruple in the next few years. "Australian hemp farmers were elated at the decision to approve hemp as a food and separate it from marijuana," added Hemp Foods' Benhaim.

"In addition to added job opportunities for Australia's farming industry, this is a very positive step towards more sustainable farming in Australia. "We expect to see hemp seeds, protein oil and our used by Australian restaurants and many manufacturers in their recipes," he added.

Associate Professor in Nutritional Science at University of Canberra, Dr Duane Mellor said hemp had been consumed in other countries for many years, offering a great source of protein and vegetarian source of omega 3 fatty acids. "It can be used as a crushed seed, flour, oil or protein powder, which can be used in a variety of recipes and foods, from breads, through burger patties and even in desserts and confectionary."



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HEALTH BITES

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Can you get diabetes from eating too much sugar?

Medical News Today 2 May 2017
by Zawn Villines

Sugar is irresistible to most people. So irresistible, in fact, that sugar cravings might be rooted in evolution. Craving sugary foods, or so the theory goes, could help prevent starvation. In a modern world, however, where food is often plentiful, sugar consumption is linked to diabetes, obesity, and other health problems.

Research into the connection between sugar consumption and diabetes is ongoing. Most doctors argue that sugar alone does not trigger diabetes. But some emerging research suggests a closer link between sugar consumption and diabetes than was previously thought.

Can people get diabetes from eating too much sugar?

While sugar does not directly cause diabetes, it may increase a person's risk of developing the condition. Both type 1 and type 2 diabetes affect the body's ability to regulate blood glucose levels. But eating sugar will not cause type 1 diabetes. Type 1 diabetes is an autoimmune condition, which causes the body to attack cells that produce insulin. Damage to these cells undermines the body's ability to manage blood glucose. Type 2 diabetes is more complex. Sugar consumption will not directly cause diabetes.

However, excess sugar consumption can cause weight gain. Obesity increases the risk of diabetes. Once a person has diabetes, eating too much sugar can make symptoms worse, since diabetes makes it more difficult for the body to manage blood sugar levels.

Understanding the link between sugar and diabetes

Although eating sugar is not directly linked to developing diabetes, some evidence suggests that increased overall availability of sugar makes diabetes more common. A 2013 study that looked at 175 different countries found that more sugar in the food supply increased diabetes rates. Specifically, for every additional 150 calories of sugar available per day per person, diabetes levels rose 1 percent. This change continued even when researchers controlled other factors linked to diabetes, such as obesity, exercise, and overall calorie consumption.

This research suggests that sugar consumption does affect diabetes, at least on a population level. The study did not look at individuals, so does not support the claim that individual sugar consumption causes diabetes. Despite this, it gives people who eat a lot of sugar something to consider, especially if they have other diabetes risk factors.

A 2012 review of previous research suggests that some forms of sugar consumption could increase the risk of diabetes. Drawing upon previous research, the study suggested that sugary drinks were likely to increase the risk of type 2 diabetes. Research on the link between other forms of sugar intake and diabetes, as well as sugar and other health risk factors, did not reach any firm findings.

Other sugar-related health risks

Though the link between sugar and type 2 diabetes is uncertain, the link between sugar and other health conditions is not. Research published in 2014 linked excessive sugar consumption to an increased risk of dying of cardiovascular disease. People who got more than 25 percent of their daily calories from sugar were more than twice as likely to die from heart disease as participants who got 10 percent or less of their calories from sugar.

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Other risks associated with eating too much sugar include:
Excess sugar consumption can cause a number of conditions, including liver disease.
- tooth decay
- liver disease, including non-alcoholic fatty liver disease
- cancer
- hormone changes
- high cholesterol
- weight gain and obesity
- chronic illnesses, such as polycystic ovarian syndrome (PCOS)
- chronic inflammation and immune dysfunction

Sugar intake recommendations

The body needs glucose to function. Widely present in food, glucose is therefore impossible to avoid. However, there is no need to add sugar to foods, and sweetened sodas, candies, and processed foods are particularly unhealthy. The American Heart Association (AHA) recommends the following limits on added sugars each day:
For the average man: No more than 9 teaspoons, 36 grams, or 150 calories from sugar.
For the average woman: No more than 6 teaspoons, 25 grams, or 100 calories from sugar.

Rather than focusing on any specific type of sugar, such as high-fructose corn syrup, the AHA advise limiting all added sugars. Limiting sugar intake to less than 10 percent of daily total calories is another way to keep sugar consumption under control. This prevents excessive sugar consumption regardless of daily caloric needs. The American Diabetes Association offer additional food recommendations. They suggest that people with diabetes should do the following:
- Eat carbohydrates with a low or medium glycemic index, such as whole wheat bread, oatmeal, or fruit.
- Eat foods rich in fibre to provide more sustainable energy for the body and help control blood glucose.
- Eat lean proteins and choose healthful fats to reduce food cravings. This will help people feel fuller for longer.
- Choose non-starchy vegetables, such as artichokes, broccoli, eggplant, mushrooms, okra, and turnips.
- Limit or avoid sugary snacks and alcoholic drinks.
- Avoid processed foods, which can be high in sodium, added sugars, unhealthy fats, and low in nutrients.
- Limit sodium consumption to 2,300 milligrams or less per day.
- Eat smaller meals more frequently. Large meals can cause blood sugar spikes, and hunger in between meals can lead to unhealthy snacking.

Type 2 diabetes risk factors

Researchers are still working to understand type 1 diabetes. Risk factors for type 2 diabetes include:
- being overweight, or having a high waist circumference
- being 45 years old or older
- having a family history of diabetes
- experiencing gestational diabetes during pregnancy
- having high blood glucose levels, or being insulin resistant
- having high blood pressure
- not getting much exercise
- having high levels of fats called triglycerides in the blood, or low HDL cholesterol
- blood vessel or circulatory issues in the brain, legs, or heart

Race and ethnicity are other risk factors. Native Americans, Asian-Americans, Pacific Islanders, Latinos, and African-Americans are at a heightened risk of diabetes.

Tips for preventing diabetes

A number of steps can reduce the risk of type 2 diabetes, or help manage symptoms in people with diabetes. These include:
- Losing weight: Losing just 5-7 percent of starting weight can lower the risk of diabetes.
- Getting at least 30 minutes of exercise at least 5 days per week.
- Eating smaller portions, less sugar, and lower-fat foods.

Women who develop gestational diabetes can lower their risk of diabetes by breast-feeding, getting tested for diabetes every 3 years, and talking to their doctors about taking diabetes prevention medications.

How to lower your A1C levels: A healthful guide

Medical News Today 30 April 2017 By Jennifer Huizen

An A1C blood test measures average blood sugar levels over the past 2 to 3 months. The American Diabetes Association (ADA) recommend the use of A1C tests to help diagnose cases of prediabetes, type 1, and type 2 diabetes. A1C tests are also used to monitor diabetes treatment plans.

What is an A1C test?

An A1C test measures how well the body is maintaining blood glucose levels. To do this, an A1C test averages the percentage of sugar-bound hemoglobin in a blood sample.

When glucose enters the blood, it binds to a red blood cell protein called hemoglobin. The higher blood glucose levels are, the more hemoglobin is bound. Red blood cells live for around 4 months, so A1C results reflect long-term blood glucose levels.


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A1C tests are done using blood obtained by a finger prick or blood draw. Physicians will usually repeat A1C tests before diagnosing diabetes. Initial A1C tests help physicians work out an individual's baseline A1C level for later comparison.
How often A1C tests are required after diagnosis varies depending on the type of diabetes and management factors.

Lowering A1C levels

Many studies have shown that lowering A1C levels can help reduce the risk or intensity of diabetes complications. With type 1 diabetes, more controlled blood glucose levels are associated with reduced rates of disease progression. With type 2 diabetes, more controlled A1C levels have also been shown to reduce symptoms affecting the small arteries and nerves in the body. This influences eyesight and pain while decreasing complications. Long-term studies have also shown that early and intensive blood glucose control can reduce cardiovascular complications in people with type 1 or 2 diabetes.

Even small changes in A1C levels can have big effects. The ADA recommend that maintaining fair control over blood glucose levels lowers the chance of diabetes complications significantly. They suggest that most people with diabetes should maintain A1C levels below 7 percent. A diagnosis of diabetes occurs with an A1C of 6.5 percent or higher on two separate occasions.

There are many ways to help reduce or control A1C levels using a combination of physical activity and diet. Physical activity tips to help lower A1C levels include:

- Getting a minimum of 150 minutes of moderate physical exercise is recommended weekly. That equates to 30 minutes at least 5 days per week.
- Increasing activities of daily life (ADLs). These are defined as routine activities that people tend to do daily. Workout schedules are helpful, but all activity can help in lowering A1C levels.
- Monitoring blood glucose to ensure targets are being met and changes addressed.
- Sticking to treatment or medication plans.
- Setting and achieving weight loss goals.
- Tracking progress for self-motivation and physician reference.
- Getting others involved. Lifestyle changes are often easier to adopt if other people can encourage and monitor progress.

Nearly all foods aside from lean proteins contain some sugar. Managing sugar intake and maintaining a healthful diet is key to lowering A1C levels healthfully. General diet tips to lower A1C levels include:

- controlling portion sizes
- keeping a strict meal schedule, eating every 3-5 hours
- eating similar sized portions at meals and snacks
- planning meals ahead of time
- keeping a journal of food, medication, and exercise
- spreading out carbohydrate-rich foods throughout the day
- choosing less processed or whole foods like whole grains, fruits, vegetables, legumes, and nuts
- eating a balanced diet complete with healthy proteins, fats, and carbohydrates
- seeking out the help of a registered dietitian

Another diet tip is carbohydrate counting. The ADA define one serving of carbohydrates as 15 grams and recommend adults consume 45 to 60 grams with each meal. Increasing or decreasing intake may be necessary depending on individual needs, exercise routines, and treatment plans.

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Foods that lower A1C

The longer food takes to digest, the slower and lesser the impact it has on blood sugar levels. Foods with simple sugars are digested much quicker and can spike blood glucose levels. Most blood glucose management plans focus on controlling carbohydrates, the main dietary source of glucose (sugar).

Moderate carbohydrates

While managing carbohydrates is important, people do not need to avoid them altogether. Carbohydrates are the body and brain's main fuel source and contain important nutrients. People with diabetes can enjoy carbohydrates while maintaining healthy A1C levels as long as consumption is balanced and spread out evenly throughout the day. Carbohydrates are broken into sugars, starches, and fibres. Sugars contain molecules that are quickly absorbed, causing blood glucose level to spike. Starches contain sugar molecules that take longer to be broken down and absorbed, affecting blood glucose levels more evenly over time.

Fiber

Fiber is complex, and takes longer to break down, which provides more sustainable energy and decreases the spike in blood sugar. Fiber also helps flush the digestive tract.

Natural sugar

Less processed, natural sugars like those found in fruits, vegetables, and low-fat dairy products are recommended over added, refined sugars. Whole fruits, vegetables,

and dairy products all contain far higher levels of vital nutrients than most processed foods and less sugar. For most fruits and vegetables, one serving of carbohydrates is about ½ cup or 4 ounces. Although all whole fruits and vegetables have natural sugars and nutrients, some have more than others. Many vegetables contain high levels of fiber.

Low-sugar options
Low-sugar fruit and vegetable options include: lemon, rhubarb, lime, guava, kiwifruit, cranberries, raspberries, blackberries, and strawberries, tangerines, nectarines, and plums, olives, avocados, grapefruit, broccoli and cauliflower, kale, cabbage, bok choy, and Brussels sprouts, lettuce, spinaches, collard greens, and Swiss chard, cucumbers and zucchini, tomatoes, mushrooms, and celery.
Fruits and vegetables that are high in sugar should not be avoided but controlled. Many contain vital nutrients that are difficult to obtain elsewhere.
Lactose
Lactose is the sugar found in dairy products. There is typically not a huge difference in sugar amounts between full fat, reduced fat, or non-fat milk.
Low or no-sugar dairy options include:

plain yogurts, cottage cheese, unsweetened creamers

Low-sugar, dairy-free options include:

unflavoured, fortified soy, rice, almond, flax, and coconut milk or products

Whole grain
Starches or complex carbohydrates include grains, starchy vegetables, and legumes and should make up most of carbohydrate consumption. For most grains and starches, half a cup contains one 15 gram serving of carbohydrates. While starches are better carbohydrate choices than simple sugars, not all starches are created equally. Whole-grain breads, cereals, pastas, and rices contain B and E vitamins, minerals, essential fatty acids, and fibre. Bleached or processed grains and cereals generally contain fewer nutrients and higher levels of sugar than whole-grain products. People with diabetes should be wary of products that claim to be made with or contain whole wheat. Many still have high levels of refined grains and even more added sugar.

The best whole-grain options include: whole-wheat flour, buckwheat or buckwheat flour, cracked wheat, whole-grain barley, whole rye, millet, sorghum, whole oats, brown rice, wild rice, quinoa, whole faro, popcorn, whole-grain corn or corn meal, triticale and amaranth.

Starchy vegetables and legumes
Plenty of starchy vegetables and legumes also contain high levels of nutrients and fibre in their skins or pods. Some vegetables, such as root vegetables like potatoes, have much higher concentrations of starch than others. For these, consumption need be monitored more closely.

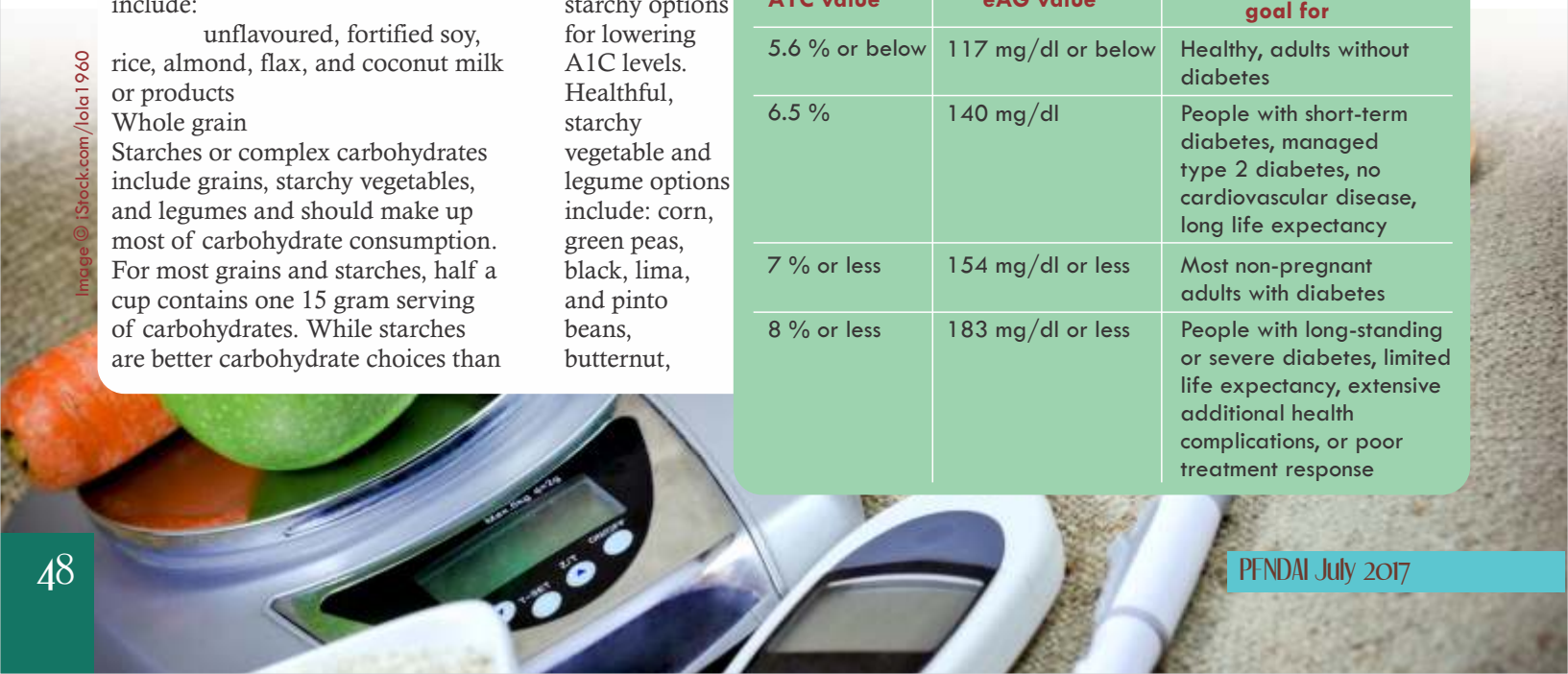
Parsnips, sweet potatoes, and pumpkins are all good starchy options for lowering A1C levels. Healthful, starchy vegetable and legume options include: corn, green peas, black, lima, and pinto beans, butternut, acorn, and spring squash, pumpkin, parsnip, plantain, dried black-eyed or split peas, lentils, low-fat refried beans or baked beans, yams or sweet potatoes, taro, palm hearts, and garlic.

Understanding A1C levels
A1C test results are expressed as a percentage. The greater the A1C level, the greater the risk of diabetes complications. Physicians may also describe A1C test results in terms of average glucose, or eAG. The eAG is determined by correlating A1C values with whole numbers. In the United States, eAG results are reported in milligrams per deciliter (mg/dL). Based on A1C results, eAG represents average 3-month blood glucose levels.

A1C value	eAG value	ADA diagnosis
5.6 % or less	117 mg/dl or less	Normal
5.7-6.4 %	117-137 mg/dl	Pre-diabetes
6.5 % or more	137 mg/dl	Diabetes

A1C level recommendations vary between individuals. People with more advanced diabetes will have higher A1C targets than healthy adults without diabetes. Factors like life expectancy, treatment response, and medical history also have an impact.

A1C value	eAG value	ADA recommended goal for
5.6 % or below	117 mg/dl or below	Healthy, adults without diabetes
6.5 %	140 mg/dl	People with short-term diabetes, managed type 2 diabetes, no cardiovascular disease, long life expectancy
7 % or less	154 mg/dl or less	Most non-pregnant adults with diabetes
8 % or less	183 mg/dl or less	People with long-standing or severe diabetes, limited life expectancy, extensive additional health complications, or poor treatment response



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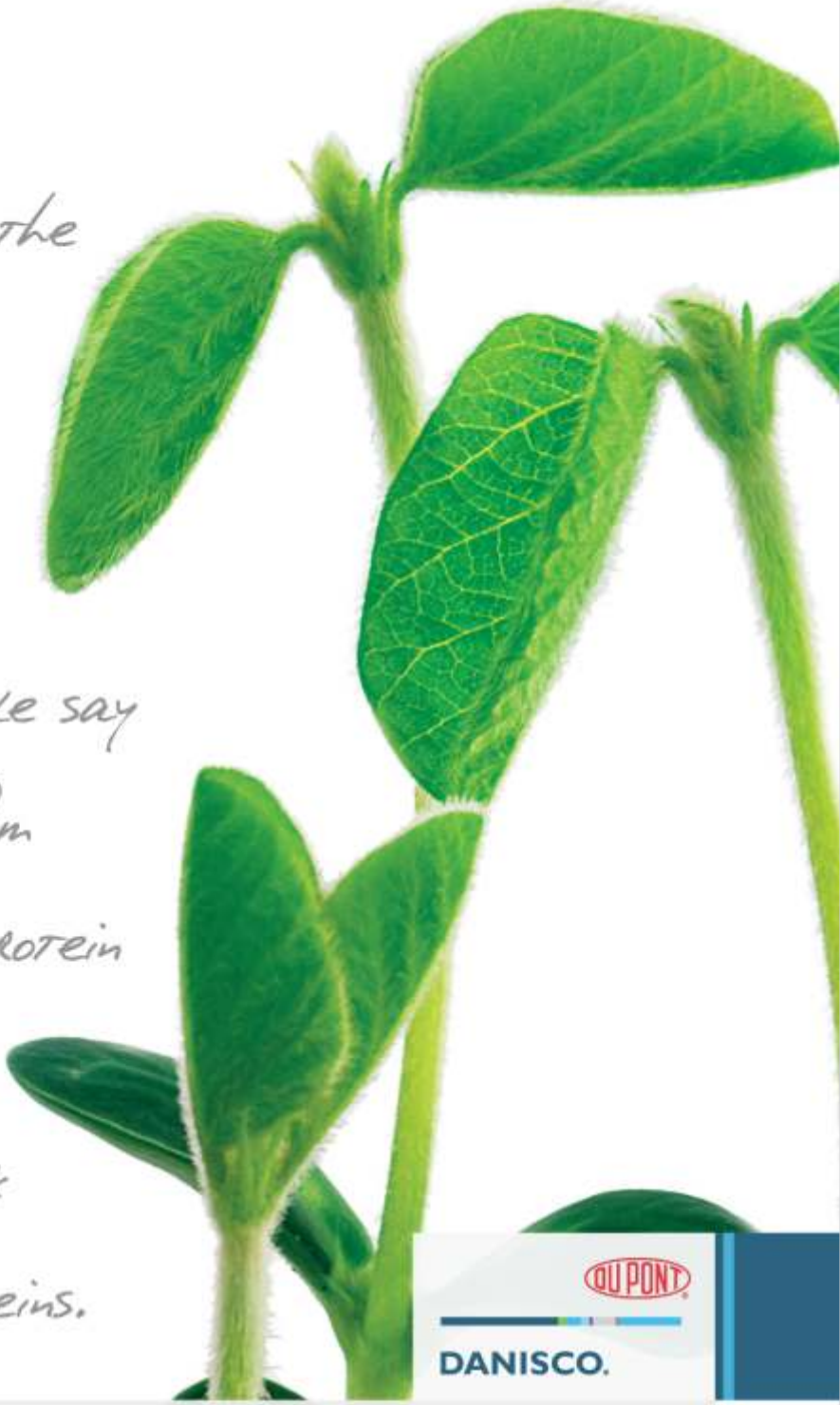

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