



BOTANICAL DIETARY SUPPLEMENTS

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INDEX

Editorial	2
Botanical Dietary Supplements	3
Formulating Food & Beverages with Proteins - The Flavour Perspective	7
Coming Events	8
Report of Nutrition Awareness Activity at Pune	10
Sugar Substitutes in Food Industry	14
Regulatory Round Up	18
Research in Health & Nutrition	20
Food Science and Industry News	35
Regulatory News	44

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EDITORIAL

Over a decade or two ago many large companies, some of them MNCs, have started producing food products in India for local markets. Many were earlier being made in countries nearby like Middle East or South East Asians countries, but now quite a few are being made locally. This shift could be due to the challenges posed by India specific regulations, cost of import among other factors.

Some companies decided to set up manufacturing units for producing their products as they could have total control of the product quality including safety and adhere strictly to the local regulations. This meant that they would have to put in a lot of resources and manpower to create the infrastructure and maintain it. In case the markets failed to grow to their satisfaction, it forced them to close these facilities or sell them at a substantial loss.

Many companies decided to take the route of contract manufacturing or third party manufacturing. There are many advantages in this but there are many risks as well. In Indian conditions, the rules are constantly changing. Obtaining necessary licenses could be a long-drawn battle. This coupled with local problems such as purchase of land, getting machinery and construction at site and manpower before the actual production would involve considerable time and money. All this may cause delay in years by which market conditions could change dramatically.

This makes a manufacturing facility with necessary licenses, good infrastructure including technical capability to understand and execute production of high quality goods, a highly desirable contract manufacturer. Hiring company with such a contract manufacturer can launch the product in a short time. They may give technical knowhow, formulation, product specification, process conditions as well as raw materials and place their representatives to ensure all the conditions are complied with. Others may give some of these and rely on the contract manufacturer to execute orders using some of their own resources to the satisfaction of product quality and specs.

This allows the hiring companies to go into markets in short time without much investment at competitive costs and more importantly without the burden of manufacturing and associated challenges. With the manufacturing in the hands of contract manufacturer, the hiring company can concentrate on the marketing of the products.

However, there are dangers of loss of intellectual property or the contract manufacturer starting to manufacture same or similar products with the knowhow gained. These aspects can be addressed by signing non-disclosure agreements, protecting some of the key or critical ingredients. To maintain quality and other critical parameters, the hiring company usually station their representatives at the contract manufacturer premises.

Third party manufacturing route is taken as a short cut by companies with no previous knowledge and experience in food products, with no laboratory or technical personnel to get quickly into the market. This model is often employed by start-up companies with selling through e commerce

However, the biggest dangers are that the contract manufacturer may not share the same goals of safety, nutrition, quality and health as the hiring company and over a period of time these may surface as consumer complaints and safety issues. Once the company loses the trust of consumers it is very difficult to regain it. We are not advocating any model, but we simply suggest that whichever model is chosen, every effort should be taken to maintain the quality and safety of the product. The contracts that are drawn up should not only include all these aspects to ensure the product quality and safety but also it must be adhered to scrupulously by all parties involved. There must be in-house infrastructure and technical personnel to verify the quality of the products. Few companies simply and totally depend on the contract manufacturers for all aspects of product realization including product development. Safety, quality and nutrition should be the mantras of food product manufacturers.

Prof. Jagadish S. Pai,
Executive Director
executivedirector@pfndai.org

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BOTANICAL DIETARY SUPPLEMENTS

Image © iStock.com/RavindraJaisa

What is a botanical?

Many plants have substances in their leaves, flowers, stems, roots etc. that have physiological effects when consumed. Some with beneficial effects are used for their medicinal or therapeutic value. They may also have flavour and fragrance. Spices and herbs are examples of plants used in culinary preparations while also promoting health. Since ancient times plant parts or products made from these have been used to maintain or improve health. They are called herbal products, botanical products or phyto-medicines.

In naming these botanicals, botanists used Latin name containing the genus and species of the plant. One examples of the botanical black cohosh is *Actaea racemosa*.

Botanicals as dietary supplements

As per the definition of dietary supplement according to Dietary Supplement Health & Education Act (DSHEA, 1994), it

must be a product (other than tobacco) that

- is intended to supplement the diet;
- contains one of more dietary ingredients (including vitamins, minerals, herbs or other botanicals, amino acids

and other substances) or their constituents;

- is intended to be taken by mouth as a pill, capsule, tablet or liquid; and
- is labelled on the front panel as being a dietary supplement.

Methods of preparation and marketing of botanicals

Botanicals are available in many forms. They are sold as fresh or dried products. Raw materials may also be extracted and then packed as liquid or dried and sold as powders. They may be made into tablets or capsules or even tea bags. Fresh ginger root is sold as such or as dried ginger root in several forms such as capsules, tablets or tea bags. Some liquid preparations are also available in stores.

Sometimes extract may be further fractionated and a group of chemicals or a single chemical may be isolated from the botanical and sold in the form of tablet or capsule as dietary supplements.

Phytoestrogens of soy are available as dietary supplement.

Teas, decoctions, tinctures and extracts are commonly prepared. Their commonly followed procedures are as follows:

➤ A tea is also known as an infusion and is made by adding boiling water to fresh or dried botanicals and steeping them. Infusion is then separated from the residue. The tea may be consumed either hot or cold.

➤ Some roots, barks and berries are difficult to extract so they need stronger treatment to extract active ingredients. They are simmered in boiling water for longer periods than teas, making a decoction, which may be consumed hot or cold.

➤ A tincture is prepared by soaking a botanical in a solution of alcohol and water. Tinctures may be sold as liquids and are also used for concentrating and preserving

botanicals. They are prepared in different concentrations that are expressed as botanical-to-extract ratios (i.e. ratios of the weight of dried botanical to the volume or weight or the finished product).





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➤ An extract is prepared by soaking the botanical in a solvent that removes specific types of chemicals. The solution may be used as such or is evaporated to make dry extract for use in capsules and tablets.

Standardisation of Botanicals

Standardisation is a process used by manufacturers to ensure batch-to-batch consistency of the products. This may involve identifying some specific chemicals (called as markers) that may be used to manufacture a consistent product. Every batch must have minimum amounts of these specific chemicals in the product. Standardisation also provides a measure of quality control.

Dietary supplements need not be standardised in the US. In fact, no legal or regulatory definition exists for standardisation in the US as it applies to botanical dietary supplements. Thus it does not have a specific meaning. Some manufacturers use this term incorrectly to refer to uniform manufacturing practices.

Following a standard recipe or procedure does not produce a standardised product. If the raw material is not of uniform quality with respect to the active or specific chemicals or substances, a standardised procedure does not produce a uniform product.

Therefore, the presence of the word "standardised" on a supplement label does not necessarily indicate the product quality.

Ideally, chemicals that are chosen as markers for standardisation are those constituents of the botanicals having the beneficial physiological effects in the body. When standardised, each batch of the product would have a consistent



Image © iStock.com/egal

health effect.

Unfortunately, in case of most botanicals, the components responsible for the effects have not been identified or clearly characterised or defined. Examples are: in botanical senna, the sennosides are responsible for the laxative effects of the plant, however, in case of valerian,

a root helpful for nervous tension and insomnia, many compounds may be responsible for its relaxing effect.

Safety of botanicals as dietary supplements

Many people believe that products with a "natural" label are safe and good for them. This may not be true as safety of botanicals depends on many things including its chemical composition, its mechanism of action in the body, method of preparation and the dose used. The botanicals can range from mild to powerful or potent with respect to its action and effectiveness.

Botanical with mild action may have subtle effects. Mild botanicals like chamomile and peppermint are usually prepared as teas and consumed for aiding digestion and are generally considered safe to consume without a medical advice or prescription. It takes a long time from weeks to months before some mild botanicals start showing their beneficial effects. Valerian for example may be required to be taken for a couple of weeks to be effective as a sleep aid and is rarely effective after just one single dose.

In contrast there are some botanicals which are powerful and produce fast results. Kava for example is known to have an immediate effect and powerful action affecting anxiety and muscle relaxation.



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NUTRELA SOYA NOODLES

Ingredients

- 400 gm noodles
- 1 cup **Nutrela Soya Mini Chunks** (soaked, boiled and squeezed dry)
- 2 medium .. spring onions (sliced)
- 3 tbsp oil
- 1 medium .. carrot (shredded)
- $\frac{1}{4}$ tbsp white pepper powder
- $\frac{1}{2}$ medium red capsicum (shredded)
- $\frac{1}{2}$ medium green capsicum (shredded)
- 1 tbsp..... soya sauce
- Salt to taste



Method

- Heat 7 cups of water in a deep non-stick pan. Add salt and place a colander in it. Put noodles in the colander and boil.
- Chop the green part of spring onions to garnish at the end.
- When noodles are done, lift the colander with the noodles and put into another pan with cold water.
- Heat 2 tbsp of **Nutrela Refined Soyabean Oil** in a non-stick wok. Add spring onion (white part), carrot and capsicums and toss.
- Remove noodles and add to the vegetables. Mix well. Add **Nutrela Soya Mini Chunks**. Cook on medium flame for a few minutes.
- Add 1 tbsp **Nutrela Refined Soyabean Oil**, salt, and soya sauce. Toss on high heat.
- Garnish with chopped spring onion green. Serve hot.



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The dose as well as the form in which a botanical preparation is available plays important roles in its safety. Teas, tinctures and extracts have different strengths. The same amount of botanical may be present in a cup of tea, a few teaspoons of tincture or an even smaller amount of an extract due to the concentration effect. Also, different preparations vary in their relative amounts and concentrations of chemical removed from the whole botanical. For example, peppermint tea is generally considered safe to drink but the peppermint oil prepared from its leaves is much more concentrated and can be toxic if used incorrectly. From the safety point of view, it is important to follow correctly the directions

Image © iStock.com/TaYa294

suggested by manufacturer for using a botanical and not exceed recommended dose without the advice of a physician.

Label of a botanical dietary supplement and its quality

Quality of a botanical dietary supplement product is difficult to determine just from its label. The degree of quality control will depend on the production processes used by the manufacturer, supplier and others. FDA issued GMPs for dietary supplements in 2007. It provided a set of requirements and expectations by which dietary supplements must be prepared or manufactured and stored in order to ensure its quality.

Manufacturers are expected to guarantee the identity, purity, strength and the composition of their dietary supplements. The GMPs aim to avoid the inclusion of the wrong ingredients, addition of too much or too little of a dietary ingredient, possibility of contamination of pesticides, heavy metals like lead and bacteria etc. and improper packaging and labelling of a product.

Methods to evaluate health benefits and safety of a botanical dietary supplement

As in the case of other dietary supplements, botanicals are also not required by federal law to be tested for safety and effectiveness before they are marketed. Hence the scientific evidence available for various botanical ingredients varies widely. Some of them have been evaluated by scientific studies. Research has shown that St. John's wort may be useful for short-term treatment of mild to moderate depression. There are many botanical dietary supplements that need more studies to determine their value and safety.

Scientists have used several approaches to evaluate botanical dietary supplements for their potential health benefits and safety or risks. They find out history of use, as well as conduct laboratory studies using cell or tissue cultures and the experiments with animals. Studies on people using individual case reports, observational studies and clinical trials provide the most direct evidence of the health benefits as well as the safety of a botanical supplement on humans.

(Prepared using Health Information on Botanical Dietary Supplement from: National Institute of Health)



FORMULATING FOOD & BEVERAGES WITH PROTEINS – THE FLAVOUR PERSPECTIVE



Saugat Banerjee,
Head, Flavour Innovation Centre,
Givaudan India

Growing workforce, urbanisation, rising income and awareness are driving protein consumption amongst Indians. The market for protein continues to grow with shoppers claiming to have increased their use of protein over the past years. This is also evident from the product launch activities with a high/source of protein positioning.

Shoppers are interested in proteins not only because it is part of a healthy diet, but also for more specific benefits such as weight and satiety, energy and muscle health.

Vegetable and nuts closely follow milk protein in terms of dietary interest amongst Indians and specialized cross functional expertise is necessary to overcome the challenges in formulating food and beverages with such proteins.

Significant consideration on

processing methods / conditions, application recipe / interactions, protein ingredients / blend selection is necessary. It is also important to consider solubility, texture (viscosity, gelation), flavour / taste and cost while formulating products.

This presents a significant opportunity in the areas of flavour modulation, mouthfeel, character flavour, authentic flavour and flavour delivery.

Over the recent years, considerable scientific work has been done on masking technology, protein compatible flavour design, understanding behaviours with flavours, in food matrices and through processing. These have resulted in greater interest to enhance flavour, taste and application capabilities for next generation proteins viz. Legume/Pulse, Grain, Oilseed, Micro-algae.

Worldwide, the flavour industry is investing significant R&D hours to expand next generation protein innovation into novel process flavours and/or delivery, involving flavour science, sensory and analytical tools and methods.

Formulation approach involves a holistic knowledge and design from component to finished composition that includes;

- Analytical and sensory characterisation of proteins and their functionality
- Understanding protein interactions and resulting impact on flavours. Identification of best protein suitable for each application.



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kolesnikovserg

- Translating Physical / Chemical properties and behaviours into Best in Class flavour and taste solutions
- Flavour creation and application relies heavily on scientific data and knowhow to deliver superior taste in food and beverages with proteins.

Maskers and blockers are being developed, customised and applied with greater understanding of flavour-protein interactions during product formulation stages.

It comprises screening of blockers

and maskers for different protein types and food formulations, model system of screening and evaluation and studying effects of ingredient matrices and processing on protein structure, functionality and organoleptic quality.

Receptor research for taste components is also gaining momentum to understand how humans taste. It involves identification of receptors responsible for perception of sweetness, and bitterness,

unravelling the mechanisms of how we taste, in collaboration with leading research institutes and high throughput screening which identifies powerful ingredients that enhance or block sweetness & bitterness taste.

A collaborative approach amongst food manufacturers, universities, ingredients and flavour companies will unlock the true potential and further accelerate innovative product launches which are healthier and tastier.

COMING EVENTS

Indiapack & Pacprocess

October 26-28, 2017

Pragati Maidan, New Delhi

T: 011-4855 0056

E: SinghA@md-india.com

Drink Technology India 2017

October 26-28, 2017

Pragati Maidan, New Delhi

T: 022-4255 4710

E: avisha.desai@mm-india.in

GULFOOD Manufacturing

31 Oct – 2 Nov 2017

Dubai World Trade Centre

W: www.gulfoodmanufacturing.com

National Conference of Nutrition Society of India

November 2-4, 2017

Assam Agri Univ, Jorhat, Assam

E:

nsi2017.organisingsec@gmail.com

Seminar by PFNDI on Nutrient & Health Claims of Food Products

November 8, 2017

Courtyard Marriott

Andheri East, Mumbai

T: 022-2353 8858 / 2353 8998,

E: foodscientist@pfndai.org

International Conference on Obesity and Weight Loss Obesity 2017

November 6-8, 2017

Barcelona, Spain

Food Ingredients India 2017

November 9-11, 2017

Bombay Exhibition Centre,

Goregaon, Mumbai

T: 022-61727000,

E: jimesh.patel@ubm.com

Bakery Business 2017

November 22-24, 2017

MMRDA Grounds, BKC Mumbai

T: +91 98211 62232,

E: pradeep@hospitalityfirst.in

19th China (Beijing) International Nutrition & Health Industry Expo 2017

December 27-29, 2017

Beijing exhibition Center

(Downtown)

Next to Beijing Zoo, Beijing

W: www.hecexpo.com



Goodness of protein with great taste

Growing workforce, urbanization, rising income and awareness is driving protein consumption amongst Indian consumers.

It is important to have in depth scientific data and understanding about application product like recipe, protein ingredients, process, solubility, texture and their interactions with flavours to create the high performing flavour solutions.

Discover our range of Masking & Flavour Solutions which allow you to create great tasting protein based products without consumers compromising on taste

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Email : india.sales@givaudan.com

<https://www.givaudan.com/flavours>



REPORT OF NUTRITION AWARENESS ACTIVITY AT PUNE



By
Ms. Anuja Rawool,
 Food Scientist, PFNDI

The Nutrition Awareness Activity at Pune was conducted on January 21, 2017 in collaboration with SNDT College of Home Science, SNDT Women's University, Karve Road, Pune. The theme for the entire activity was Proteins for Health. Besides students of various colleges of food & nutrition from Pune and their teachers, eminent nutritionists and dieticians from Pune also attended. From the food industry many consultants and representatives of food companies attended the event.

The morning was devoted to intercollegiate competitions among students. Students from eight colleges participated in the different competitions. At an impressive turnout of nearly 170 participants of students, participation in the activity was appreciable. To support the students, members of the staff attended in good numbers.

The competitions organized were, group discussion, quiz, food

photography and recipe Competition. For the recipe competition, there were two categories –protein rich recipes using Pulses and Legumes or using Soya. The prizes for these competitions were sponsored by Tata Chemicals and Ruchi Soya.

The number of entries for the various competitions was: Recipe competition – 49 (Pulses: 27, Soya: 22), Group Discussion – 14, Food Photography – 22 & Quiz Competition – 12. All the judges for the four competitions were highly appreciative of the efforts made by the students. The quiz was very well organized and the audience also enthusiastically participated in this activity.

In the afternoon, a seminar was conducted wherein various experts were invited to speak on selected topics. The seminar started with a brief welcome address by Dr. Chandrakala Mannuru, Head Dept of Food Science and Nutrition, SNDT College of Home Science.

The first speaker was Mr. Amol Pendharkar, Head Product Development and



Dr. Amol Pendharkar

Innovation Center, TetraPak spoke on Food Safety and Technology. Mr Pendharkar highlighted the need for safety, security and sustainability when feeding the growing populations and that safety and sustainability are challenges.

The second speaker was Dr. Geeta Dharmatti, Clinical Nutritionist & Registered Dietician. Her topic was "Proteomics to Nourishing DNA: New Era Dietetics".

Dr. Geeta Dharmatti presented very nice and simple discussion on how our genes affect our nutrition and health.



Dr. Chandrakala Mannuru welcoming



PFNDI July 2017

Enzymes for Protein Modification

- Meat Tenderization / Fish Protein Hydrolysis
- Gluten Hydrolysis & Production of Savory Flavours
- Hydrolysis of Vegetable Proteins
- Debittering of Peptides





Dr Vilas Shirhatti

"Pulses for the Future Good for People, Planet & Economy". He presented the audience a startling figure how India is the largest importer of pulses and that with westernization pulses are being gradually deemphasized in Indian diets. He also proposed some solutions for improving the diets by traditional methods.

Dr Vilas Shirhatti,
Chief Advisor Nutraceutical Business at Tata
Chemicals and Advisor New Business Development,

Dr. Sanjay Singh, Head R&D(CBD),Ruchi Soya Industries spoke next on "Health Benefits of Soya Protein". His presentation highlighted the protein gap in India and causes for the same. His emphasized the need to tackle the problem of malnutrition in India in view of its consequences. He described in considerable detail the health benefits of including soy protein in general and for women and children.

Dr. Joseph Lewis, Food Consultant spoke about the "Safety of Foods". Making his session interactive, he discussed the paradigm shift that has occurred in food safety from detecting and preventing adulteration to risk analysis including risk assessment, risk

management and risk communication.

The seminar was followed by prize distribution to the student winners of the four competitions. The prizes were given away by speakers and other dignitaries. The programme ended with vote of thanks given by Dr. S.A. Udupi Sr Nutritionist, PFNDI and Mrs Rajesh Kapila, Sr Faculty SNDT College of Home Science, Pune.



Vote of Thanks by Mrs. Rajesh Kapila



Judges



Judges Group Discussions



Judging Recipes



Judging Recipes



Lunch



Dr. Lewis and Dr. Shirhatti





SUGAR SUBSTITUTES IN FOOD INDUSTRY

By **Dr. Jagadish Pai, Executive Director, PFNDI**

Life style of Indians has been changing rapidly for over a decade or more. This is more evident in urban areas and health professionals are worried because many life-style diseases associated with it are also increasing alarmingly. Hypertension, obesity, heart diseases, diabetes and many other diseases are increasing not just in older population but also in younger Indians.

Experts have been attributing this sharp rise in health problems to many changes taking place including the sedentary lifestyle by adults but also by children who were earlier doing a lot of physical activity including walking, playing on fields and exercising, but now spend too much of time with entertainment or electronic gadgets and moving around in vehicles or escalators.

Health professionals are also pointing to the change in diets of Indians. It is being said that sugar, fat and salt (or rather sodium)

consumption has increased steadily over the years and also foods that are consumed include less fruits and vegetables, less pulses but more of grains especially those with less dietary fibre. Some are pointing to the increase in consumption of processed food products which they feel are responsible for the problems.

Government has proposed controlling sales of some of the food products especially those with high amounts of sugar, fat and salt particularly in the school canteens and nearby areas. As sugar is one of the target ingredients, industry has been looking at various alternatives to prepare sweet food products. Indians love sweets and although the per capita sugar consumption has not increased the kind of sweets and other products through which it is being consumed has changed and one of the biggest change is sugar consumption is accompanied by less amount of dietary fibre.

As there is a lot of focus on sugar with diabetes rising, health professionals and government alerting consumers about sugar and asking industry to declare on labels,

industry is under pressure to either use less sugar or use sugar substitutes to satisfy the sweet tooth.

Sugar and other sweeteners

Although sugar has been used for sweet taste, it has several functions in a food product. It balances sourness making the combination quite acceptable. In several food products like jams, jellies and preserves, it serves as natural preservative as most spoilage organisms cannot grow at high concentration of sugar.

It provides typical texture in various sweets giving not only body in beverages, thickness in shakes, provides browning in many baked goods, provides snap in cookies, helps in gelling, gives glaze, offers protection by coating and many other functions in various products working together with other ingredients. These properties change depending on the type or purity of sugar or degree of refining used e.g. chikki made with jaggery will have different properties compared to that made of pure sugar. Flavour also to some extent depends on the source of sugar like brown sugar or Demerara sugar.

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Corn syrup has been used for many decades for its sweetness and some other texture properties but since its sweetness is due to glucose formed during syrup preparation, it is not very sweet. However, when enzyme glucose isomerase or xylose isomerase is used almost half of glucose gets converted to fructose from a glucose solution.

Since fructose is much sweeter than even sucrose, the resultant mixture is equal to or sweeter than sucrose solution depending on the proportion of fructose in the mixture. Amount of fructose in the mix can be increased to 55, 65 or even 90% by separating glucose from the mixture and reconverting by enzyme. This gives High Fructose Corn Syrup (HFCS) which can be much sweeter than sugar syrup. The advantage of this is it is liquid and can be pumped from storage vessel to mixing equipment to prepare a food or beverage product and mixing is quite rapid.

The less refined sugars not only have different functional properties like texture, flavour and colour but also there are micronutrients like essential minerals present. Some of the other sugars and sweeteners used although less commonly are molasses, maple syrup, glucose syrup, honey, palm sugar etc. They not only have different sweetness strengths, they are also different cost-wise and availability.

Some of the non-sugar substitutes have sweetness which does not exactly match that of sugar and also

have some aftertaste or metallic taste. Many need to be used in combinations in order to mimic the taste of sugar.

One of the more recent sugar substitutes is fructo-oligosaccharide (FOS) which is present in chicory and some other roots and can be prepared from inulin, a long chain carbohydrate made up of fructose units, present in these roots. It can also be prepared from sucrose using microbial bioconversion. It is about half as sweet as sugar but has advantage of being a dietary fibre so it has extremely low GI. However, since gut bacteria can ferment it producing gas. Hence large amounts can cause laxative effects.

Sugar Substitutes

The above examples are of different types of sugars obtained from different sources and using different preparation methods. However, they all are sugars, meaning they are either mono- or disaccharides. There are different substances which are sweet in taste and have little or no effect on blood sugar. These are sugar substitutes.

One group of sweeteners is polyols or sugar alcohols. Most of them are naturally occurring in fruits, vegetables etc. and examples are sorbitol, mannitol, xylitol and maltitol, whereas Isomalt does not exist in nature. Although present in nature, commercially they are chemically synthesised from sugars. They are less sweet and often combined with high-intensity sweeteners.

They have lower calories (about 2) than sugar. They also do not cause

dental caries. As microbes in gut ferment them producing gas, they have mild laxative action so must not be consumed in large quantities. As they are low glycemic, they could be used by diabetics.

They are mostly used in sugar-free confectionery such as chocolates, hard candies and chewing gums. As they are less sweet than sugar, they need to be used in comparable quantities for their sweetness effect and so are called bulk sweeteners.

High Intensity Sweeteners

There are some sweeteners which are several hundred to several thousand times as sweet as sugar and so may be used in extremely small quantities for their sweetness effect. Examples of these are saccharin, aspartame, acesulfame-K, sucralose, stevia, thaumatin, and others. The table gives the intensity of sweetness of substitute sweeteners compared to sugar. As could be seen they need to be used in milligram quantities and so most are quite cost effective.

Most of them are not metabolised in our body as recently there are some reports that some of them change the population of gut bacteria adversely due to excessive consumption of some of these sweeteners. The effects of such changes are not fully understood but all these artificial sweeteners have been thoroughly tested for their safety at the level commonly consumed in a variety of sugar-free food products as well as in the form of table-top sweeteners for coffee and tea.



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Although, artificial sweeteners have been used in the west for several decades in a big way with global market around US \$2 billion, their market is still low in India but rapidly rising. Regulators have allowed sucralose, saccharin, aspartame, acesulfame-K and neotame and recently added stevia to that list. Some combinations are also permitted. Since extremely small quantities are necessary to provide the desired sweetness, most sweeteners for table-top use have added substances that provide bulk so one can easily add requisite quantities to a cup of tea or coffee. Some of the bulking agents include sugars, polyols, starch, dextrins etc.

These sweeteners many times work better in combination. Some have unpleasant aftertaste so flavour system needs to counter that. Aspartame and Acesulfame-K are usually used together. Recently some soft drink manufacturers are

claiming that using these combinations they could mimic the exact taste of the original product with sugar. Acesulfame-K works well with sucralose as well.

Some of these can withstand heat processing e.g. sucralose, acesulfame-K and stevia can tolerate heat or cooking to different degrees. They have more varied applications other than table sweeteners and for products not heat treated like soft drinks. Although stevia is not the only natural sweetener, being obtained from a plant Stevia rebaudiana, it is today most promising natural substance used as high intensity sweetener.

Although there are some studies stating that high intensity sweeteners cause undesirable changes in the microflora of gut bacteria,

they could be used in controlled quantities to reduce the caloric intake and to control the blood sugar for diabetic who crave for sweets.

There are undesirable effects of consumption of all substances providing sweet taste when consumed in excess. Sugar and other natural sweet substances in excess quantities may be undesirable. Same is also true of sugar substitutes listed above.

Table 1: Relative Sweetness of Different Sweeteners

Sweetener	Relative Sweetness
Glucose	50
Fructose	150-180
Sucrose	100
Lactose	20-40
Erythritol	60-80
Isomalt	45-65
Maltitol	50-90
Sorbitol	50-100
Xylitol	100
Acesulfame-K	20,000
Aspartame	18,000-20,000
Saccharin	30,000-50,000
Sucralose	60,000
Steviol glycoside	1000-1500

From: Chattopadhyay et al. (2014) J Food Sc & Tech, 51, 611-621
& Mortensen (2006) Scand J Food & Nutri, 50, 104-116



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REGULATORY ROUND UP

At last, we received few encouraging feedback along with suggestions. We request the readers to send in comments and suggestions for continual improvement. Please find below food regulations published since the last round up. FSSAI has introduced a preamble called "Press Note" in every Gazette notification which explains the scope and purpose of the amendment. I found it very useful.

General

One of the pain area in regulation is to keep constantly following the amendments. I had always wished that FSSAI consolidate all the amendments and publish such compendium regularly. [FSSAI does publish a compendium in all the regulations updated with amendments](#). Please have a look. It will solve many of your follow up problems.

[FSSAI through a notification](#), mandates all Food Business Operators (FBO), who are extracting ground water for production purposes, to register and seek permission from concerned authority. The authority could be either the Central Ground Water Authority or the state government. The deadline for this is 31st December 2017. The "No Objection Certificate" obtained from the authority must be then submitted to the food licensing authority by 31st March 2017.

[Central authority of FSSAI in its](#)



By

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

[letter issued to the State Food Safety Commissioners](#), has suggested a check list for auditing the status of Good Manufacturing Practices in food facilities. The check list will give an idea about the audit and will also help in implementation of GMP.

[Latest list of FSSAI approved and NABL accredited laboratories](#)

Standards

[Final notification relating to revision of vertical standards on fish and fisheries products](#). It covers all types of fish and their products including traditional ones like fish pickles, etc.

[Final notification on the standards of certain cereal and cereal products like Durum Wheat Maida, Quinoa, Instant Noodles, etc](#). Of great interest is standard of identity for instant noodles. It will now be considered a standard food.

[An interesting and general regulation on Non-Carbonated, Non-Alcoholic water based beverage has been released by FSSAI](#). It is permitted to contain fruit and vegetable extracts, herbs and spices mentioned in the regulations. Flavoured water, herbal water, etc can be included under this category. Limits are specified for caffeine.

Rabbit has been included in the list of "Animal" in Food Safety and Standards Regulation.

Products based on rabbit meat are now permitted.

A quick search indicates that rabbit meat is superior to other meat in nutrition and has lower carbon foot print.

[Final regulation on the approval process of non specified food, ingredients, additives, processing aids has been published](#). Non-specified foods do not include proprietary foods. It essentially applies to novel foods, novel ingredients, non-permitted additives, probiotics, etc which are outside the FSS regulations. The regulation describes the documentation required for such an application. No timelines are specified for the different steps in the approval process. In a [separate notification](#), the fees for the application has been fixed at 50,000.

[An amendment in the Carbonated water regulation](#) The additional labelling requirement of "added sugar" has been dispensed with to align the standard with the requirement of Packaging and Labelling Regulation.

Tin containers used in the packaging of food products have to comply with BIS standards. [FSSAI through a notice](#) has informed the food business operators of amendments made in BIS standards for tin containers.



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RESEARCH IN HEALTH & NUTRITION

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No Scientific Evidence that Sugar is Addictive and Leads to Weight Gain, Finds Study

Nutrition Insight 31 Mar 2017

A study conducted by researchers at Maastricht University has found “no scientific evidence to support the general assumption that sugar is addictive and leads to weight gain.”

The research comes at a time when high sugar content in food products is being penalized due to previous associations with obesity and ill health. Instead, the researchers found that weight gain is more likely when food dependence is combined with a high-calorie diet, meaning that sugar is not the main culprit. The Maastricht researchers presented their findings last week in the scientific journal *Appetite*.

The researchers say that while there is certainly a link between the consumption of palatable products like sugar and dopamine production in the brain, that link has no bearing on “addiction,” contradicting the widely acknowledged idea food is addictive. Given the common acknowledgement that food – and sugar in particular – can be addictive, neuropsychologist and Professor Rob Markus was interested in studying the phenomenon of food dependence. In doing so, he expanded the standard international measurement tool for food addiction – the Yale Food Addiction Scale (YFAS) – by adding four product categories. He then administered his adapted survey to

1,500 healthy young adults and invited them to his lab for weight measurements.

Professor Markus wanted to answer two questions in particular: which product category is most likely to trigger food dependence and which type of product dependence is most strongly correlated with weight gain. He divided his product categories as follows: low-calorie foods (rice crackers, crackers, vegetables), sugary foods (sweets, soft drinks, dried fruits), a combination of high-fat and sugary foods (pastries, cakes) and finally, a combination of high-fat, protein-rich foods (cheese, fried foods, sausage). Of the people who indicated that they sometimes struggle to avoid certain foods, nearly 30% had a tendency to consume the combination of high-calorie, high-fat protein-rich foods. For sugary foods, that figure was 5%.

The relationship between food dependence and weight gain was only evident in relation to combined foods. The study also found that overweight participants struggled more with combined foods (high-calorie, sugary foods and high-calorie protein-rich foods) compared to sugary foods. The findings aren’t the only to contradict the negative reputation that sugar is known for. Previously, Dr. Alison Boyd, Director of Sugar Nutrition UK, disputed that sugar as a standalone ingredient has a direct impact on developing illnesses, telling NutritionInsight: “Current scientific evidence does not support the theory that consumption of sugars is

a specific cause of a wide range of diseases.”

She continued, “In 2015, the UK’s Scientific Advisory Committee on Nutrition (SACN) published a comprehensive report, Carbohydrates and Health. It stated: “there is insufficient evidence to demonstrate that fructose intake, at levels consumed in the normal UK diet, leads to adverse health outcomes independent of any effects related to its presence as a component of total and free sugars.” However, many health advocates and charities are still keen to highlight the dangers of too much sugar. Andrew Langford, Chief Executive of the British Liver Trust told NutritionInsight, “One in five of us are already likely to have the early stages of fatty non-alcohol liver disease, and being overweight is the chief risk factor. We know that too much sugar in the diet is a major reason for many people being overweight.”

However, Professor Markus says that the problem with weight gain is that, “We tend to consume more than we expend - what we eat doesn't really matter.” He also stresses that his study results demonstrate that the use of the term, “food addiction” is not appropriate. “Perhaps we need to change the term “food addiction” into “eating dependence”,” he says. “This term does more justice to the unique and individual experience of eating food than ascribing addictive qualities to products like sugar.”
by Hannah Gardiner

Children have 'non-negotiable' right to good nutrition amid dismal Indian health survey findings

By Millette Burgos+, Food Navigator Asia 17-Apr-2017

Ninety percent of Indian children are not getting the proper nutrients crucial for their development, a new survey has found.

The recent National Family Health Survey revealed that nine out of 10 children in the age group six to 23 months do not receive an adequate diet – a finding lamented by the Child Rights & You (CRY), a non-governmental organisation that promotes children's rights and welfare.

Deprived of a healthy start, millions of these children will suffer from undernutrition not just during childhood, but for the rest of their lives, the organisation said. "Illness in children and lack of adequate and appropriate nutrition is a vicious cycle which needs constant attention through preventive as well as promotive approaches," said Komal Ganatra, director of Policy, Research and Advocacy for CRY. Some of the 'worst performing' states included Rajasthan, the lowest with only 3% of children in the age group getting adequate diet. Uttar Pradesh recorded 5%, and the national capital, which was perceived as the most equipped to provide more nutrition, only registered 6%.

"Even Tamil Nadu which has the highest percentage of children receiving adequate nutrition did not cross 31%," CRY noted. CRY stressed the need to implement the right nutrition programmes to address this issue. "The Integrated Child Development Scheme, which addresses nutritional needs of children in an early age (under six)



Harris, lead author of the study and founder of OmegaQuant Analytics, where the samples were analysed. "These findings support the view that higher EPA and DHA omega-3 levels are associated with better overall health."

The research followed more than 6,500 women to assess the relationship between omega-3 index and health outcomes. Overall, researchers found that higher levels of red blood cell PUFAs correlated significantly with a lower risk of non-cardiovascular disease (CVD) and non-cancer deaths.

"This study adds to a larger body of evidence demonstrating the positive correlation between higher omega-3 index levels and general wellness," said Adam Ismail, executive director of the Global Organization for EPA and DHA Omega-3s (GOED). "The results gathered over a 15-year period support the notion that adequate omega-3 intake is an important part of a healthy lifestyle, just like exercise and following a well-balanced diet."

Omega-3 could decrease mortality rate in postmenopausal women, study suggests

By Emma Jane Cash, Nutra Ingredients USA 01-Mar-2017

Women with a high omega-3 status are up to 20% less likely to die from any cause, compared to those with low levels of DHA and EPA, finds a new study.

The research, published in the Journal of Clinical Lipidology, looked at associations between omega-3 index scores – a measure of EPA and DHA levels in red blood cells - and all-cause mortality rates in a population of postmenopausal women over a 15 year period. Women with the highest omega-3 status were found to be 20% less likely to die from any cause than those with the lowest omega-3 levels, said the team.

"This is the largest -but far from the only - study to confirm that blood levels of EPA and DHA omega-3 fatty acids, in this case the omega-3 index, are independent predictors of risk for death," said Dr. William

Image © iStock.com/naito8



A higher overall omega-3 index was also associated with older age, greater alcohol intake, higher education, increased physical activity, more frequent use of cholesterol-lowering medications, less smoking and lower BMI.

Researchers concluded in their study that two and a half fillets of salmon each week provided an adequate amount of omega-3 PUFAs to be considered a safe high amount. They said that estimated intakes suggest that approximately 1g of EPA and DHA per day would be required to increase omega-3 status for those in the lowest omega-3 status group to a level where they were in the highest group. This amount also translates to between one and three softgel omega-3 supplements or one teaspoon of a liquid omega-3 supplement daily. Salmon, tuna and sardines are fish which are high in omega-3 PUFAs.

Nutrition advice questioned by gut microbe scientist

By Rick Pendrouse, Food Manufacture UK
03-Mar-2017

Conventional advice on maintaining health and avoiding obesity have been called into question by a leading expert on bacterial gut health - also known as the microbiome - who claimed that ensuring healthy bacteria in the lower intestines and colon has far more effect.

Speaking at the Food Vision event in London yesterday (March 2), hosted by William Reed, publisher of Food Manufacture, Tim Spector, professor of genetic epidemiology at King's College London and director of the crowdfunded British Gut Microbiome

project, challenged conventional nutritional wisdom on diet, health and obesity.

In particular, he questioned advice about counting calories and claims that all calories were equal. He also challenged advice to avoid eating high fat foods and recommendations about eating starchy foods. He further challenged advice about not skipping meals and widely-held views about the need to balance calories consumed and calories expended.

"This is all simple advice that has been promoted pretty much in most countries in the world and in all those countries, obesity and allergy rates have at least doubled in the last 30 years," said Spector, who is also founder of Map My Gut, a microbiome research company that draws upon the findings of the Twins UK research project he leads. This involves a study of the health of 12,000 twins from across the UK.

'Contains many errors'

"So, something was a bit wrong. Actually, there is no evidence to support any of these claims," he added. "And the Eatwell Plate [which advises people on eating a balanced diet] – although it has some good things in it – contains many errors and I think people are losing confidence in what the government is telling people."

Contrary to advice from most nutritionists, Spector claimed "the low-fat idea doesn't work and high fat diets are most likely to protect you against disease than low-fat diets".

Spector also argued against recommendations from some sources that people should eliminate certain classes of food from their diets completely, such as gluten, fat, carbohydrates, dairy and red meat, to maintain health and avoid allergies. "All you're left with then is a Kale smoothie and a vitamin tablet,"

he joked. "What I am getting at is that we are moving towards exclusion diets that make us [in terms of our microbiome] even less diverse than we were in the past." Instead, he called for greater focus on people maintaining better gut health, which he claimed helped control everything from mood to feelings of satiety, while regulating the immune system.

'Fat-busting microbe'

Referring to the studies on twins, Spector argued that while genetics could explain some differences in the health of individuals, "most of this is still driven by our diets and our environments". He added: "We also found there was a difference between the thin twin and the overweight twin in the number of microbes they had. The overweight twin was lacking certain beneficial microbes ... we called this the fat-busting microbe."

Spector reported that some of these microbes were now being used by French and Japanese companies, which were incorporating them into foods designed to reduce obesity. "This is a huge revolution in the way we are thinking about these foods and Christensenella is one of a tip of an iceberg of other microbes that we can find that could work," he claimed.

Certain foods, such as red grapes, which contain polyphenols, acted as food for beneficial microbes, including the probiotic microbe akkermansia, added Spector. "A healthy gut is like a perfect English garden. You've got a diversity of microbes of all types, all living together and feeding off each other's by-products – nothing is wasted," he added. But, he warned: "Emulsifiers, preservatives and artificial sweeteners all have very negative effects on the gut microbiome and it is really important for the food industry to understand this."





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Childhood obesity in India 'biggest threat to future generations'

By Gary Scattergood+, Food Navigator Asia 25-Apr-2017

India will have the second largest childhood obesity problem by 2025 in what has been described as "the greatest threat to future generations."

That's the view of Dr Jayshree Todkar, the organising secretary of the International Federation for the Surgery of Obesity and Metabolic Disorders, which recently held a 'Diabesity' summit in India featuring 700 participants from 18 countries. In India, 25 million people are suffering from obesity, but there are not enough expert doctors to tackle the condition, said Dr Todkar.

She estimated India needed 12 to 14 experts to treat every 100,000 patients. The event has focused on training doctors and nutritionists across the three-day conference. "There are so many advances in the field of treatment of obesity. But there is barely any awareness about obesity as a disease. Many people, including doctors, think of obesity in a very cosmetic way. They only look at the external factors like looks which get affected due to obesity," she said.

"Obesity and diabetes are a fatal combination. They are two sides of the same coin. Due to this combination, life is reduced by at least 10 years. It comes as a silent, chronic disease. Mostly, patients turn to doctors at a very later stage. It is an overt expression. It leads to lot of multiple organ failures. The

complications of any disease including diseases like pneumonia get worse if combined with diabetes and obesity," she added.

DHA vs EPA: Which omega-3 is better for raising the Omega-3 Index?

By Stephen Daniells, NutraIngredients USA 14-Apr-2017

High-doses of the omega-3 DHA (docosahexaenoic acid) may boost the Omega-3 Index (O3I) more than EPA (eicosapentaenoic acid), says a new study.

"A high O3I, which reflects a relatively high content of EPA and DHA in the membranes of [red blood cells], has been associated with a lower risk of CHD [coronary heart disease] and mortality in observational studies," explained the study authors in Prostaglandins, Leukotrienes and Essential Fatty Acids. "While there is emerging evidence suggesting that DHA may be more potent than EPA in modifying cardiometabolic risk their respective impacts on the O3I have not been thoroughly examined.

"To the best of our knowledge, this is the first randomized double-blind controlled crossover trial to show that the increase in O3I is significantly greater after supplementation with high dose DHA (2.7 g/d) than with a comparable dose of EPA."

Study details

Scientists from the Université Laval in Québec, The University of South Dakota, and OmegaQuant Analytics, LLC, analyzed data from 154 men and women randomly assigned to receive 2.7 grams per day of EPA or DHA or 3 grams per day of corn oil for 10 weeks. Results of the double-blind controlled crossover study indicated that the Omega-3 Index of participants in

the DHA group increased by an average of 5.6%, compared with a 3.3% increase in the EPA group. In addition, the researchers observed potential gender differences, with a greater O3I increase in men than in women. "The increase in the O3I is greater with high dose DHA supplementation than with high dose EPA, which is consistent with the greater potency of DHA to modulate cardiometabolic risk factors," they wrote. "The extent to which such differences between EPA and DHA in increasing the O3I relates to long-term cardiovascular risk needs to be investigated in the future."

"This study is long overdue"

Commenting on the study's findings, Harry Rice, PhD, VP of scientific and regulatory affairs for Global Organization for EPA and DHA Omega-3s (GOED), told us: "Given the debate about which is better, EPA or DHA, this study is long overdue. While it's a well designed and conducted study, with an outcome that serves as a solid basis upon which further research can be designed, don't switch your supplement just yet. Until it is determined if the differences in the Omega-3 Index relate to the risk of cardiovascular outcomes such change would be premature. This is definitely a topic worth following and one that is unlikely to be resolved in the near future."



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Researchers confirm chicory inulin benefits on blood sugar

By David Anderson,
Nutralngredients 03-Apr-2017

Inulin fibre from chicory root's beneficial effects on metabolic risks - including managing blood sugar levels - has been confirmed by new research.

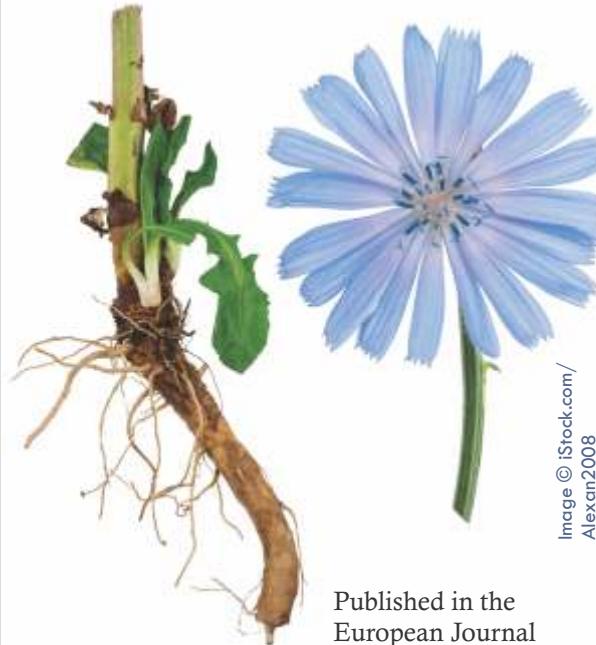


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Published in the European Journal of Nutrition, the newly published research contains previously proprietary data that was used to help inulin gain an EFSA approved health claim after a joint application by Beneo, Cosucra and Sensus.

Carried out by the Functional Food Centre at Oxford Brookes University, UK, and co-funded by the same three giants of chicory-derived inulin and fructo-oligosaccharides (FOS), the two randomised, double-blind controlled trial tested blood glucose and insulin responses in healthy adults after consuming foods that were identical in composition yet contained either full

sugar or the sugar partially replaced with chicory root fibres, either oligofructose or inulin. "Lowering the blood glucose response to food products with chicory inulin or oligofructose, instead of sugars, could contribute to prevention and reducing the risk of chronic metabolic diseases," said lead researcher Doctor Helen Lightowler.

Trial details

The first study included a yoghurt drink in a portion of 250g, in which 20% of the sucrose was replaced with oligofructose. A 14% reduction in blood glucose response was measured, compared to a 17% reduction after the full sugar yoghurt drink had been consumed. The second study included a 110g portion of fruit jelly in which 30% of the sucrose was replaced with inulin. The results showed a 16% reduction in blood glucose response compared to a 40% in the full fruit jelly. Lightowler said that

importantly the trial results were achieved without compromising on taste and sensory qualities "which is essential for the acceptance of such products by consumers in their everyday life."

While part of the research was submitted and accepted in the joint health claims submission relating to lower blood glucose responses with chicory root fibres, this is the first time such the data has been published in a peer reviewed scientific journal.

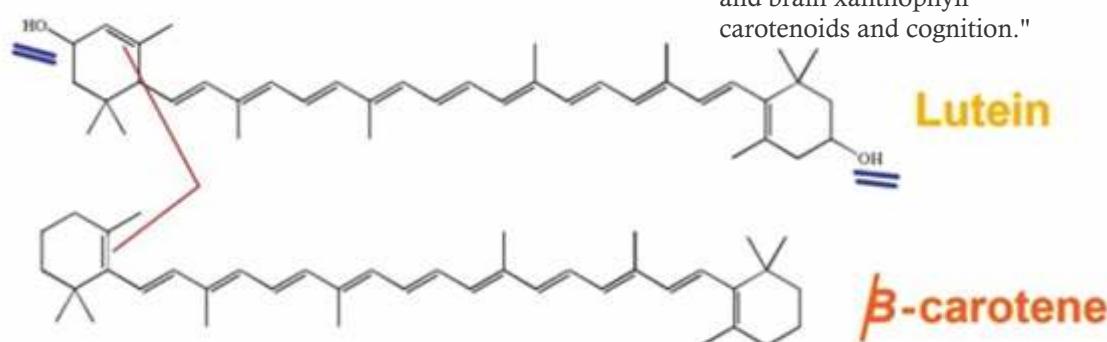


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Lutein and zeaxanthin levels linked to better cognitive function: Study

By Stephen Daniells+,
Nutralngredients 03-Apr-2017

Higher blood levels of lutein and zeaxanthin may be associated with better cognition, memory, and executive function, says a new study from Ireland.

Data from the Irish Longitudinal Study on Ageing, published in the Journal of Gerontology, Series A, indicated that the xanthophyll carotenoids lutein and zeaxanthin were independently associated with better scores for a range of cognitive measures.

In addition, the researchers also found evidence that higher zeaxanthin levels were associated with better processing speed. However, no such associations were observed for lutein. "To our knowledge, this is the first study to investigate plasma lutein and zeaxanthin in relation to cognition, with between-domain comparisons, in a large population-based sample of older adults," wrote the authors. "The results are in concordance with smaller studies of the association between plasma/serum

and brain xanthophyll carotenoids and cognition."



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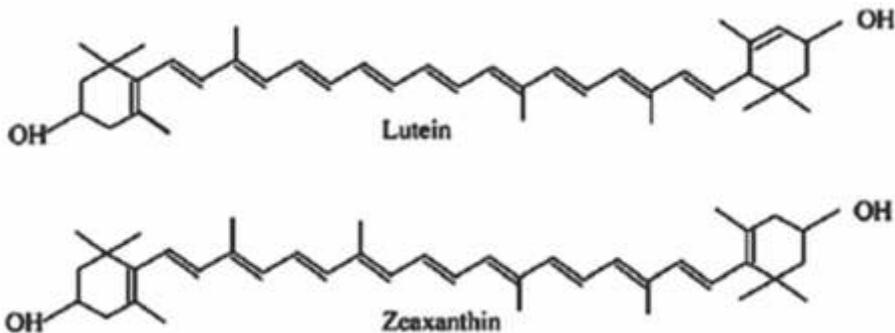
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Lutein and brain health

The link between lutein and eye health was first reported in 1994 by Dr Johanna Seddon and her co-workers at Harvard University, who found a link between the intake of carotenoid-rich food, particularly dark green leafy vegetables like spinach, and a significant reduction in age-related macular degeneration (AMD) (JAMA, Vol. 272, pp. 1413-1420). Numerous studies with data from primates, children, middle-aged people, and the elderly now support the importance of lutein in brain health. Indeed, recent findings from pediatric brain tissue studies have shown that about 60% of the total carotenoids in the pediatric brain tissue is lutein, and yet NHANES data show that lutein is only about 12% of the carotenoids in the diets, so there is a preference for lutein in the brain (Vishwanathan et al. J Pediatr Gastroenterol Nutr . 2014).

Much of the research has been led by Elizabeth Johnson, PhD, Scientist I in the Antioxidants -Laboratory in the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Dr Billy Hammond's group at the University of Georgia, and Prof John Nolan and Prof Stephen Beatty from the Macular Pigment Research Group at the Waterford Institute of Technology in Ireland. The new paper was authored by scientists from Queens University Belfast, The Irish Longitudinal Study on Ageing, and scientists from the Macular Pigment Research Group at the Waterford Institute of Technology.

Prof John Nolan, co-author on the paper, told NutraIngredients-USA:

"This work is very important as it adds to recent findings that show a link between the macular carotenoids and cognitive function. In this study, we confirm that plasma lutein and zeaxanthin were independently associated with better composite scores across the domains of global cognition, memory, and executive function. "The uniqueness of this study relates to its very large representative sample of the older population. The next question is to assess the impact of enriching these nutrients in different populations (e.g. the healthy population and patients with mild cognitive impairment). We have already finished a gold standard clinical trial in healthy individuals and we expect to publish that study in 2017."

Study details

The researchers analyzed data from 4,076 community-dwelling Irish adults aged 50 or older. The results showed that the carotenoids were associated with "better composite scores across the domains of global cognition, memory, and executive function". Interestingly, only zeaxanthin was found to be associated with better processing speed. "Although it is premature to draw inferences from these results as to the absolute or relative importance of the carotenoids for cognitive function, there is a good biological basis for hypothesizing that these compounds may be neuroprotective, owing to their antioxidant and putative anti-inflammatory cell signaling properties,"

wrote the researchers. "Longitudinal investigations in similarly large population cohorts are needed to establish the prognostic significance of this relationship," they concluded.

Is vitamin D deficiency an indicator of heart disease in obese children?

By Nathan Gray+, NutraIngredients
06-Apr-2017

Vitamin D deficiency may be linked with early markers of cardiovascular disease in overweight and obese children, new data suggests.

Research recently presented at the 2017 Annual meeting of the Endocrine Society suggests that levels of the sunshine vitamin are closely linked to risk markers for heart disease in children who are obese – which is itself a risk factor for vitamin D deficiency. "These findings suggest that vitamin D deficiency may have negative effects on specific lipid markers with an increase in cardiovascular risk among children and adolescents," said lead author Dr Marisa Censani from New York Presbyterian Hospital/Weill Cornell Medicine.

"This research is newsworthy because this is one of the first studies to assess the relationship of vitamin D deficiency to both lipoprotein ratios and non-high density lipoprotein (non-HDL) cholesterol, specific lipid markers impacting cardiovascular risk during childhood, in children and adolescents with obesity/overweight," Censani noted.



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Censani and her colleagues reviewed the medical records – including vitamin D levels – of children and adolescents between 6 and 17 years of age over a two-year period.

Participants in the study were all outpatients at the pediatric endocrinology clinics at Weill Cornell Medicine, the team noted. In total, 178 of 332 patients met criteria for overweight and obesity, which included having a Body Mass Index (BMI) above the 85th percentile. Of those, 60 patients with BMI above the 85th percentile had fasting lipid test results available. Analysis showed that vitamin D deficiency was significantly associated with an increase in atherogenic lipids and markers of early cardiovascular disease, said the authors.

Total cholesterol, triglycerides, LDL, non-HDL cholesterol, as well as total cholesterol/HDL and triglyceride/HDL ratios, were all higher in vitamin D-deficient patients compared to patients without vitamin D deficiency. "These results support screening children and adolescents with overweight and obesity for vitamin D deficiency and the potential benefits of improving vitamin D status to reduce cardiometabolic risk," Censani said.

New Research Showing Sucralose Doesn't Increase Appetite Refutes Previous Study

Nutrition Insight 29 Mar 2017

A new study by Park et al. published in *Cell Metabolism* has found that sucralose doesn't increase appetite or food intake in fruit flies, challenging assertions made by Wang et al.² last July, based on a study of similar, but not identical, design.

The Wang et al. study caused big media headlines, suggesting that the results showed that sucralose caused increased food intake in fruit flies – which, therefore, might be a concern

for people trying to lose weight.

The authors of the new study, Park et al., found that the older research could be explained simply by the fruit flies just getting less food to eat than the controls. In other words, the more likely explanation is that the flies only ate more as a consequence of a caloric deficit (fasting), irrespective of sucralose ingestion.

A spokesperson from the International Sweeteners Association (ISA) told NutritionInsight, "While isolated study findings are important to consider, as indicated by Park et al. in their publication, they must not be generalized or reported as final evidence for claims about low calorie sweeteners."

"Overall, in nutrition science, including research on low calorie sweeteners, it is critical to both avoid premature conclusions that might result from a single research study and look at the entire body of evidence. A wealth of well-designed research supports that approved low calorie sweeteners can help safely lower sugar intake, which can be a useful tool in nutritional strategies

for maintaining or lowering body weight."

A big difference between the two studies

was more work done by

Park et al., to further investigate what happens when you give fruit

flies food with a high concentration of sucralose. The new study points out that conclusions drawn from individual research studies may not always represent the big picture. "Sucralose suppresses food intake" – reports the new study by Park et al. In contrast to the study by Wang et al., the new study found that sucralose suppresses food intake under the conditions of the study.

Park et al., demonstrated that the resulting food intake during the sucralose exposure period in either study was less than what it was for control flies during this time. The authors reported that this level of underfeeding would explain why the sucralose-treated flies subsequently appeared hungry and later ate more vs. the control flies, for a limited time, when they were re-introduced to control feed. In considering the importance of low calorie sweeteners in global health, the authors also comment that it's "vital to avoid premature conclusions on the potential benefits or risks".

They follow this by noting that their results also do not support a hypothesis proposed by Wang et al., that sucralose might be able to directly trigger a neural state simulating fasting. Instead, Park et al., found that the fasting-like behaviours observed in the fruit flies following intake of sucralose-containing feed was found "likely arising as an indirect consequence of underfeeding."

Overall, Park et al. suggest that the post-sucralose-exposure overfeeding reported by Wang et al. is simply the "consequence of caloric deficit irrespective of sucralose ingestion." The authors further remark that "our results strongly support the idea that post-exposure hyperphagia is due to compensation for the caloric deficit accumulated during sucralose exposure rather than sucralose ingestion per se."

Ginger: A gut health superfood?

IFT Weekly April 5, 2017

A study published in the Journal of Food Science suggests that ginger extract may be developed as a functional food for the maintenance of gastrointestinal health.

Ginger (*Zingiber officinale* Roscoe) rhizome is known for its beneficial effects in the management of gastrointestinal (GI) disturbances. While it has been hypothesized that the beneficial effects of ginger on the GI tract are due to the powerful compounds it contains, there is insufficient information regarding the precise mechanisms of action.

The researchers prepared and investigated the effects of an ethanolic extract of ginger (GEE), which contains 6-gingerol and 6-shogaol, on Caco-2 cells. The human colonic epithelial cell line Caco-2 has been widely used as a model of the intestinal barrier. The cells were pretreated with GEE, 6-gingerol, or 6-shogaol and exposed to a mixture of the following inflammatory mediators: interleukin (IL)-1 β , tumor necrosis factor (TNF)- α , interferon gamma (IFN)- γ , and lipopolysaccharide (LPS). Then, the researchers evaluated the various anti-inflammatory parameters and investigated the protective effects of ginger and its major constituents on gut barrier integrity.

The researchers found that GEE and its constituents, such as 6-gingerol and 6-shogaol, might improve inflammatory responses by decreasing the inflammatory cytokine levels via nuclear factor-



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kappa B (NF- κ B) inhibition in Caco-2 cell line. In addition, GEE, 6-gingerol, and 6-shogaol significantly decreased inducible NO synthase (iNOS) and COX-2 mRNA expression levels, whereas they increased the transepithelial electrical resistance (TEER). The researchers noted that “detailed experiments using other normal intestinal cell lines, animal models of colitis, as well as human clinical trials should be performed to develop GEE as a functional ingredient beneficial for gut health.”

Peanuts may help keep arteries open, flexible

IFT Weekly April 5, 2017

Research from The Pennsylvania State University and published in The Journal of Nutrition, suggests that peanuts, especially peanut protein and bioactives, may help keep arteries flexible.

To isolate the effects of peanut protein and bioactives, researchers prepared two shakes: a control shake containing a mixture of healthy oils, fiber, and protein from egg whites, and a shake

containing peanuts. The fat content in the control shake was an exact match to that of the peanut shake, allowing researchers to test the effects of peanut protein and bioactives specifically. The researchers measured the blood vessel flexibility of overweight and obese—but otherwise healthy—men

using an ultrasound technique called flow-mediated dilation (FMD). In addition, they took blood samples to measure blood triglycerides.

The researchers found that the participants who ate peanuts as part of a meal containing 50% fat reduced the rise in blood triglycerides by 32%. In addition, peanuts also caused the participants’ arteries to remain open and flexible.

Levels of fat in the blood rise rapidly after a high fat meal, causing blood vessels to become stiff. This makes your heart work harder to pump blood through the blood vessels in your body, increasing the risk of heart disease and stroke.



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SergeyZavalyuk

The researchers think the peanut protein, along with bioactives, vitamins, and minerals play a major role in preventing this stiffening response. "Since the macronutrients were matched between the two shakes, we don't think that it was the mono- and polyunsaturated fatty acids in the peanuts that affected the response," said lead researcher Penny Kris-Etherton, The Pennsylvania State University. "The plant protein in peanuts, and specifically the amino acid arginine, along with the many other nutrients in peanuts likely played a role."

Diet rich in plant protein may prevent type 2 diabetes

Medical News Today 22 April 2017
By Hannah Nichols

Eating a diet with a higher amount of plant protein may reduce the risk of developing type 2 diabetes, according to researchers from the University of Eastern Finland. While plant protein may provide a protective role, meat protein was shown to increase the risk of type 2 diabetes. A high dietary intake of protein from plants rather than meat may decrease the risk of developing type 2 diabetes.

More than 29 million people in the United States are affected by diabetes, with type 2 diabetes accounting for between 90 and 95 percent of all cases. An essential part of managing diabetes is partaking in regular physical activity, taking medications to lower blood glucose levels, and following a healthful eating plan.

According to the National Institute of Diabetes and Digestive and Kidney Diseases, healthy eating consists of consuming a variety of products from all food groups, with nonstarchy vegetables taking up half of the plate, grains or another starch on one fourth of the plate,

and meat or other protein comprising the final fourth. It is recommended that fatty or processed meat should be avoided and that lean meat, such as skinless chicken, should be opted for as an alternative.

Meat consumption has frequently been explored as a variable associated with diabetes, and previous research has found a link between a high overall intake of protein and animal protein, and a greater risk of type 2 diabetes. Eating plenty of processed red meat, in particular, has been connected with the condition.

The new research - published in the British Journal of Nutrition - adds to the growing body of evidence suggesting that the source of dietary protein may be important in altering the risk of developing type 2 diabetes. The researchers set out to investigate the links between different dietary protein sources and type 2 diabetes risk. They used data from the Kuopio Ischaemic Heart Disease Risk Factor Study (KIHD), which was carried out at the University of Eastern Finland.

When the KIHD study began in the years between 1984 and 1989, the diets of 2,332 men aged 42 to 60 years old were assessed. None of the individuals had type 2 diabetes at the onset of the study. Over the course of the 19-year follow-up, 432 men were diagnosed with type 2 diabetes. High plant protein intake decreased type 2 diabetes risk by 35 percent

Jyrki Virtanen, a certified clinical nutritionist and an adjunct professor of nutritional epidemiology at the University of Eastern Finland, and colleagues discovered that a

diet high in meat was associated with an increased risk of type 2 diabetes. The association was seen across all types of meat in general, including processed and unprocessed red meat, white meat, and variety meats. The researchers say that the association may be a result of other compounds found in meat other than protein, since meat protein alone was not connected with the risk of type 2 diabetes. Men who included a higher intake of plant protein in their diets also had healthier lifestyle habits. However, their lifestyle habits were not shown to fully explain their reduced risk of diabetes.

Male study participants who had the highest intake of plant protein were 35 percent less likely to develop type 2 diabetes than men with the lowest plant protein intake. Furthermore, using a computer model, Virtanen and team estimate that replacing around 5 grams of animal protein with plant protein per day would diminish diabetes risk by 18 percent.

The link between plant protein and reduced diabetes risk may be explained by the effect of plant protein in the diet on blood glucose levels. Those people who consumed more plant protein had lower blood glucose levels at the start of the study. The primary sources of plant protein in this study were grain products, with additional sources including potatoes and other such vegetables. A diet preferring plant protein to meat protein may help protect against type 2 diabetes. The authors conclude that:



Image © iStock.com/peangdao

"Replacing 1 percent of energy from animal protein with energy from plant protein was associated with [an] 18 percent decreased risk of type 2 diabetes. This association remained after adjusting for BMI. In conclusion, favoring plant and egg proteins appeared to be beneficial in preventing type 2 diabetes." Overall protein, dairy protein, and fish protein were not connected with a risk of type 2 diabetes, the researchers note. The team also revealed that, confirming the group's earlier studies, a higher intake of egg protein was identified as able to lower the risk of type 2 diabetes.

How to get adults to eat their vegetables? Study explores potential of spices and herbs use

Science Daily April 26, 2017

Researchers at the University of Illinois interested in developing interventions to encourage adults to make better food choices are investigating whether using more spices and herbs, like ginger, curry, rosemary, or garlic, for example, can help adults consume more vegetables as part of their diet.

Parents may have their tricks to get kids to eat their vegetables, but what about getting adults to eat theirs?

According to recent reports, most Americans, of all ages and genders, do not meet the recommended vegetable intake of 2 to 3.5 cups per day, consuming an average of only 1.5 cups per day. Although tactics such as providing vegetables as a juice or hidden as a puree in entrees have been suggested, many people still say no thanks to vegetables, citing adverse taste perception.

Researchers at the University of Illinois interested in developing interventions to encourage adults to make better food choices are

investigating whether using more spices and herbs, like ginger, curry, rosemary, or garlic, for example, can help adults consume more vegetables as part of their diet.

Cassandra Nikolaus, a nutrition doctoral student at U of I, says that for registered dietitians, recommending the use of spices and herbs to promote healthy food choices is already encouraged. "If you use spices and herbs to flavour up your dishes, then you're not adding sodium or fat, which we are trying to reduce in the diet, generally," she says.

But Nikolaus and Brenna Ellison, an assistant professor of agricultural and consumer economics at U of I conducted a study to first establish which consumers already use spices and herbs, and to determine how they use them. The results are



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published in the American Journal of Health Behavior.

"We want to see if spices and herbs can be a facilitator to increase vegetable intake, but what's not in the literature so far is how people use them, or which ones they use," Ellison says. "We really don't know much about that. So this was the first attempt, to help inform future studies, to see which spices and herbs are well liked and frequently used. And, who is using them? This information can help us identify target populations for study

interventions and provide insight on the best spices and herbs to promote to these groups."

In their study, the researchers collected information on what spices and herbs consumers like, how frequently they use them, whether they are used when cooking vegetables, and whether the participants feel proficient in cooking with spices and herbs. Participants were given a list of 20 spices and herbs to choose from.

Nikolaus says the results were surprising.

Younger respondents in the survey (18-29 years) and those who identified as Asian/Pacific Islander or other used 19 of the 20 spices and herbs more frequently than their older and white/Caucasian, African-American, or Hispanic

counterparts. Women were more likely to use spices and herbs when cooking at home. Women and individuals ages 18-49 felt more confident in their ability to cook with spices and herbs, while those who identified as white/Caucasian or those with an annual income below \$50,000 exhibited less confidence.

"The high level of variability across groups was the biggest takeaway," Nikolaus says.

But does identifying these socio-demographics really matter when trying to get adults to eat more vegetables?

Ellison says it does.

For one thing, Ellison explains that the data show that age and cultural differences were linked to which ones, out of the 20 spices, people were more inclined to like or use.

For example, she says that older participants were less inclined to like and use bolder spices and herbs like cayenne pepper or cilantro and tended to stick to milder flavours such as paprika or garlic.

Knowing information like that can help dietitians or other health educators when developing intervention strategies. Nikolaus explains, "There are so many community education efforts that are already underway. If they have one more piece of evidence to determine recipes for certain groups of people, they can select something more well-liked by that population."

As part of the study, Nikolaus created a chart categorizing which spices were most well-liked, less well-liked, and least well-liked, based on the demographic subpopulations that participated in the study. Ellison says this is a resource that nutrition or health educators can use as they make recommendations for healthier food choices.

Another piece of information the researchers learned from the study is that some people simply don't feel confident in cooking vegetables, or cooking with spices and herbs. "What can we do to educate these groups of people on how to use spices and herbs in hopes of improving their vegetable consumption? One issue may be limited knowledge on how to cook vegetables in the first place," Ellison says. "We actually had questions on the survey about which cooking methods people used. Boiling and steaming were the most common cooking methods, so spices and herbs might be useful there to enhance flavour."

Nikolaus adds that along with low knowledge of culinary techniques, the availability of specific cooking equipment -- think zucchini spiralizer -- might also determine if (and how) consumers will prepare

vegetables for themselves. The researchers, as part of a larger team, are currently collecting data in an actual dining setting, observing diners' consumption of vegetables when spices or herbs have been added. They want to see if diners choose the vegetables that have been cooked with spices and herbs, and if less of those vegetables go to waste.

"Taste is king. That is one of the most powerful reasons behind why we make our food choices," Nikolaus says. "If we can make things more appealing based on spices and herbs and flavors that people are more prone to appreciate, they may choose to eat more vegetables because they enjoy what they are consuming."

"Spice and herb use with vegetables: Liking, frequency, and self-efficacy among U.S. adults" is published in the American Journal of Health Behavior. Co-authors include Cassandra J. Nikolaus, Brenna Ellison, Pamela A. Heinrichs, Sharon M. Nickols-Richardson, and Karen M. Chapman-Novakofski, all of the University of Illinois.

Could genetics influence what we like to eat?

Science Daily April 24, 2017

Have you ever wondered why you keep eating certain foods, even if you know they are not good for you?

Gene variants that affect the way our brain works may be the reason, according to a new study. The new research could lead to new strategies to empower people to enjoy and stick to their optimal diets.

Silvia Berciano, a

predoctoral fellow at the Universidad Autonoma de Madrid, will present the new findings at the American Society for Nutrition Scientific Sessions and annual meeting during the Experimental Biology 2017 meeting, to be held April 22-26 in Chicago.

"Most people have a hard time modifying their dietary habits, even if they know it is in their best interest," said Berciano. "This is because our food preferences and ability to work toward goals or follow plans affect what we eat and our ability to stick with diet changes. Ours is the first study describing how brain genes affect food intake and dietary preferences in a group of healthy people."

Although previous research has identified genes involved with behaviors seen in eating disorders such as anorexia or bulimia, little is known about how natural variation in these genes could affect eating behaviors in healthy people. Gene variation is a result of subtle DNA differences among individuals that make each person unique.

For the new study, the researchers analyzed the genetics of 818 men and women of European ancestry and gathered information about their diet using a questionnaire. The researchers found that the genes they studied did play a significant role in a person's food choices and dietary habits. For example, higher chocolate intake and a larger waist size was associated with certain forms of the oxytocin receptor gene, and an obesity-associated gene played a role in vegetable and fiber intake. They also observed that certain genes were involved in salt and fat intake.



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The new findings could be used to inform precision-medicine approaches that help minimize a person's risk for common diseases -- such as diabetes, cardiovascular disease and cancer -- by tailoring diet-based prevention and therapy to the specific needs of an individual.

"The knowledge gained through our study will pave the way to better understanding of eating behavior and facilitate the design of personalized dietary advice that will be more amenable to the individual, resulting in better compliance and more successful outcomes," said Berciano.

The researchers plan to perform similar investigations in other groups of people with different characteristics and ethnicities to better understand the applicability and potential impact of these findings. They also want to investigate whether the identified genetic variants associated with food intake are linked to increased risks for disease or health problems.

Fresh fruit consumption linked to lower risk of diabetes and diabetic complications

Science Daily April 11, 2017

In a research article published in PLOS Medicine, Huaidong Du of the University of Oxford, Oxford, United Kingdom and colleagues report that greater consumption of fresh fruit was associated with a lower incidence of diabetes, as well as reduced occurrence of complications in people with diabetes, in a Chinese population.

Although the health benefits of diets including fresh fruit and vegetables are well established, the sugar content of fruit has led to



uncertainty about associated risks of diabetes and of vascular complications of the disease. Du and colleagues studied nearly 500,000 people participating in the China Kadoorie Biobank over about 7 years of follow-up, documenting new cases of diabetes and recording the occurrence of vascular disease and death in people with pre-existing diabetes.

The researchers found that people who reported elevated consumption of fresh fruit had a lower associated risk of developing diabetes in comparison with other participants (adjusted hazard ratio [aHR] 0.88, 95% CI 0.83-0.93), which corresponds to an estimated 0.2% reduction in the absolute risk of diabetes over 5 years. In people with diabetes, higher consumption of fresh fruit was associated with a lower risk of mortality (aHR 0.83, 95% CI 0.74-0.93 per 100g fruit/d), corresponding to an absolute decrease in risk of 1.9% at 5 years, and with lower risks of microvascular and macrovascular complications.

In addition to the health benefits of consuming fresh fruit, Du and colleagues emphasize the value of their findings for Asian populations where fruit consumption is commonly restricted in people with diabetes. The main limitation of this observational study is that the effects of fruit consumption can be difficult to distinguish from

those of participants' other dietary and behavioural characteristics.

Blood fat levels an indicator of kids' diet quality and disease risk: Study

By Will Chu, Food Navigator 27-Mar-2017

Family-based lifestyle interventions, such as a diet high in unsaturated fat, can have a dramatic impact on children's blood fatty acid make-up, Finnish researchers have determined.

The findings serve to provide evidence of plasma fatty acid composition's link with diabetes and other cardio-metabolic risks and the effects of lifestyle interventions on this composition in children. Fatty acid metabolism is closely associated with cardio-metabolic risk, already in childhood and is a reliable indicator of dietary fat and carbohydrate quality in a given diet.

"The relative proportion of oleic acid was higher in children who consumed a lot of sugar, and lower in children who consumed plenty of whole grain products," the study said.



"Excessive intake of sugar stimulates the body's endogenous synthesis of fatty acids, which can be detected in the plasma fatty acid composition."

The team from the University of Eastern Finland studied 512 children aged six to eight years old. The children and their families received nutrition and exercise counselling over a period of two years. A four-day food record was used to evaluate food consumption. Fatty acid composition in plasma was determined by gas chromatography from a fasting blood sample.

Study findings

Findings revealed a high intake of vegetable oil-based margarines (60-80% fat) was linked to a lower levels of saturated and monounsaturated fatty acids and a high polyunsaturated fatty acid content in plasma fatty acid make-up. A higher consumption of high-fibre grain products and a lower consumption of confectionary was also linked to lower levels of monounsaturated fatty acids in plasma.

Several saturated fatty acids and that of palmitoleic acid were positively linked with cardio-metabolic risk score. The opposite was true for many polyunsaturated fatty acids. "It is possible to affect plasma fatty acid composition by a two-year individualised and family-based lifestyle intervention," said the study's lead author, Taisa Venäläinen, from the University of Eastern Finland. "Of note, plasma fatty composition is not only a biomarker for dietary fat quality but also reflects the consumption of high-fibre grain products and foods high in sugar, such as candy." It is known that high consumption of high-sugar confectionary increases activity of delta-9-desaturase, an enzyme that helps the liver form monounsaturated fatty acids from saturated ones.

While it prevents saturated fatty acids from accumulating in the liver, it also promotes the excretion of fatty acids from the liver into the blood stream.

Previous studies show a high carbohydrate intake ups delta-9-desaturase activity in adults. This effect, along with the enzyme's role in increasing cardiovascular disease risk, has not been shown in children until now. "Increased enzyme activity may be due to the liver producing saturated fatty acids from sugars at an increased pace, which is harmful for lipid metabolism and overall health," the study concluded.

Ginseng and anti-obesity: Does Asian variety offer greater weight loss hope?

By Gary Scattergood+,
Nutrlngredients 05-Apr-2017

Studies comparing the differing anti-obesity effects of Asian and American ginseng are urgently needed, it has been claimed, not least because they are thought to have opposite medical effects in Traditional Chinese Medicine (TCM).

Writing in a review in the Journal of Nutritional Biochemistry, scientists from Tennessee State University said a number of investigations had been conducted on ginseng in preventing and treating of obesity. However, the effect and the relevant mechanisms behind how ginseng works as an anti-obesity treatment are still controversial, they added, and the issue is clouded by the differing uses of American and Asian ginseng in TCM.

The former is used to treat yin manifestations of Qi (life energy), while the latter tackle yang manifestations. Therefore, Asian ginseng has often been used to help treat, fatigue, poor appetite,

diarrhoea, breath shortness, feeble pulse, spontaneous perspiration, febrile diseases, amnesia, insomnia and impotence. On the other hand, American ginseng is used to treat diseases such as cough, blood sputum, dysphoria, fatigue and thirst. "Although the potential anti-obesity effect of Asian ginseng has been investigated in mice and humans in Asia in the last several decades, the anti-obesity effect and mechanism of ginseng are still not fully understood, especially in humans," wrote the researchers.

"Moreover, high-quality studies of the effects of ginseng in the United States are rare, particularly whether and how American ginseng prevents obesity is almost blank." They said this was area ripe for further investigation, and pointed to their own unpublished data which showed that while Asian ginseng significantly inhibited fat accumulation in 3T3-L1 cells, American ginseng has no such effect at the same concentration (1 mg/ml).

They suggest this could be due to increased fat accumulation caused by one of the major ginsenosides in American ginseng that is not detectable in Asian ginseng "The different anti-obesity effect between American ginseng and Asian ginseng may also result from the different profiles of other ginsenosides," they added. The researchers also said high-quality clinical trials of anti-obesity effect of ginseng and ginsenosides were very limited.



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Weight loss

"There is only one study showing that Asian ginseng extract intake exerted a weight loss effect in obese women," they wrote. "American ginseng extract or whole plant/berry has not been investigated for anti-obesity in humans. In addition, there is no report using human primary cells investigating the antiobesity effect of ginseng and ginsenosides."

They argue that standardised ginseng production is sorely needed to overcome the fact that the results of existing studies "are controversial". "These controversial results at least partly come from the variety of the quality of ginseng, especially the whole extract and juice.

The quantity and composition of ginsenosides in ginseng plants are dramatically influenced by species, age, and part of the plant, cultivation methods, harvesting season, preservation methods and geographical distribution," they state. "However, almost all ginsenosides or extracts in these studies were prepared in the individual labs or from different companies, it is almost impossible to keep the quality at the same level, particularly the whole extract."

The authors concluded; "Although Asian and American ginsengs have similar profiles of active ingredients, the different percentage of crude saponins (4.8%–5.2% in Asian ginseng vs. 7.0%–7.3% in American ginseng) and the specific ginsenoside (Rf only in Asian ginseng, F11 only in American ginseng) may contribute to the different functions of these two ginsengs. Therefore, it is very important to compare the medical effects using modern scientific approaches."

Diabetes in Asia: Food and nutrition industry action an economic and social imperative

By Gary Scattergood+, Food Navigator Asia 26-Apr-2017

Asia's food and nutrition companies risk turning their backs on a vast potential market if they fail to innovate and reformulate to provide products to help fight the war on diabetes. Speaking at our Food Vision Asia summit in Singapore, Prof Jeya Henry, from Singapore's Clinical Nutrition Research Centre, said industry had to help academics and regulators use diet at the main weapon against the disease.

Outlining how Asian's were more predisposed to diabetes than Caucasians, he said the region was "the epicentre of diabetes because Asian's respond to food differently."

He said the region was characterised by the thin-fat phenomenon, where people who were seemingly of a reasonable weight were frequently diabetic. "BMI is not a proxy indicator of diabetic risk in Asia," he said. More than half of the world's 400m people with diabetes are in Asia, although Prof Henry believes that for every two people who are aware they have the condition, there is a further one who does not. "The numbers are profoundly high. I'd say there are maybe 1bn people affected globally, including those with prediabetes.

We urgently need to look at using diet for a paradigm shift."

Prof Henry leads a team in Singapore looking at new product innovation, reformulation and functional ingredients that can help fight diabetes in an Asian setting. "We need solutions and products that Asian's actually want to consume, and use ingredients that are common to Asia. "I'm not sure how many of these innovative products will come from MNCs, I suspect it will be from smaller companies because they really see the opportunities."

Economic activity

He argued there was a social and economic argument to innovate in this space in Asia. Unlike in Europe and the US where many people are affected by diabetes later in life, in Asia it affects the younger population at the time they are most economically active. "We also have a situation here where most of foods we consume in Asia are high GI foods, which inevitably leads high GI responses. We need to make foods that are high GI become medium or low GI through the removal or addition of nutrients," he added. "The good news is that we are starting to see a revolution around ingredients to reduce these problems." That said, this wasn't always filtering down into a raft of new products, he said. "There are incredible opportunities for new food products and innovation that aren't yet been taken," he said. "We need more action."

"The other challenge for food companies is to look at people below the poverty line. If you think you can't make money there, think again, but there is also a social obligation to act here as well."



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FOOD SCIENCE & INDUSTRY NEWS

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Indians are now willing to pay more for healthier snacks

By RJ Whitehead , Food Navigator Asia 04-Apr-2017

Indians are becoming obsessed with the pursuit of a healthier lifestyle, according to market intelligence that suggests some food companies have already been taking measures to appeal to this change in demand.

Almost half of Indian consumers now cite a “healthier lifestyle” among their goals, far ahead of other aspirations, including better time management (30%), improving relationships (25%) and travelling (24%). Mintel, the market analyst, found that close to three quarters reported increased happiness as their motivation for leading a healthier lifestyle, while over half each said this was either to look better or feel better.

Though 41% claimed their goal was to live longer, only 10% wish to do so to manage a health condition. Fifty-two per cent of Indian consumers claimed to eat a suitable diet to achieve their health goal. “With healthy living and better time management on consumers’ radars, the time is ripe for brands to innovate within this space,” said Ranjana Sundaresan, senior research analyst at Mintel, adding that this was particular true within the food and drink segment given attitudes towards healthy eating.

This way of thinking is reflected in product launches last year, whereby

“natural” was behind only “suitable for” as the most common claim for new releases. Natural claims—defined as food and drink with on-pack claims including “All-natural product”, “GMO-free”, “No additives/preservatives”, “Organic” and “Wholegrain”—accounted for 28% of all launches in 2016, up from 22% in 2012. Indeed, India witnessed the highest number of “natural” food launches in Asia between 2012 and 2016—and was the fifth biggest market for these launches globally, accounting for 6% of the world’s new products labelled as such, according to Mintel’s database of global launches.

“Awareness of natural products has grown in India and consumers are increasingly demanding cleaner labels and organic attributes. That said, there are still opportunities for manufacturers to innovate within the natural space, particularly in the snack category.” Sundaresan added.

Indeed, 19% of consumers say they would like to see a wider variety of natural snacks. Moreover as many as half of those who snack think it is important for snacks to be healthy. And it seems that they are willing to pay more for nutritious snacks, with 39% of snackers saying they are willing to pay extra for fruit or vegetable snacks, while a quarter would pay more for fortified nibbles.

Elsewhere, India’s ready-meal market has also seen trends move in a healthier direction, after 25%

of products launched in 2016 had the claim “all natural product” written on-pack. “It is known worldwide that healthy and natural foods tend to be more expensive, and many think twice before making a purchase,” said Sundaresan. “However, powered by higher disposable income and increasing health consciousness, India’s growing middle-class urban population is now more willing to pay the additional cost for healthier options.”

Cargill, General Mills and Unilever agree to fortify flagship wheat flour brands with vitamins and minerals in India

By Gary Scattergood+, Bakery & Snacks 10-Apr-2017

Major brands and millers have agreed to fortify wheat flour with iron, folic acid and vitamin B12 under India’s drive to boost nutrition levels through a mass fortification programme.

According to Indian regulator FSSAI, market leaders such as General Mills, Hindustan Unilever, Patanjali, ITC and Cargill have voluntarily agreed to start fortification of their flagship wheat flour brands. The commitment from major producers comes after FSSAI backed the fortification of meals served on government supported food programmes at the end of last year.

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ArishaRay

Products should begin to be seen in some stores by July/August and then nationwide by December. This decision is the outcome of a series of meetings convened by FSSAI over the past two months with businesses, including medium and small industry players. In a meeting with FSSAI CEO Pawan Agarwal, food industry associations the Roller Flour Millers Federation of India (RFMFI), Wheat Products Promotion Society (WPPS) and Society of Indian Bakers (SIB) conveyed their commitment to start fortification of wheat flour and other products such as biscuits, breads, rusks and cakes at the earliest opportunity.

FSSAI said fortification of wheat flour with iron, folic acid and vitamin B12 offers one of the most feasible and cost-effective strategy to combat anaemia and other micronutrient deficiencies that affect more than 50% of India's population. India has a fairly high consumption of wheat flour, with an average per person consumption of about 200-250g per day. Government programmes FSSAI announced last December that government food programmes would be used as a vehicle for fortification, in particular the Integrated Child Development Services scheme and Mid-Day-Meal programme. "Fortification is a cost-effective and reliable means of reducing micronutrient malnutrition," said FSSAI at the time. "The goal is not to provide 100% daily requirements of micronutrients but rather 'fill the gap' between intake from other sources and daily micronutrients needs."

At an open market level, guidelines are now also being issued for fortified packaged foods such as breads, biscuits, rusk and cakes. Meanwhile, manufacturers and retailers have agreed to increase consumer awareness of fortification, including promotion

of the national logo for fortified foods. Members of the Retailers Association of India have committed to promote the logo of fortified foods and provide a separate shelf to display such products.

Agarwal said: "Fortification Standards and a logo for fortified foods released by FSSAI recently, has provided a rallying point for food businesses to take up fortification on a large scale. With this we can see a lot of traction amongst the food businesses to undertake fortification of entire range of their food products on a voluntary basis. "FSSAI has also established a Food Fortification Resource Centre (FFRC) to facilitate and support food businesses in their fortification efforts. I am reasonably optimistic that fortified staple food will soon be available in the open market and most states will soon switch over to using fortified foods in the government programmes."

India's Diabetes Epidemic Shifts to Poorer People in More Affluent Cities

Nutrition Insight 08 Jun 2017

India's diabetes epidemic is shifting, with the disease now increasingly common among people from low socio-economic backgrounds living in urban areas of the more affluent states, according to a study published in The Lancet Diabetes & Endocrinology journal. The authors say the findings should cause concern in a country where most treatment costs are paid out-of-pocket by patients, and highlight the urgent need for effective prevention measures.

The Indian Council of Medical Research – India Diabetes (ICMR-INDIAB) study is the largest nationally representative study of diabetes in India and includes data

from 57000 people across 15 states. As part of the study, each person had their body weight, height, waist circumference and blood pressure measured. Glucose tolerance tests were used to diagnose diabetes and pre-diabetes.

The prevalence of diabetes across all 15 states was 7.3% and rates varied from 4.3% in Bihar to 13.6% in Chandigarh. Almost half of the people in the study did not know they had diabetes until they were tested. On average, diabetes was twice as common in urban areas (11.2%) compared to rural areas (5.2%). Overall, diabetes was more common among people with higher socio-economic status, compared to people with low socio-economic status. However, in urban areas in seven states – most of which rank among the more economically advanced states – diabetes was higher among people from low socio-economic status.

For example, in urban areas of Chandigarh, the rate of diabetes was 26.9% for among people from a low socio-economic background, compared to 12.9% for people from high socio-economic backgrounds. In urban areas of Punjab, the rates were 16.1% and 11.9% respectively.

Additionally, the rates of diabetes in rural areas were much higher than those identified in previous studies. The authors note that since 70% of the population in India lives in rural areas, even small increases can translate into several million more people requiring chronic care in areas with poor access to health care.

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Parlé Agro



"Our study suggests that cities in the country's more affluent states have transitioned further along the diabetes epidemic. As the overall prosperity of individual states and the country as a whole increases, the diabetes epidemic is likely to disproportionately affect the poorer sections of society, a transition that has already been seen in high-income countries," explains senior author Dr. Viswanathan Mohan, President, Madras Diabetes Research Foundation, Chennai, India, the national coordinating centre for the study.

"This trend is a matter of great concern because it suggests that the diabetes epidemic is spreading to individuals who can least afford to pay for its management," adds Dr. R. M. Anjana, lead author of the study, Vice-President, Madras Diabetes Research Foundation.

Finally, the prevalence of pre-diabetes was 10.3% across all 15 states, varying from 6.0% in Mizoram to 14.7% in Tripura. In most states, the rate of pre-diabetes exceeded the rate of diabetes.

"The high rates of pre-diabetes across the country imply the existence of a huge number of individuals who could conceivably develop diabetes in the near future. Our findings have serious implications for the country's health and socioeconomic development and highlight the urgent need for implementing effective preventative measures," says Dr. Mohan.

The authors note that the study did not differentiate between type 1 and type 2 diabetes.

Writing in a linked Comment, Dr. Vijay Viswanathan M V Hospital for Diabetes, Chennai, India, says: "The management of type 2 diabetes varies widely in different parts of India. Whereas some people living in urban parts of the country have access to excellent diabetes care services and can afford

the out-of-pocket expenditure associated with diabetes, people living in semi-urban and rural areas of the country do not have access to the diabetes centres or clinics that provide comprehensive diabetes care.

As such, people with diabetes in rural areas do not get an opportunity to be screened early for the microvascular and macrovascular complications of diabetes. This situation means that the development of advanced complications such as renal failure and blindness due to retinopathy are commonplace. This is one of the biggest challenges faced by the healthcare system in India.

Addressing the increasing prevalence of diabetes in India will require solutions at many levels, including increased awareness of the disease and its complications throughout the country – especially in rural areas – and the establishment of cost-effective prevention programs."

Sugar... only sweeter? First products using DouxMatok sugar reduction technology to hit stores in 2018

By Elaine Watson+, Food Navigator USA 05-Apr-2017

Israeli start-up DouxMatok - which has developed patented technology which effectively makes sugar taste sweeter - has struck a series of joint development agreements with leading food manufacturers and says the first products containing its enhanced sugar could hit the market next year.

When it comes to sweetness perception, size and shape matters, says DouxMatok, which is using an inert mineral particle (silica) as a

carrier for sugar molecules such that they bond to the silica via non-covalent chemistry (the process does not involve the sharing of electrons).

The sucrose molecules surround and coat the silica particle to form structures that our taste receptors perceive to be sweeter than a comparable amount of sugar in free unassociated form – enabling sugar reductions of 20-40%, depending on the application. The 'enhanced' sugar performs – and tastes – just like regular sugar, can be listed as 'sugar' on the ingredients list, and does not require manufacturers to change their processes.

As less sugar is required to deliver the same sweetness, formulators will typically have to add some bulking agents in applications where bulk is needed, although in some cases, such as dairy, other components in the recipe can simply be used in slightly higher amounts. The cost is higher than regular sugar, but as firms can use less, the cost-in-use is appealing, said Alejandro Marabi, PhD, head of food science and technology at the firm, who was speaking to FoodNavigator-USA during a press trip organized by the Israel Export Institute last month.

"The silica is not metabolized by the body and is excreted' When the DouxMatok sugar is consumed, the sugar component (sucrose) is metabolized as normal and the silica (which is tasteless) passes through the body and is excreted, said Dr Marabi: "The silica [which contains no calories] is

Image © iStock.com/
koosen



not metabolized by our bodies and therefore it is excreted." He also noted that silica is a GRAS (generally recognized as safe) food additive that is widely used in the food industry as everything from an anti-caking agent to an emulsifier (currently the FDA permits the use of silicon dioxide at up to 2% by weight of a food).

While both components (silica and sucrose) are GRAS, DouxMatok is preparing a GRAS determination for the enhanced sugar in order to reassure customers that the ingredient is safe, he added.

What's in a name?

So how game-changing is this technology, and will manufacturers – in the interests of transparency – choose to label the silica on the ingredients list, even if it's present in tiny quantities (less than 0.5% of DouxMatok 'sugar' is silica) and effectively only serves as a flavor carrier? And if they do, could that put some consumers off? According to Marabi, the silica serves as a carrier, and does not have to be declared although some manufacturers may wish to do so: "It's up to customers to decide how to label it."

The business model

So what's the strategy at DouxMatok? To become an ingredients manufacturer, or to partner with other companies and license its technology? Likely the latter, said Marabi, although it is exploring multiple business models. "We've been talking to all the big sugar manufacturers."

Applications

DouxMatok has had particular success in chocolate, dairy, bakery and cereal applications, with trained sensory panel data showing that sweet whipped cream with a 30% sugar reduction thanks to DouxMatok was perceived as being equally sweet, while the flavor profile was near identical. A

breakfast cereal coating with a 20% sugar reduction thanks to DouxMatok also performed as well as the full sugar product, with no significant differences between the reduced sugar sample and the control on all key parameters, said Marabi, who said the product was also an obvious candidate to enter the tabletop sweeteners category as well as the industrial sugar/sweeteners market.

"We have had extremely positive feedback, not just because it tastes and performs like sugar, but because it is so easy to use. You can freeze it, heat it, bake it and so on."

But what about beverages?

Right now, this is the most challenging application because some of the bonds between the silica and the sucrose are broken in a solution, he acknowledged. "We've got up to 28% reductions, but we are typically delivering a 10% sugar reduction in beverages, which is not good enough. We're looking for 25% for this to be of real interest in this category."

Funding rounds

The technology behind DouxMatok was created by CEO Eran Baniel's father, Avraham Baniel, who worked as a consultant with Tate & Lyle to develop sucralose and came up with the technology underpinning DouxMatok -which means 'double sweet' in French and Hebrew – in his nineties. Based in Petah Tikva near Tel Aviv, DouxMatok – which was founded in 2014 and recently tied up with the Warner Babcock Institute for Green Chemistry in Boston – has raised \$3.5m in an initial funding round and is now seeking to rise around \$7m in its second round, said Marabi.

Image © iStock.com/robynmac



'Fibre is the only option to turn our comfort foods from toxic to therapeutic,' says FiberFlour founder

By Niamh Michail, Food Navigator 28-Mar-2017

What made a practicing doctor give up medicine to create and supply a high-fibre flour?

"I saw an opportunity to be infinitely more effective in preventing disease in the first place. Fibre is the only option to transform our staple comfort foods from toxic to therapeutic," says Gerald Davies, founder of FiberFlour.

Despite being a lifetime jogger and careful follower of dietary guidelines, between the ages of 45 and 55 Gerald Davies, a trained doctor specialised in cardiothoracic anaesthesia, steadily began putting on weight. His moment of epiphany - which led to him promptly shedding the weight and donning his 30-year-old suits again - came when he read 'Good Calories Bad Calories' by Gary Taubes.

The book disputes the alleged role of fat in causing obesity – a belief that has shaped most countries' dietary guidelines for years – instead shifting the blame to carbohydrate-rich diets and their chronic lack of fibre.

After a brief stint heading up a healthy, low glycemic restaurant in Florida, Davies returned to his native Wales but continued reading into the growing body of research on the microbiome and how fibre fermentation benefits gut function.

Healthy blend

Combining his knowledge of home baking and preventive medicine, Davies began experimenting in the kitchen to create a low-carb, high-fibre flour with the same functionality as regular flour. The result is a blend of oat bran, flax/linseed flour, wheat bran, inulin and wheat protein as well as conditioners, packing in 21% protein, 40% fibre, 18% available carbohydrate and 7% fat which comes from the linseed and contains omega-3 fatty acids.

The fibre comes from a variety of different natural sources - both soluble and insoluble - including lignans, betaglucans, oligofructans and inulin. As a comparison, whole-wheat flour generally contains around 10% fibre and around 60% rapidly digested starches.

"[This flour] addresses the two public health 'elephants' ignored by government guidelines: chronic repetitive raised glucose and insulin levels in response to virtually every meal, and the flip side: a fibre gap that has much more serious metabolic consequences than are generally appreciated."

The fact that FiberFlour contains gluten from the wheat means the dough retains key functional properties such as elasticity, consistency and rise, and can be used to make leavened and flat bread, pizza, biscuits, cookies, muffins and snack bars.

'The US market is more advanced than Europe for this kind of product'

FiberFlour retails at £6.75 (€8.75) per kilo - less for volume customers

and commercial bakers. This is cheaper than competing low-carb flours made from almond flour or coconut which retail at around £10 (€11.60) per kilo. It currently produces 1000 kg batches that are sold in 12.5 kg and 1 kg bags, but can increase this "quickly and substantially" if there is a sudden rise in demand, said Davies, and its current manufacturing partner Romix Foods would like to increase production to several tons a day.

FiberFlour currently supplies to customers in the UK via its website (a listing on Amazon will follow soon) but has had inquiries from Australia, Spain, Mexico and, principally, the US. In fact, it's in the US where Davies, a dual US and UK citizen sees the most potential for the flour – hence the US spelling of fibre in the company's name. "Every supermarket there has a low carb baking section with all sorts of ingredients of interest to low carb bakers such as almond flour, gluten, xanthan and coconut flour."

Will the food evangelists buy it?

When so much of the conversation on healthy eating focuses on Instagram-friendly superfoods such as chia seeds, goji berries or stevia, a high fibre flour to stimulate fermentation in the gut can hardly be described as the sexiest of products or claims. But, Davies said, it has robust science behind it.

"I agree high fibre claims are not the most popular amongst the food

evangelists although low carb and low sugar are - and for good reason," said Davies. "But you can't quit carbs without eating something else. However, glamorous or not, of the very few health claims approved by the European Food Safety Authority (EFSA) as opposed to nutritional claims, fibre has been approved for several."

Fiji looks at irradiation to open up fruit and veg exports

By staff reporter, Food Navigator Asia
25-Apr-2017

Fiji has proposed a project to support irradiation to help increase exports of fruits and vegetables to international markets.

The technical cooperation (TC) project will support food irradiation for the 2018–2019 cycle. The IAEA, an expert in radiation technologies and a specialist in quality infrastructure and value chains from UNIDO recently assessed its scope and went to fruit and vegetable production areas in Nadi, Sigatoka and Navua. The next steps include drafting a business plan with the International Atomic Energy Agency (IAEA) and the United Nations Industrial Development Organization (UNIDO). A feasibility study will determine suitable technology and examine market factors to help Fiji enhance its exports of fruits and vegetables.



Attaining export quality

Export of fruit and vegetables are hindered by different species of fruit fly, which affect the quality of products such as okra, papaya, breadfruit, mango, eggplant and chili. To reduce the impact of insect pests, the country has been using High Temperature Forced Air (HTFA). However, it has only provided a partial solution as it cannot eliminate all types of flies that affect the fruits and vegetables. The Government of Fiji has opted to introduce irradiation to address the insect pest challenges facing exports.

"In helping Fiji to introduce food irradiation to its economy, the IAEA's TC programme will contribute to the fulfilment of Fiji's Trade Policy Framework and thus to the government's vision of a better Fiji for all," said Faiyas Siddiq Koya, Minister for Industry, Trade and Tourism. Hillary Kumwenda, CEO of the Biosecurity Authority (BAF), who is leading the development of the project, said the HTFA plant can treat up to 3,000 tons of fruits and vegetables per year. "However, Fiji has capacity to significantly increase its exports, if a new technology such as food irradiation is introduced."

The move should benefit the 250 growers and 15 exporters of fruits and vegetables, who are small farmers with an average of two to four hectares each. Growers and exporters expressed support for the Government's initiative to enhance infrastructure for the treatment of fruits and vegetables, said the IAEA. They said a food irradiation facility will allow expansion of exports to international markets such as Australia, New Zealand, the Middle East and the US.

Irradiation for food packaging

Meanwhile, Canada is researching biodegradable food packaging developed using radiation

technology. Scientists at RESALA and CIC are using training with the IAEA to research and develop biodegradable, active packaging materials. They take raw renewable materials such as starch or proteins, combine them with nanocellulose and irradiate them. IAEA said this leads to materials with improved durability, biodegradability and better water resistance compared to conventional materials.

Monique Lacroix, director of the Research Laboratories in Sciences Applied to Food (RESALA), said irradiating natural polymers to make new materials is a promising avenue to enhance product safety and reduce food packaging waste. "These polymers are not naturally very sturdy, but when you add nanocellulose and subject it to radiation, the polymers become tough and offer more reliable, sturdy coverage and protection of food," added the researcher at the Canadian Irradiation Centre (CIC). "Then when we add specific bioactive materials such as essential oils from thyme, the packaging is considered 'active' because these additions actively help to extend the shelf life of food and assure food safety."

Another IAEA project involving radiation processing began in 2013 and runs until next year. It includes scientists from Algeria, Bangladesh, Brazil, Canada, Egypt, Italy, Malaysia, the Philippines, Poland, Romania, Thailand, Turkey, the UK and the US.

German project

In other news, the Federal Institute for Risk Assessment (BfR) and the Federal Office for Radioactive Protection (BfS) will examine prepared food for radiation caused by radioactive elements such as uranium. In the seven-year study, foods most frequently eaten by Germans will be considered including cereal products, vegetables and potatoes, dairy

products, meat and fish. Wolfram König, president of the BfS, said: "Citizens therefore depend on verified and reliable data provided by us. The joint study is intended to help better understand, compare and classify possible or negligible risks." Samples from the BfR-MEAL study will be examined for various natural radionuclides such as uranium, radium-226, radium-228 or lead-210 and the BfS will estimate doses for the population.



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kenko

Acacia gum improves texture, softness and shelf life of bread

Food News LATAM APRIL 17, 2017

Alland & Robert, an international leader in acacia gum, named LEMPA1 (Food Testing Laboratory), an independent French expert and a professional bakery product laboratory, conducted a study on the impact of acacia gum on breads (texture, water retention and preservation) as well as a sensory evaluation.

The tests were carried out using two grades of acacia gum - Acacia gum Seyal and Acacia Gum senegal - with three different doses of 1%, 3% and 6%. The tests were carried out on two different types of bread: white bread for sandwich and gluten free bread, the results were measured against a control that did not contain acacia gum.

The research carried out by LEMPA produced significant results with White Sandwich Bread and Gluten Free Bread. In fact, by using a specific dose of Acacia Gum seyal or Acacia Gum of Senegal for each type of bread, acacia gum improved texture, increased softness in white bread after 25 days after 4 days. In addition, the addition of acacia gum also increased water retention in breads, allowing for a freshness sensation. The addition of acacia gum increased the shelf life of both loaves.

Types of breads, with a short-term conservation gain of up to 50%.

Sensory study has revealed that breads containing acacia gum are most appreciated by consumers in both white bread sandwich and gluten free bread. Breads with acacia gum received more positive feedback on taste, colour, odour and crustiness than the control sample. Depending on country regulations, the addition of acacia gum will allow the enrichment of nutritional fibre ("fibre enriched" / "fibre source"). Acacia gum is a clean label ingredient and a soluble fibre, Alland & Robert guarantees a minimum fibre content of 90%. As fibre, acacia gum offers several advantages such as:

- Resistance to acidity and heat
- No side effects, discomfort or bowel problems
- Very low glycemic index
- Scientifically recognized prebiotic effects

LEMPA1: Testing laboratory for foodstuffs

Alland & Robert, founded in 1884, is a family business based in Normandy. The company is an international leader in the gum arabic market, an all natural additive or ingredient used mainly in the agri-food industry. In 2016, Alland & Robert generated a turnover of 40 million euros, 86% worldwide in 69 countries through

37 distributors.

Pathogen elimination processes may impact spice quality

IFT Weekly April 19, 2017

A study published in the Journal of Food Science examines the effect of pathogen inactivation processes on the quality of spices and herbs.

Processing methods for spices and herbs include fumigation with ethylene oxide (EtO), irradiation, and vacuum-assisted steam. While fumigation with EtO has been shown to significantly reduce microbial populations on spices, some EtO-treated spices have been shown to undergo alterations in flavour and colour. Vacuum-assisted steam processing has been used with greater frequency due to greater consumer acceptance of this process over EtO or irradiation.

However, there may be a decrease in quality from the high temperatures typically used in this process. Finally, irradiation has been described as an effective, energy-efficient method for decontaminating spices, but higher doses of ionizing radiation have been shown to change the physical and antioxidative properties of food products. In addition, consumers have not been readily accepting of any product that has been treated with gamma rays, electron beam, and X-rays.

The researchers irradiated black peppercorn, cumin seed, oregano, and onion powder to a target dose of 8 kilograys (kGy). In addition, the researchers utilized ethylene oxide (EtO) fumigation and vacuum assisted-steam (82.22°C, 7.5 psia) on whole black peppercorns and cumin seeds. They then compared the treated and untreated spices/herbs

(visual, odour) using sensory similarity testing protocols to determine if processing altered sensory quality. In addition, analytical assessment of quality (colour, water activity, and volatile chemistry) was completed.

The researchers found that irradiation did not alter visual or odour sensory quality of black peppercorn, cumin seed, or oregano, but created differences in onion powder, which was lighter and redder in colour, and resulted in nearly complete loss of measured volatile compounds. EtO processing did not create detectable odour or appearance differences in black peppercorn; however, visual and odour sensory quality differences, supported by changes in colour (darker and more yellow) and increased concentrations of most volatiles, were detected for cumin seeds. Steam processing of black peppercorn resulted in perceptible odour differences, supported by increased concentration of monoterpane volatiles and loss of all sesquiterpenes. Meanwhile, steam processing only altered the visual appearance of cumin seeds. An important step in process validation is the verification that no effect is detectable from a sensory perspective.

The researchers concluded that "the progression of the relationship of spices and herbs beyond culinary contributions and toward developing relationships to health and wellness further establishes the importance of identifying effective processes that protect spice and herb quality."

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The researchers concluded that "the progression of the relationship of spices and herbs beyond culinary contributions and toward developing relationships to health and wellness further establishes the importance of identifying effective processes that protect spice and herb quality."

A novel form of iron for fortification of foods

Science Daily April 25, 2017

Around 1.2 billion people worldwide suffer from iron deficiency, with women worse affected than men. In Europe, one in five women around the age of 20 suffers from iron deficiency. Typical symptoms include diminished work performance, fatigue, anemia and headaches.

Boosting iron levels through the diet or supplements is tricky, as the iron must be in a form that the body is able to absorb successfully. Iron is also a trace element that can alter the colour, taste and smell of the food it is added to, making it far less appetising.

Combining protein fibres and iron nanoparticles

The two ETH professors Raffaele Mezzenga and Michael B. Zimmermann from the Department of Health Sciences and Technology have discovered a new way of fortifying food and drinks with iron: with a hybrid material made of edible whey protein nanofibrils and iron nanoparticles. The relevant study produced by Mezzenga's doctoral student Yi Shen in collaboration with Zimmermann's doctoral student Lidija Posavec has just been published in the journal Nature Nanotechnology.

The protein nanofibrils are formed by denaturing native whey protein by heating them to 90°C, and further hydrolysing them in strong acid until they form the final

protein filaments. Several protein filaments then organise themselves into thicker protein nanofibrils.

The researchers combined these nanofibrils with iron nanoparticles which can be readily absorbed by the body. To produce these nanoparticles, the researchers mixed ferric chloride (FeCl_3) directly with the protein nanofibrils in the same acid solution, creating iron nanoparticles of 20 nanometres which immediately bound to the protein nanofibrils surface and were effectively stabilised. This is a key trick, as normally iron nanoparticles are not stable: they tend to quickly clump together and form aggregates that cannot be easily mixed into foods or drinks.

Iron deficiency rapidly overcome To test the efficacy of the new iron compound, scientists administered it to rats with iron deficiency after being fed a low-iron diet. The new preparation cured the animals' iron deficiency and the associated anemia just as effectively as iron sulphate (FeSO_4), the most commonly-used iron supplement used in humans; FeSO_4 , however, often causes undesirable sensory changes in foods.

The new supplement was also easily digested. As the authors showed in an ad-hoc in-vitro experiment, the enzymes in the rats' stomachs entirely digested the whey protein nanofibrils. In addition, acid conditions like in the stomach dissolved the iron nanoparticles into iron ions, which can then be quickly absorbed into the blood and used to produce new red blood cells.

The iron-coated whey protein nanofibrils can be administered either in powder or liquid form, and the new compound can be easily added to different types of food without affecting their taste or smell or color.

No side-effects so far

To identify potential risks and side-effects, the researchers ran microscopic tests on the rats' brain, heart, kidney and other organs, after they had eaten the nanofibrils for 2 weeks. They were particularly interested in the whey protein nanofibrils, which have never been used in foods or food supplements before. From a structural point of view, these structures are similar to amyloid fibrils, which accumulate in the brain and have been linked to Alzheimer's disease, but differently from them, in the present case are made out of hydrolysed edible food proteins.

The ETH researchers therefore wanted to make sure that eventually undigested protein fibres in their iron supplement do not accumulate in the body and potentially produce tissue anomalies. "On examining the organs and tissues of the rats, we did not find any evidence of nanoparticles or nanofibrils accumulating or possibly causing organ changes," says Mezzenga. One thing he can be sure of: "Our new iron supplement has enormous potential for successfully combating iron deficiency in an economic and efficient way."

Alternative to existing products

The ingredients used to make this innovative food supplement are cheap and in plentiful supply. Whey proteins are a side-product of the dairy industry. Iron salts are also cheap and readily available. As both the process and the ingredients are easy to work with, this iron food supplement would also be a good alternative for people living in poor countries who are more prone to iron deficiency than those living in western industrialised nations.

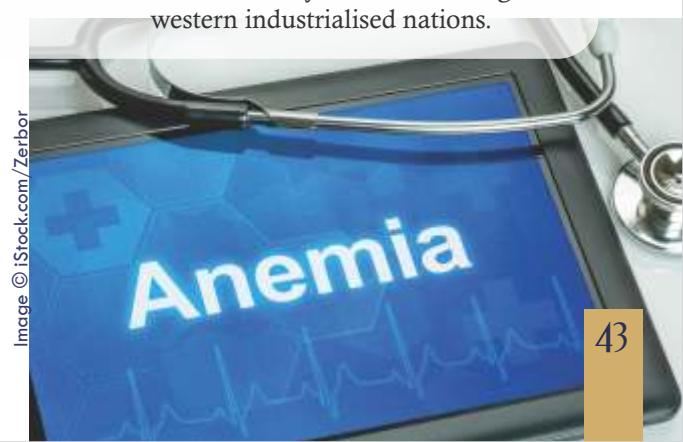


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REGULATORY NEWS

UK publishes guidelines to reduce sugar 20% by 2020

IFT Weekly April 5, 2017

Public Health England (PHE) has published the technical guidelines setting out the approaches the food industry can take to reduce the amount of sugar children consume through the everyday foods that contribute the most to intakes.

The guidelines include the recommended sugar limits for nine food groups including biscuits, breakfast cereals, and yogurt. One of the main commitments in the government's "Childhood obesity: a plan for action" was to reduce the amount of sugar contained in food. The challenge is to reduce sugar 5% by August 2017 and 20% by 2020. The guidelines offer three approaches the food industry can take to reduce sugar. They are:

- Reformulating products to lower the levels of sugar present
- Reducing the portion size, and/or the number of calories in single-serve products
- Shifting consumer purchasing towards lower or no added sugar products

PHE will judge the success of the sugar reduction program by measuring the net amount of sugar removed from key food categories. The principles are to encourage the industry to go further and faster in sugar reduction in order to improve health outcomes, but also to give it flexibility in how it meets the government's challenge. The PHE

guidelines are based on more than six months of meetings with the food industry and public health non-governmental organizations (NGOs). More than 40 meetings were held with food suppliers, manufacturers, retailers, and the foodservice sector, representing fast food, coffee shops, family restaurants, entertainment venues, and pub chains.

"This government believes in taking a common-sense approach to improving public health and that includes changing the addictive relationship our children have with sugar," said Public Health Minister Nicola Blackwood. "Many companies have already taken impressive steps to rise to this challenge but it's important that everyone steps up. We should seize this unique opportunity to be global leaders in food innovation."

Arjuna's Gut Health Herbal Blend Approved in Belgium

Nutrition Insight 06 Apr 2017

The Belgian government has granted Arjuna Natural Extracts official recognition to market its proprietary herbal blend for overall wellness in Belgium, which

would make registration and notification in all other European countries possible.



The blend, branded "Herbagut," consists of 14 herbal extracts, all approved as non-Novel Food by the European Commission and accepted for use in food supplements. The blend's key botanical ingredients include curcumin, ginger and pepper, along with other Ayurvedic ingredients. According to the botanical extracts manufacturer, these well-known medicinal herbs help allow for the use of several claims, such as for digestive health.

Herbagut is based on an all-natural extract blend based on a selection of traditional Indian herbal ingredients extracted and formulated according to an ancient Indian recipe and applied to a reliable, traceable, clean-label formulation.

Herbagut is safe to use in food supplements and can offer a range of health benefits including: improving gut microflora, mitigating constipation, relieving heartburn and other digestive health issues. A clinical study with Herbagut shows that it helps regular and easy bowel movement, significantly reduces straining during bowel evacuation and improves overall bowel health and wellbeing, the company said.

The herbal blend can be used in supplements, Benny Antony, PhD, Joint Managing Director for Arjuna, told NutritionInsight by email. "We recently developed a water dispersible grade of Herbagut which makes it possible to use this unique blend in liquid applications like shots and drinks."

Image of stamp © iStock.com/scannrail



PFNDI June 2017

**§ AS MUCH
IRON
AS IN
100g OF
SPINACH
AND MUCH
TASTIER**

15% RDA⁺⁺ OF IRON

**[^]SOURCE OF
VITAMIN A & C**

**"VITAMIN A & C HELPS IN
METABOLISM AND ABSORPTION
OF IRON"**



°ESSENTIAL NUTRIENTS FOR A RUSHED LIFESTYLE!

Mixed fruit and vegetable juice based beverage (Proprietary Food).

^aAs per Codex Alimentarius Commission Guidelines. ^bMean values of iron as per Indian Food Composition Tables. National Institute of Nutrition, ICMR (2017). Values of Spinach compared against 1 serve of beverage (200ml).

⁺⁺1 serve (200ml) of this beverage provides 15% RDA of Iron. ^{*}Dietary Guidelines for Indians, published by National Institute of Nutrition, 2011. [°]Vitamins & Minerals are essential nutrients. This Tropicana Essentials can be consumed as a part of balanced diet and healthy lifestyle. For further details, see pack.

JWT 5494.2017

"The recognition by Belgium Food and Safety authorities means acceptance throughout the EU," Antony said. "It's also a natural step in our strategy to lead the market in Indian herbal ingredients—not only regionally but also in the EU market." Arjuna Natural opened an office in Brussels last year to better serve its customers. "We have a comprehensive understanding of the complex European food regulation," Antony said. "This places us in an excellent position to offer our European customers complete commercial, technical and regulatory support."

Nutrition label readers favour food quality over quantity

Science Daily April 18, 2017

People who closely eyeball nutrition labels tend to eat differently than less-discerning diners in one key regard, according to research from a University of Illinois expert in food and nutrition policy and consumer food preferences and behaviours.

Although nutrition-label users and non-nutrition-label users eat roughly the same amount of food, the two groups diverge when it comes to the quality of the food they eat, says a new paper co-written by Brenna Ellison, a professor of agriculture and consumer economics at Illinois.

"Research has often concluded that people who use nutrition labels eat better. But we don't necessarily talk about what better means," Ellison said. "Is it eating less food, or is it

eating better food? This study looks at people's plates and considers both what they selected to eat and what they actually ate in an effort to determine which difference" -- volume or quality -- "is occurring."

To examine the relationship between label use and food selection, servings and consumption, Ellison and co-author Mary J. Christoph of the University of Minnesota combined survey and photographic data of the lunch plates of college students at two different university dining halls. Food selection, servings and consumption were assessed using digital photography, a method with strong reliability for validating portion sizes compared with weighing food and visual estimation.

"In terms of measuring and evaluating the plates, we had students who built their own plates because it was a self-serve dining environment," Ellison said. "Diners were only eligible if they were just sitting down to eat. It couldn't be someone who was halfway through their meal, which would misrepresent what they were eating and skew the results."

Based on the meals assessed, the quantity of foods served and consumed were roughly similar between the two groups. There were, however, distinct differences in the types of foods plated and consumed within MyPlate food categories between those who tended to read nutrition labels and those who didn't, the researchers found. The results indicate that a greater proportion of nutrition-label users selected more fruits, vegetables and beans, and fewer potatoes and refined grains, compared with non-label users. In addition, fewer label users selected fried foods and foods with added sugars, Ellison said.

"We find that it's more about the

types of food rather than the quantity of the food," Ellison said. "The amount of food between label users and non-label users was roughly the same amount. It's the differences in quality that are more prevalent than the sheer amount of food selected."

Using digital photography also provided a more objective assessment of food selection, servings and consumption compared with self-reporting because "you don't have to rely on students remembering how much of each food they ate," Ellison said. "That's one big advantage to this study. Another one is that diners did not interact with our data collectors until after their plate was built. So our data collection methods shouldn't have affected what they chose. For example, people weren't picking more salad because they knew there was going to be a picture taken of their plate."

Participants were further surveyed on socio-demographic and behavioural variables such as gender, body mass index, exercise frequency and nutrition education to better assess the possible link between label use and food selection, servings and consumption, according to the paper.

Examining nutrition labels is often recommended by doctors and dietitians to improve food choices, but choice does not always translate to consumption. Furthermore, evidence on the effectiveness of labels is mixed, and few studies can identify how labels actually influence behaviour, Ellison said.

"Previous research has focused on portion control for weight loss or weight management, generally eating less. But, more-recent research indicates this may not be the most effective message. By eating less, consumers may feel deprived, or even 'hangry,' which



can make it difficult to sustain long-term dietary behaviours," she said. "Newer research indicates that eating less of certain types of foods, rather than all foods, may matter more."

Although the results show label users eat differently than non-users, the implications of the research suggest there may be a need for greater consumption of fruit, vegetables, beans, whole grains and low-fat dairy among both groups.

In addition to posting labels, Ellison said dining facilities may want to increase offerings of nutrient-dense foods (whole grains and vegetables, for example) or consider product reformulations that creatively incorporate these foods to encourage healthy eating behaviours.

But Ellison warned that the study's findings should still be cautiously interpreted, as the conclusions are based on only one meal.

FDA issues GRAS no objection letter for SweeGen's Bestevia Reb-M - which starts with the leaf, then undergoes 'enzymatic conversion'

By Elaine Watson+, Food Navigator USA 24-Mar-2017

California-based SweeGen has received a GRAS no objections letter from the FDA for the use of its Bestevia branded Reb-M - manufactured from stevia leaf extracts converted to Reb M using enzymes - for use as a general purpose sweetener for food and beverage applications in the US.

The announcement follows a tie up with ingredients giant Ingredion, which recently became the exclusive global distributor of SweeGen's stevia-based sweeteners in all markets except China (where it is a

non-exclusive distributor). According to the GRAS notification (GRN 667), submitted last year by SweeGen affiliate Blue California, Bestevia Reb-M 95% is "synthesized from Stevia rebaudiana Bertoni extract by genetically modified yeast."

The 'bioconversion' process involves a "novel multi-step biosynthesis pathway process to manufacture high purity rebaudioside M (Reb-M 95%) using a strain of yeast from the Saccharomycetaceae family that contains uridine 5'- diphospho-glucuronosyltransferase enzymes that facilitate the transfer of the glucuronic acid to small molecules via glycosidic bonds."

Unlike Cargill's EverSweet product, which is made using a genetically engineered strain of yeast that converts sugars to the steviol glycosides Red D+M, the SweeGen process begins with stevia leaf extracts, and then uses enzymes from yeast to convert them to Reb M, one of the most 'sugar-like' tasting steviol glycosides (the components of the stevia leaf that make it sweet).

The notification adds: "This microorganism [the yeast] contains several enzymes that carry out multiple steps of glucose addition to naturally occurring steviol glycosides, eventually converting them to Reb M." As the yeast is not present in the final product (it is completely removed) and would serve as a processing aid, SweeGen is describing Bestevia Reb M as 'Non-GMO' on its website.

Our proprietary production pathway starts with the natural stevia leaf. SweeGen has not responded to detailed questions about the process, but the company

sent FoodNavigator-USA a statement explaining that: "Our proprietary production pathway starts with the natural stevia leaf and uses non-GMO technology. Our Bestevia Reb-M is of high purity and offers great taste while being produced cost-efficiently compared to other technologies."

Asked how end users might describe Bestevia on an ingredients list/food label, it said: "SweeGen's non-caloric Reb-M combined with its great sugar-like taste enables food and beverage companies to reduce or completely cut sugar in their products, though it is entirely our customers' decision as to when and how to announce their products that use our Bestevia Reb-M as an ingredient."

Asked who owned the intellectual property surrounding SweeGen's products, it said: "SweeGen has an exclusive license from Conagen [a corporation majority owned by SweeGen president Steven Chen] for production methods of Reb-M."

In a letter from the FDA dated February 17, 2017, the agency said it had reviewed the application and has no further questions regarding the safety of Bestevia Reb-M. "Having received the No Objection Letter from the FDA, SweeGen and our valued distribution partner Ingredion, are now able to support food and beverage companies in the United States to meet consumer demand for reduced and no sugar products made with a new, high-purity, great tasting stevia sweetener," said SweeGen president Steven Chen.



Bioconversion

According to Sweegen's website: "Our production process starts with first generation natural steviol glycosides as the substrates, we add natural enzymes to convert them into next generation sweeteners through enhanced fermentation. "The result is a natural compound (Reb-M, Reb-D or any other targeted steviol glycoside) that can be isolated and further purified for use as a sweetener in food and beverage products for the global consumer.

"The fermentation process does not change the natural molecule of the steviol glycoside and the end product can be confirmed as natural using isotopic analytical methods that can differentiate a natural ingredient from a synthetic product."

As a result, Sweegen's products "represent the next generation of stevia sweeteners," claimed Anthony DeLio, Ingredion's chief innovation officer. "Along with our current sweetener offerings, these great-tasting sweeteners give us even more options to help our customers develop on-trend products that meet consumer demands for healthier foods and beverages with less sugar."

Goat milk protein authorized for infant formulations

Food News LATAM, APRIL 04 2017

The truth is that goat's milk has 20% more calcium than cow's milk and 80% sheep's milk. The fat type also influences the best digestion, since goat milk has 50% more medium chain triglycerides (the same as virgin coconut oil) than cow's milk, and are easily assimilated.



All this would affect an optimization of fat absorption. Due to the lower levels of α -s1-casein, the size of the casein micelles in goat milk are 100-200 nm versus 60-80 nm in cow's milk. The practical consequence is a faster gastric digestion, more similar to breast milk, favouring gastric emptying.

These triglycerides are also a great source of energy because they stimulate metabolism and also reduce the size of our body's fat cells as well as cholesterol levels. It is a milk very similar to human milk, which makes it ideal for baby formula in case you have to replace breast milk. Directive 2013/46 / EU, and subsequently Regulation 2016/127 / EU, have authorized goat milk protein as a source for infant formulas.

Capricare is the first baby milk made from whole goat milk backed by scientific studies created by the New Zealand company DGC Dairy Goat Co-operative. Capricare is a baby milk that offers different advantages over other formula milks and has the approval of the European Food Safety Authority (EFSA) to meet all European requirements to ensure a complete and optimal development of the baby. Capricare is currently available in pharmacies.

The process of elaboration of this formula is different from the one usually used for formulas based on cow's milk, which has repercussions on its composition. The lipid content maintains 55% of the animal fat, with 14% of palmitic acid, 31% of this in position β -monoglyceride. It also contains 6.5% MCT. The amount of free inorganic calcium is only 20%, since the rest is bound to casein.

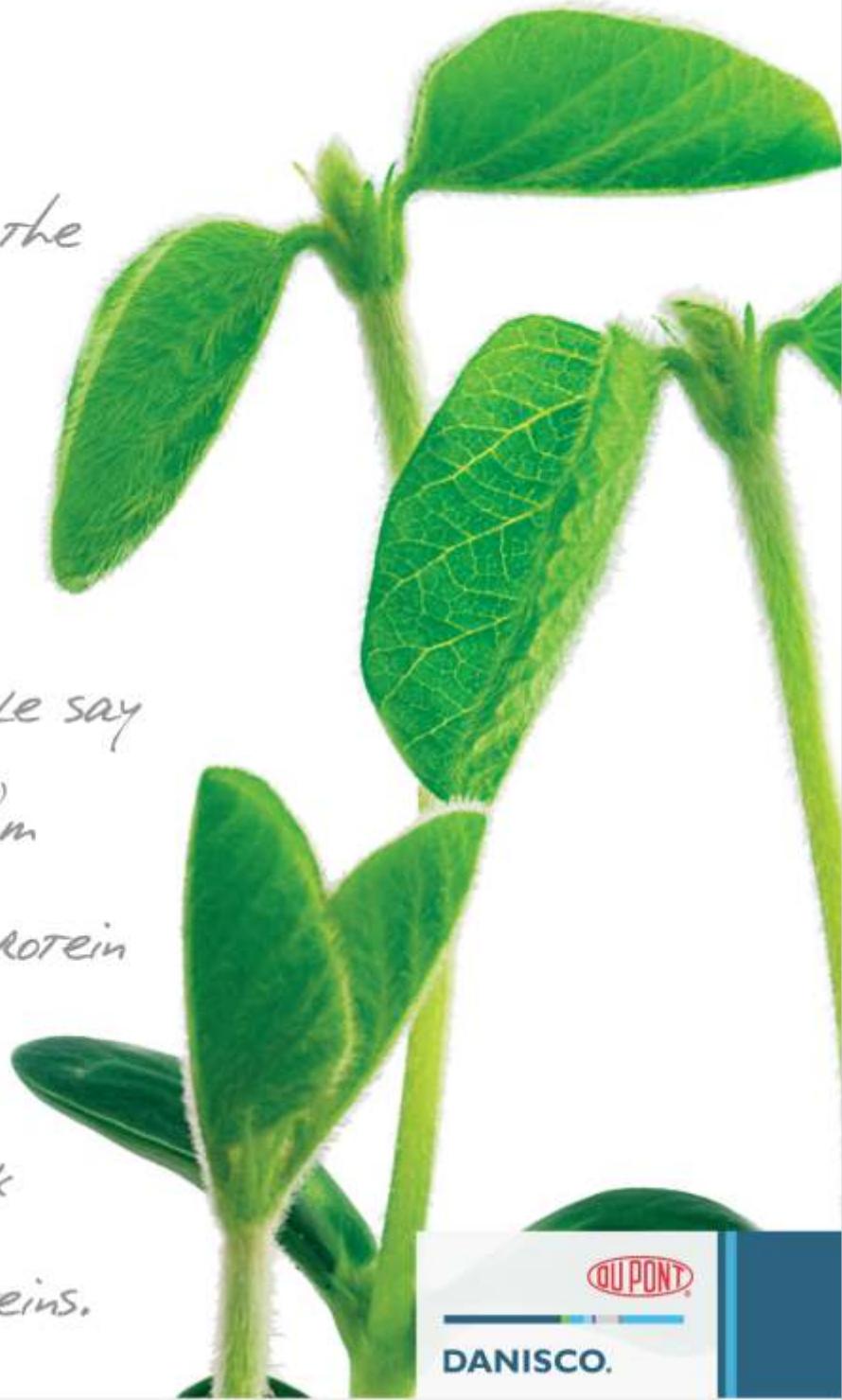
Goat's milk has an apocrine secretion process that naturally releases cellular components, such as nucleotides, taurine, polyamines and free amino acids. It contains oligosaccharides, many of which are structurally similar to the oligosaccharides in human milk. In view of the characteristics of this goat formula, there is no doubt that it could have its positioning in the diet of the infants with the so-called "intestinal discomfort", or as a natural alternative of nutrition of the healthy infant. Future clinical studies will be necessary to corroborate this positioning (AU).



Image © iStock.com/claraveritas

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My friends say I'm the complete package: high quality protein, plant based and economical. But people say my best quality is I'm versatile - I can protein fortify practically anything and I work well with other proteins.



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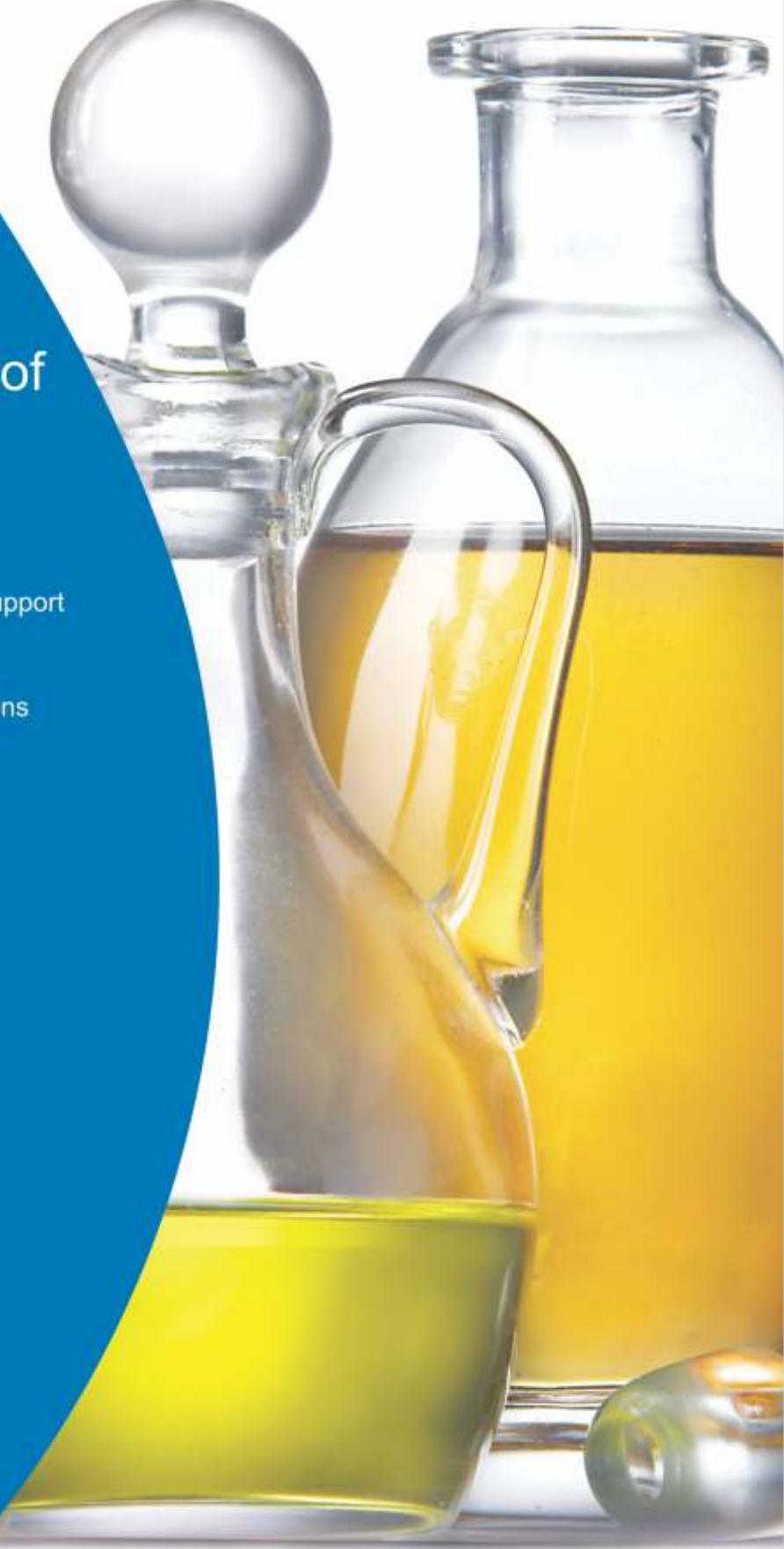
B2 – 207, Kanakia Boomerang, Chandivali Farm Road,

Near Chandivali Studio, Andheri (E), Mumbai - 400072

Ph.: 62110191 | Fax: 022 - 28478805

E-mail : sales.in@aakkamani.com | www.aakkamani.com

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