OCT 2016 **PENDAI PENDAI Bulletin** FOOD, NUTRITION & SAFETY MAGAZINE

# PALATABLE PROTEINS For COMPLEX PALATES

**Microbiological Evaluation:** A Key To Food Safety

PROTEIN FOODS AND NUTRITION DEVELOPMENT ASSOCIATION OF INDIA Texturizers Build Better Food Products

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COVER STORY 3	INDEXEditorial2Palatable Proteins for3Complex Palates
SPONSORS	Coming Events 7
British Biologicals, Food Ingredient Specialities, E.I. DuPont India,	Microbiological Evaluation:8A Key To Food Safety8Texturizers Build Better12Food Products12
ITC,	Brief Report of AGM 2016 16
Unipektin,	Research in Health & Nutrition 17
Marico,	Food Science and Industry News 31
Advanced Enzymes, AAK Kamani Oils,	Regulatory & Safety News
Hardcastle Restaurants &	Health Infosules 44
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# EDITORIA



Everyone knows the Parsi dish dhansak, which is made of many vegetables and a few dals with mutton and served with rice. It is made with many different vegetables such as potatoes, tomatoes, brinjal, pumpkin, fenugreek leaves etc. with small quantities of each.

For this the Parsi lady would go shopping for small amounts of these vegetables which the vendors would only oblige these ladies. If other ladies go to buy these, they had to purchase at least <sup>1</sup>/<sub>4</sub> kg or more.

So if a non-Parsi lady wants to prepare dhansak, she will have to cook a lot of it or large amounts of vegetables would go waste. Each one would be needed just 25g or 50g at the most. So wouldn't it be wonderful if someone packed all these ingredients together in small quantities and sold it together. That is the idea of a meal kit.

Meal kits started becoming popular a few years ago. After the success of noodles where one could prepare a meal in a short time using some of your own ingredients along with the noodles and spices supplied by the company, some people thought why not supply all the ingredients needed for making some well-known recipes such as tikka masala or vindaloo to NRIs in the US or UK with instructions so they can cook their own meals. It is very difficult to find all Indian ingredients including spices and that too in just small quantities necessary for just one meal.

Although a small market at present but fast growing because young people would love to experiment with cooking rather than eat restaurant food or ready-toeat packaged food. Also the ingredients were claimed to be genuine so there is no need to substitute with something that may change the taste.

Now for past couple of years Indian markets are seeing some of these. Authentic Indian cuisines may not be such a novelty here, although there are a few traditional recipes like thalipeeth, poha or kadhai paneer but many exotic recipes are available such as cheesecake truffle, risotto, Thai soup and Tsing Hoi noodles.

It would be very difficult to find the ingredients in the markets and even when one finds them they will not be available for just one meal. When you buy more, you may not want to cook for some time so wasting them. These meal kits become quite useful when you get authentic ingredients along with the authentic tested recipe and instructions how to prepare them.

Although some of these would have ingredients that are staples and can be stored in supermarkets and at homes for quite some time but some would be having fresh vegetables and meat, which will only be available upon order and will be delivered home.

Young Indians especially living in cities away from families would sometimes prefer to prepare these meals available in kits. Even the families sometimes rather than spend a lot of time shopping for ingredients could order kits and many would be finished as per their marketers within half an hour to forty five minutes. They also say these meals are very healthy and nutritious.

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

# PALATABLE PROTEINS FOR COMPLEX PALATES

As demand for protein increases due to increasing population and as people start consuming more proteins, it is time to look for newer alternatives. People are also becoming vegetarian or vegan. Some avoid certain foods that trigger allergic reactions. In the US, there are 5% vegetarians, about 2% vegans and roughly 15 million have food allergies. The incidence of food allergies is increasing and will continue to escalate. There is also consumer awareness about positive effects of plant foods on health as well as their concern for environ and sustainability. People want plant based diets. Protein sources from plant sources and free from allergens are growing in markets and they may constitute half of alternative protein market by 2050s. Algae-derived and novel plant-based proteins are viable alternatives to protein foods that vegetarians, vegans and consumers with allergy cannot or will not eat.

#### Algae-Derived Protein

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Fish and other seafood are excellent sources of protein and other essential nutrients but many forms of algae are also good sources of proteins. They are marine plants containing chlorophyll and other pigments and using solar energy can convert CO2 into their food. They are responsible for half of photosynthesis occurring on Earth. There are macro and microalgae. Macroalgae are seaweeds like kelp and other multicellular algae growing in oceans as well as lakes, rivers and ponds. They are visible to eye and grouped into brown, red and green algae. Microalgae are single-cell organisms and can only be seen with microscope. What we see as clumps are composed of millions of cells bunched together.

Macro- & microalgae are nutrientdense with differing amounts of vitamins A, C, E, folate and others, calcium, iodine, iron and other minerals and trace minerals, omega-3 fatty acids and other lipids along with carbohydrates and proteins. Protein content of seaweeds can range from 3 to 50% whereas in microalgae it can go up to 70%.

#### Super Seaweeds

Among seaweeds, red seaweeds tend to have higher protein content, with species Porphyra among them known as laver or nori is highest with 50% protein which is more than in wheat germ or sunflower seeds. Nori has amino acid profile similar to peas or beans. It also has high amount of omega-3 fatty acid eicosapentaenoic acid (EPA) and is a good source of B12, which is rare for food that is not from animal.

Commonly used to wrap sushi rolls, dried nori is sold in sheets that can either be cut into strips to wrap rice and fish or cut into small pieces to sprinkle onto soups and noodle dishes. Nori is very popular in Asian countries, particularly Japan, so production is abundant. Some American companies have been making nori products such as dried nori, mild and sweet snack of toasted nori, brown rice crackers wrapped with strip of nori and others.

Another good source of protein is red seaweed species Palmaria palmata known as dulse which contain up to 25% protein besides vitamins A, B1, B2, B3, B5, B6, C and D and minerals iodine, iron, magnesium and potassium and unusually high concentration of EPA (nearly 60% of total fatty acids). In Iceland, dulce is consumed in dried form as a snack and added to salads, bread dough and curds. In Nova Scotia, Canada, dulce is used to make sea parsley sprinkled on dishes as a substitute for salt and to add a salty sea flavour. In Wales, it is used to make laverbread, a puree served with toast, bacon and shellfish or rolled in oatmeal and fried in bacon fat.



Research and innovation is allowing more products made with dulce to be developed and marketed. A patented strain of dulce became news due to its ability to mimic flavour of bacon when deep fried. A number of projects are underway to boost growth and harvest of both dulce and laver along Ireland's coasts and make products with health benefits. Proteins in Palmaria and Porphyra seaweeds may be as effective as medication in reducing high blood pressure and the risk of stroke and heart attack but without side effects. Some benefits of red seaweeds have been highlighted as "[Palmaria palmate] protein hydrolysates generated using enzymes have potential for use as functional food ingredients for prevention of diabetes and obesity."

#### Tiny Algae Have Huge Capacity

Concept of using microalgae for human food is fairly new to Westerners, but Asian cultures have been using microalgae as food source for hundreds of years. There are hundreds of thousands of microalgae species (most still unidentified and unexplored). They constitute the base of the oceanic food chain, serving as food for smaller aquatic organisms that are eaten by larger organisms; that is how large predator fish have DHA and EPA. Some are used as nutritional supplements because they are rich sources of DHA and EPA as well as vitamins, minerals and antioxidants. Through their use as nutrient supplements some

companies have begun using them as food and food ingredients.

Microalgae generating a lot of interest for food and human nutrition are Dunaliella, Chlorella and Arthrospira (technically a type of cyanobacteria). Dunaliella are saltwater green microalgae with protein content of up to 50% on dry basis. One of the richest sources of beta carotene it is predominantly sold as powder to be mixed into beverages. Chlorella are freshwater green microalgae with protein contents up to 60% on dry basis. These are commonly made into tablets or powders which could be added to sauces, smoothies, soups and beverages. Arthrospira (also called Spirulina) are blue-green algae growing naturally in salty lakes and ponds. They have up to 70% protein. Typically they are made into tablets, capsules, powders and liquid extracts and also have been used as ingredients in some food products.

Human food and food ingredients made using microalgae are not many, so there is scope for new ideas. One Korean company made Chlorella Cup Noodles and Green Tea Chlorella Noodles. A Malaysian company made Vitame Organic Spirulina Noodles and an Italian company used Spirulina to make pastas and protein bars. An American company make organic cold-pressed Daily Green Hemp Milk containing blue-green algae Aphanizomenon flos-aquae. Thus developments are still in early stages. The reason may be that incorporating microalgal protein into palatable foods on a large scale is challenging. These products may have a fishy odour or aftertaste as well as a green hue. There is also a possibility of contamination as these are grown in open-pond system. Using photobioreactors is expensive. One company seems to

have overcome these problems.

An American biotechnology company which originally produced high-performance biofuels using microalgae, realised that biofuels is only part of microalgae's potential. After screening over 100,000 strains of microalgae, one was selected for food ingredients. This natural strain of Chlorella originally from Netherlands grows in stainless steel fermentation tanks. After processing it produces fine microalgae powder that yields two products: whole algae flour containing lipids which can serve as replacement for dairy fats, oils and egg yolks and whole algae protein, a powder that also contains fibre, monounsaturated fats and micronutrients. This powder is supposed to contain all essential amino acids with a protein content of 63%. This protein has a complete amino acid profile with 88% digestibility and does not interact with other ingredients or precipitate in a formulation. It delivers a vegan protein along with rich collection of dietary fibre, healthy lipids and micronutrients such as lutein and zeaxanthin.

#### **Plant-based Protein**

Algae-derived proteins are gaining ground but they have a long way to go to reach the use, consumption and applications of plant-based proteins. Duckweeds, floating freely on surfaces of marshes, ponds and lakes, may resemble algal bloom, but they are not microalgae. They are the smallest flowering plants having neither stems nor leaves but have round or slightly oval-shaped bodies and small root-like







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NATURAL GRAIN MIX -**ENSURES** LOW GLYCEMIC INDEX



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### COVER STORY

structures. They also grow rapidly especially in still or slow-moving waters having high levels of nitrogen and phosphorus. They photosynthesise, making them beneficial to environment and are sources of vitamins, minerals, trace elements and proteins. Their protein content is up to 45%. Although they are considered as food for birds and fish, people in Laos, Thailand, Vietnam and parts of Africa have been consuming duckweeds for centuries.

Two types of duckweed can be excellent plant based sources of protein for humans. One is a protein concentrate prepared from water lentils, member of duckweed family. It is a fine, free-flowing green powder that can be added to chips, crackers, bars and cereals clusters. It can also be blended into sports drinks and meal-replacement shakes. It is marketed as free of allergens associated with soy, nuts and dairy.

Another duckweed product is made by Israeli company. It is available fresh or as dry whole-food powder and can be used in bakery products, health bars, pasta, shakes and smoothies or can be sprinkled on salads.

#### Protein with a Pulse

Legumes contain edible seeds enclosed in a pod and pulse is part of legume family but refers to only dried seed. All pulses are legumes but not all legumes are considered pulse e.g. peanut and soybean. Although legumes are referred to as vegetables but botanically they are fruits. Regardless of category, legumes are very nutritious foods. They are rich sources of fibre, vitamins (especially folate and other B-vitamins), calcium and other minerals, polyphenols and other beneficial phytochemicals and high quality protein. Legumes have 20-40% proteins, which are gluten-free and most are allergen-free (exceptions peanuts and sovbeans). Legumes also have the health benefits of lowering disease risks of certain cancers. cardiovascular disease and diabetes.

Despite their excellent nutrition profile and health benefits, global consumption of legumes has been declining and is possibly due to increased consumption of meat. However, for vegans and vegetarians the legume consumption remains significant. More consumers are embracing plant-based foods keeping the demand for high-protein vegetarian and vegan products increasing. Overwhelming majority of R&D food professionals predict increase in products using pea protein and other legume products. Market of pea protein is expected to touch around \$35 million by 2020.

Some of the legumes can be processed into flour, flakes, starches, pastes and protein concentrates. They are used to enrich protein content of many foods. Yellow peas are converted to pea protein isolate for use in baked goods, beverages, dressings, nutrition bars, pasta, sauces and snack foods. One company is exploring the possibility of offering pea protein isolates and concentrates to meet demands for functional protein from alternative sources.

Another ingredient manufacturer uses black beans, fava beans, garbanzo beans (Bengal gram) and white beans to make flours, which are marketed for thickening soups and sauces, augmenting flavour of dips and taco/burrito fillings, and replacing part of wheat flour in some baked goods. Beans are also used in making pasta e.g. organic bean spaghetti. Another company uses white beans, black beans and pinto beans to make snacks like chips.

#### Grainy, Seedy Protein

Most legumes and other plant-based proteins are not complete as they lack one or more essential amino acids. Pairing certain plant-based foods with others called protein complementation can provide missing amino acids. For beans, peas, lentils and other legumes, nuts are complementary. However, tree nuts can be allergic. Grains and seeds are also protein options that are complementary. Among grains, amaranth, wild rice, buckwheat and quinoa have higher protein contents. Among seeds, hemp, pumpkin, flax and sunflower have high levels of proteins.

One grain-based product made for vegans and vegetarians is seitan which is meat substitute made from gluten and grain spelt. Seitan can mimic taste of steak, chicken, pork or sausage and contains 20g protein per portion of 85g. Companies are offering several spicy and other types of seitan including chicken, bacon, and Chipotle style and curry style seitan.



6

### COVER STORY

Hemp seeds are becoming popular among vegetarians. They contain 10g protein per two tablespoon serving along with vitamins, minerals and omega 3. They could be eaten raw, ground into meal and baked into cereals and baked goods or added to shakes and smoothies, or used to make milks and butters. Hemp milks of different flavours including chocolate and vanilla are marketed.

Although proteins are essential for survival and health, some proteins cause food allergies. Some proteins especially animal-derived proteins take toll on the environment, depleting land, water and energy resources. Hence, more people are motivated to consume less meat and animal products or none at all. Vegetarians and vegans as well as those with food allergies to common sources of proteins, may have difficulty getting enough protein of high quality. Seaweed, microalgae, duckweed, legumes, whole grains and seeds may be part of the solution.

#### **Guilt-free Animal Protein**

Eating plant foods is for a variety of reasons including managing weight and health, environmental and preventing cruelty to animals. A survey shows that overwhelming majority revert to eating meat eventually and a sizeable percentage of those feel guilty about it. There are some animal based proteins that could be eaten without feeling guilty.

Eggs: These are compact, highly nutritious form of animal protein obtained without butchering and are environment friendly. Eggs contain all B-complex vitamins and all essential amino acids making up complete protein. Large egg has 7g protein. Also eggs provide iodine, choline and vitamin D missing in many foods. They have antioxidants lutein and zeaxanthin which help prevent macular degeneration. Some still object to chickens being raised in cage systems. Now cagefree or free-range eggs are available. Some companies have committed to using only cage-free eggs in their products within 5 to 10 years.

Insects: There are over 1,900 edible insects on Earth and about 2 billion people around the world eat them. They contain protein, fibre, vitamins and minerals, however, nutritive values of edible insects are highly variable as it varies with their species, size, habitat and diet. Raising edible insects needs far less land than raising cattle, chickens and pigs. They also need 6 times less feed than cattle and 2 times less feed than pigs and chickens to produce same amount of protein. Moreover they produce far less greenhouse gases. However, consumers are resistant to



consuming them. Restaurants prepare grasshopper dishes. Insect flours and protein powders as well as bars and baked goods from these are available.

Cultured Meat: This would reduce the amount of land, energy and water used to produce meat. People shunning meat for environmental reasons would be happy about it. First hamburger made with meat grown in vitro was in August 2013 by a professor at Maastricht University. They created cultured meat by removing stem cells from a living animal's skeletal muscle tissue and growing cells into muscle tissue in an artificial environment. In the US also meatballs were made using lab-grown cells. Various products including pork and chicken is expected to be marketed in 5 years.

(Condensed from articles by **Toni Tarver** in **Food Technology** *March 2016*)

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# MICROBIOLOGICAL EVALUATION: A KEY TO FOOD SAFETY



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Food safety is a matter of concern for all of us. Unsafe food has been a human health problem historically and many food safety problems encountered today are not new.

Although governments all over the world are doing their best to improve the safety of the food supply, the occurrence of food borne diseases remains a significant health issue in both developed and developing countries. World Health Organisation (WHO) first ever

estimates of the global burden of food borne diseases in 2015 shows almost 1 in 10 or as many as 600 million people fall ill every year from eating contaminated food and 420 000 die as a result. Children under 5 years of age are at particularly high risk, with 125 000 children dving from food borne diseases every year. As per WHO, African and South-East Asia Regions have the highest burden of food borne diseases. In order to meet

the challenges of food safety, associated dynamics have to be understood clearly and addressed with equal fervor by the scientific community existing in academics, research institutions, industries and regulatory bodies.

#### How safe is your food?

Safe food is food that is free not only from toxins, pesticides, chemicals and physical contaminants, but also from microbiological pathogens such as bacteria, parasites, and viruses that can cause illness. Food borne diseases can cause short-term symptoms, such as nausea,



vomiting and diarrhea, abdominal pain, fever, headache, and can also cause longer-term illnesses, such as cancer, kidney or liver failure, brain and neural disorders [Food borne Infections and Intoxication, 4th edition by Glenn J. Morris and Morris Potter.2013. Academic Press: London, UK]. Favorable environment for disease transmission and high density of live-stock and its proximity to human population are some of the factors leading to the food contamination.

## Microbial safety...a BIG challenge!

General parameters for testing of food articles include chemical and biological testing. Chemicals can disturb normal functioning of the body metabolism and accumulate in the body over a period of time, causing severe toxicity. Thus it is important for food industry to ensure that their products are free from toxic chemicals. Chemical and physio-chemical parameters once controlled in food products, remain unchanged.

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Microbiological Evaluation: A Key To Food Safety



Concerns pertaining to microbiological safety for foods are different from chemical contamination, with bigger challenges. This is because microorganisms may lead to food loss due to its spoilage and can cause a variety of foodborne illnesses. In addition, microbes are more ubiquitous, non-uniform in distribution and like all other living beings has specific nutrient requirements which help them to multiply, mutate, adapt and release toxins. These single celled microbes reproduce by splitting in two often very rapidly (less than 30 min in many cases) and under right conditions of warmth, pH and moisture they can produce millions of cells in a few hours. Some bacteria form spores which are resistant to drying and heating, and can survive cooking and will start to grow again under favorable conditions. Thus, unlike chemical contaminants which remain at stable concentration after they are introduced in the foods: microbes are extremely dynamic with full potential to increase in number, therefore not only their detection and estimation are necessary, their control during and post manufacturing, transport, storage at both retail and consumer levels have to be monitored.

#### Approaches to Microbiological Control in Foods

• Processing Goals for Industries: Food industry personnel should setup processing goalsapplying the understanding of microbial occurrence, their types and behavior applicable to the foods being produced by them. Includingthe right choice of test cultures, will not only aid in defining the shelf-life of foods, it will also help in assessing pathogen behavior, ensuring consumer safety.

· Inspection of Facilities and Operations: Inspections of facilities and operations are commonly used to evaluate adherence to good handling practices. This can be achieved through periodic inspection of facilities and operations. Besides different stakeholders of the society, welltrained, knowledgeable personnel are required for identifying microbial risk in different foods, especially the indigenous ones and setting appropriate sciencebasedlegislationsguaranteeing national food safety norms that are neither too restrictive, nor too relaxed.

• Set Surveillance System for

foodborne outbreaks (CDC model):One could look at the CDC (Centers for Disease Control and Prevention) model, take their assistance or collaborate to set systems similar to FoodNet which is associated with active surveillance and PulseNet which identifies cause and epidemiological spread of the microbe using molecular fingerprinting.

• Education, Training Programs and Research: Training can be held by

creating centers for excellence at colleges and universitiesusing globally accepted quality management systems. Special training on Microbiological Risk Assessment, sample processing of indigenous foods and methods used for evaluating

accuracy are needs of the hour. Learning from Healthcare/ diagnostics industryshould be explored for microbial evaluation of foodsespecially for rapid and sensitive method. These programs will help in developing an understandingthe causes and consequences of microbial contamination and of measures toprevent contamination and subsequent growth, particularly those affecting Indian foods. Advanced processing techniques that can control spoilage and pathogenic microorganism by modified product formulation, packaging technologies and storage conditions can be employed. Rapid method for Hygiene & Spoilage Indicators detectors can be developed. Molecular technologies like Metagenomics will help us identify those microbes which are not easily detected by cultivation methods, including the foodborne viruses and parasites besides unknown bacteria..

## What is Microbial Risk Assessment (MRA)?

• MRA is the formal, scientifically based process to estimate the likelihood (probability) of exposure to a microbial hazard and the resulting public health (and/or environmental) impact from this exposure.

• Components necessary for successfully conducting a risk assessment, quantitative or qualitative, includes: a) Planning and scoping, including problem formulation, b) Hazard identification, c) Hazard characterization, d) Dose response assessment, e) Exposure assessment, and f) Risk characterization.

• The information generated through conducting a risk assessment are analyzed by statistical tools; and thesecan assist government and regulatory bodies in their role of setting national policies, criteria or providing public health advice, and also assist industry in their ambition to design innovative yet safe foods for consumers.

#### Quantitative microbial Risk

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Assessment (QMRA) tool: Basic surveillance mechanisms and reporting of outbreaks have to be modified with quantification and management systems to close the Indian food industry structure is unique in distribution of organized, unorganized and small scale industry distribution. Lack of sound guiding principles for the

reduce infections and outbreak incidences QMRA tool will help to identify hazards, assess the risks and exposure. governing risk communication and management strategies. This approach gets strengthened if microbiologists, epidemiologists, mathematicians and government agencies work in tandem.

loop and to

• Publication: As India has huge variety of foods, publication of data generated from above exercise will help all stakeholders related food safety. establishment of microbiological criteria has, at least in part, been responsible for the large number of standards and guidelines that are impractical, unenforceable, and without uniformity.

This puts a burden on the food industry, give a false sense of security to the public and lessen confidence in the ability of government agencies to regulate the food supply.

We not only need to take cognizant of distribution, but also our indigenous foods, our environmental, economic and geographical conditions to achieve the food safety goals. We also need to define our own methods particularly for our foods (fermented, sweet meats) in term of sample processing, hazards and specifications to ensure a realistic change in the food safety scenario.

The traditional mechanism of surveillance food quality and reporting food-borne illnesses in our country perhaps is not adequate in times of globalization, massive technology and platform changing events across industries; and as a country we need to address this challenge for providing safer food in plates of consumers and increasing export potential of our industries.

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# TEXTURIZERS BUILD BETTER FOOD PRODUCTS

It is very important to give attention to texture during product development as it plays a vital role in overall eating and drinking experience. It often determines consumers' first and often a lasting impression of food and beverage.

Food manufacturers are emphasising texture messaging on food packages to entice consumers to buy their products. Innova Market Insights survey shows a significant increase in front-ofpackage texture claims between 2011 and 2015 in Europe, the Middle East, Latin America and North America. Creative language is used to communicate texture messages including "crunchy", "creamy", "thinly cut", "smooth", "crispy", "super moist", "ooey gooey chocolatey chewy" and "oh so creamy".

Crunchiness of chips, chewiness of soft candies, creaminess of sour cream and much more is improving because of advances in ingredients. Starches, gums and emulsifiers play specific roles in developing and enhancing textures of all types – crunchy, crispy, chewy, gummy, thick and creamy.

Also some of these ingredients also help food and beverages tolerate rigors of processing, transport, and storage by creating structure, reducing syneresis, providing freeze/thaw stability, suspending ingredients in solution and preventing drying out of foods to name a few.

#### Texture Knowledge Fuels Innovation

Perception of texture is quite complex. It occurs when food in placed in mouth. Texture is perceived by all the senses. We can feel if a product is dry, moist, tender etc. by just looking at it. How a product sounds also helps in texture perception. It is very important that the texture experience of food must remain consistent over the shelf life.

Simple changes in texture of a product can be quite impactful turning a product that would appeal a wide range of consumers. There are two ways of achieving this. One is developing products from scratch and the other is through developmental process changing existing product may be quicker.

In dairy, for example, there are many untapped opportunities to diversity consumer appeal of traditional products. Slight change in texture of flavoured milk by lowering mouth coating, faster mouth clearing and reduced cohesion combined with refreshing banana or vanilla flavour instead of chocolate makes it appealing as exercise recovery beverage. Increased mouth coating, slower mouth clearing and more indulgent flavour like chocolate truffle fudge, will give a dessert alternative for adults.

Developers need to find out what attributes are responsible for perceived mouthfeel of a product to develop a targeted texture. Scientists use comprehensive list of textural attributes and descriptors called Texture Lexicon for assessing textural components of foods and beverages. This translates consumer terms like 'creamy' into basic texture attributes like mouth coating, viscosity and awareness of particulates. With basic texture attributes established, specific texture and stability can be assessed using various hydrocolloids.

Scientists have been working with many texture ingredients from starches to soy proteins for texture solutions in foods and beverages. Switching starches with such hydrocolloids as alginates, pectin, xanthan gum, carrageenan and galactomannan etc. can produce a range of textures. Pectin provides cleaner bite and clarity of flavour while carrageenan adds chewiness to some candies.

Some textures that are indulgent, crunchy and chewy are quite popular globally. There is interest in layering textures. Preferences differ from market to market. Some textures unique in certain cuisines, so persons unfamiliar with it would find it difficult to appreciate it.





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VIDOCREM	viscosity reduced guar gum
VIDOGUM GI	guar gum / organic quality
VIDOGUM SP	standard tara gum
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All product names are trademarks used by UNIPEKTIN Ingredients throughout the world Yogurt is found in many global cuisines but texture varies widely. Differences in viscosity, heaviness, firmness, aeration and sheen/shine contribute to regional textures. Analysis of these attributes may be helpful for developers understand requirements of some global markets.

Making simple adjustments in usage levels of gums and other texture ingredients developers can create different textures such as a drinkable-style or thick spoonable yogurt popular in many countries. Indulgent textures are important in the US where consumers prefer creamy textures and thicker mouthfeel. Consumers in many Asian countries prefer thinner consistency, almost drinkable. Europeans prefer full-fat yogurt with slightly thin consistency. Fatreduced yogurt has become popular in overall diary health and wellness segment in Europe. Modified starch, n-octenyl-succinylated starch is claimed to allow 50% fat reduction with little impact on taste, shine and mouthfeel of yogurt. Hydroxypropyl starches do not provide the same shine when it replaces fat.

Some of the ingredients with hydrocolloid blends help improve texture and stability of ready-todrink protein beverages. They suspend protein and vitamin/mineral blends in higher protein beverages with/without affecting viscosity. Higher viscosity is desired when more indulgent drink that is not water or gritty is needed.

## Influencing the Eating Experience

Texture is multi-dimensional part of the entire eating experience which greatly influences consumer product choices and enjoyment. Crispness, crunchiness, creaminess, chewiness are all experiences that can be affected by texturisers. Application experts of texture-ingredients company can help with their experience and suggest applications.

Although it is known that consumers have preferences for certain textures but little is known about what drives these preferences. It may be because people have low texture awareness and limited ability to verbalise texture characteristics. Texture experts can get better understanding by examining eating experience through consumer mouth behaviour. It is known that distinctive crunch means 'fresh' to a cruncher and decadent creaminess feels like 'comfort' to some. These insights could be used to target the final products to the exact way consumers prefer to eat.

As scientists learn more about texture preferences and their drivers, they develop new and improved ingredients to provide textural enhancements. Consumers enjoy snacks globally, with textures from tender, delicate crispy textures to snapping or shattering crunchy as well as in between a new region called 'crinchy'.

Cheese is another popular category globally which also comes in a variety of textures. Other important qualities are melting characteristics and how easily it shreds. With hydrocolloid systems one can improve emulsification and waterholding capacity to achieve preefficiencies and reduce product defects.

Textures are important in beverages also. Carrageenan provides unique textures in beverages. One innovation gives a new twist on alcoholic beverages which is becoming very popular in many regions.

Although there are large numbers of different types of ingredients for texture improvement are available, starches are still the most popular. They have a key role in building texture if fat and sugar are reduced or eliminated, transforming the texture into a whole new experience or simply cleans up the label. Starches are also most versatile and affordable texturisers available.

#### Emulsifiers for Margarine, Chocolate

One company has developed emulsifiers for a range of applications. One of the important applications is for margarine. There are many emulsifiers depending on the applications e.g. frying margarines, table margarines, spreads, bakery margarines and shortening. Newer applications are in liquid margarine and the ingredient used is a combination of mono-diglycerides of vegetable fatty acids and citric acid esters of vegetable fatty acids. Combining these two gives emulsifying and crystallising properties for liquid margarine as well as excellent frying and anti-spattering results in frying applications and anti-staling effects in dough systems.

For chocolate manufacturers, an ammonium phosphatide, as an alternative to lecithin has been introduced. It combines refined and deodourised sunflower oil and glycerine. The ingredient can offer several benefits such as viscosity control and cost savings. Using as little as 40% of normally required amount of lecithin reduced the plastic viscosity and yield value of chocolate. Also it also saves cocoa

mage © iStock.com/prudkov

butter additions to chocolate so further savings. It also has neutral taste and odour in chocolate including chocolate with low cocoa solids contents, white chocolate and white confectionery spreads.

Several activated cake emulsifiers have been developed to improve stability and quality of cake. Newer applications are for sugar-free and gluten-free devil's food cake mix. The cake produced is moist, with stable structure and no trans fat. The mix is a blend of polyglycerol esters, monoglycerides and diglycerides combined with rice starch in an extrusion process to produce a free-flowing off-while powder. It has high tolerance to ingredients like egg powder, cocoa and oil.

#### Ingredients Target Stability Challenges

Every product category has some texture and stability problems. A line of stabilisers based on hydrocolloid blends, agglomerated hydrocolloid phosphate blends and others provides stabilisation control, texture enhancement, moisture control and improved process tolerance. These stabilisers could be used for dairy beverage applications for UHT processing, for whey proteins, as well as for giving creamy consistency to liqueur and combination of ingredients to bind all ingredients together and create a desired texture as well. Developers may use soy protein as texturiser, but other plant proteins are being used as well.

One calcium-phosphate based hydrocolloid ingredient functioned as dough conditioner to help stabilise gluten network to provide volume and density to a French baked savoury choux pastry made with cheese and without eggs. It also functioned similarly for eggfree chocolate muffin to produce soft and tender crumb.

#### **Keeping Crust Crispy**

The fried chicken should be crispy and crunchy on outside and juicy inside. When batter or breading fails to adhere to chicken before or during frying, proper curst is not formed, allowing moisture to migrate causing dry chicken and soggy crust. Customised ingredient system with emulsifiers, gums and other hydrocolloids, and starches has been developed which prevents breading fall-off on fried chicken and other fried products including cutlets nuggets fish and seafood as

Percentage of product launches tracked with a texture claim front-of-pack

well as vegetables like onions, eggplant and pickles. The product helps maintain crispiness in fried foods that are microwaved from frozen, reheated in microwave or kept under heat lamps. It even works upon cooling during transport in take-out applications.

## Enhancing Confections with Gelatine Systems

Combination of different gelatines and pectin can be used for confectionery products. One gelling and foaming agent work well for acid marshmallows. Gelatine by itself may not work well to release flavour and provide stability in acid marshmallows. These also work well with low-pH confection like gummies in warm climate. There are combinations that are suitable for neutral pH also. Another formulation is suitable for use in oilin-water emulsions like sauces, dressings, and spreads and in meat applications.

(Condensed

Technology

February

2016)

in Food

from article by

Karen Nachay

help increase product shelf life.

Vegetarian simulated meat products need



2011-H1 2015-H1 Growth in launches +54% +463% +70% +74% +81% tracked 6% 5.3% 5% 4.2% % of product launches 4.0% 4% 3.5% 3.4% 3.2% 3% 2.5% 2.4% 1.8% 2% 10 1% 0% Middle East East Europe Latin America North America West Europe

Figure 1. An analysis of products lounched from the first half of 2011 to the first half of 2015 found an increase in the number of products that make a front-of-pack texture claim. Source: Innove Warket Insights



m/MielPhotos2008

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## BRIEF REPORT OF AGM 2016

The AGM was held in Hotel VITS at Andheri Mumbai on Friday 14th October 2016.

Chairman Mr. Bhupinder Singh welcomed the members and requested the Executive Director Dr. Pai to start the proceedings. Dr. Pai gave a report of Association's activities during the year including the various projects, seminars & conferences, Nutrition Awareness activity, publications, various efforts including regulatory affairs recommendations to FSSAI, scholarships and others. These were well appreciated by the members. They suggested that the association should lay more emphasis on student-related activities and supports to students such as meritcum-means scholarship which could be enhanced.

The members then reviewed the financial status of the Association

and expressed satisfaction at the same. The Election Results were announced next and the newly elected members are as follows: Chairman: Mr. Bhupinder Singh (Vista Processed Foods), Vice Chairman: Mr. Sailesh Venkatesan (Mead Johnson Nutrition), Members: Ms. Shilpa Telang (General Mills), Mr. Prakash Chawla (AAK Kamani), Mr. Arun Kelkar (Hexagon Nutrition), Mrs. Madhavi Trivedi (Kellogg), Dr. Shatadru Sengupta (Hardcastle Restaurants), Mr. V. Mohan (Inttl Advocare), Mr. Amitabh Tewari (Parle Products) & Mr. Sanjaya Mariwala (OmniActive Health Technologies).

Elected members were congratulated by others. The cooption of other members including past chairmen would be done in the first Governing Board meeting. The Chairman gave remarks inviting greater participation from the members in the association's affairs. He also suggested that there should be more seminars and conferences and exchange of experiences with younger generation. Vice Chairman emphasized that we are science based would continue to guide industry in all matters in these matters. The Treasurer Dr. Sengupta expressed satisfaction at the sponsorship support by industry and hoped we keep a control over expenses and tap different sources for finances.

mage : PFNDAI Members

at the AGM

Mr. Mohan expressed that we should celebrate the approaching Golden Jubilee approaching large number of people spreading awareness about food and nutrition. We could explore social media like Facebook and others for PFNDAI activities. We should also explore newer projects to create awareness.



## RESEARCH IN HEALTH &NUTRITION

#### Calcium-rich fermented foods preferred in improving bone and heart health

By Will Chu, 19Aug2016 Nutra-Ingredients

Calcium should come from healthy sources like fermented dairy products and leafy greens as a review outlines an approach to receiving an adequate intake while supporting bone and heart health.

The review paper, published in the latest edition of the Open Heart journal, stated that the majority of the US population did not consume the current recommended dietary allowance for calcium. This finding has also been echoed in Europe with studies identifying dietary calcium intake as low 300 and 600 mg/day in women, and 350 and 700 mg/day in men.

"Calcium is ideally obtained from dietary sources. The form of calcium in bones and bone meal is calcium hydroxyl apatite, which may be particularly effective for building bone," said Dr Hogne Vik, chief medical officer with NattoPharma. "Increased consumption of calciumrich foods such as bones, fermented dairy products (e.g. yogurt, kefir, cheese), leafy greens, almonds, and chia seeds may be effective for improving both skeletal and cardiovascular health."

The review also found milk and dairy

products the most readily available dietary sources of calcium that were preferred by the general population. However, concerns as to these food's long term health effects were mentioned as milk, in particular was singled out as a promoter of inflammation and oxidation in adult humans. Despite this, the review detailed a series of steps that could help in building strong bones while maintaining soft and supple arteries.

These included obtaining calcium from dietary sources rather and ensuring that adequate animal protein intake is coupled with calcium intake of 1000 mg/day. Other measures included maintaining vitamin D levels in the normal range, and increasing intake of fruits and vegetables to alkalinise the system and promote bone health. Other research has shown that calcium supplementation can play an important role in boosting levels, especially in areas where healthy diets are less common.

#### Milk is unhealthy?

The findings that suggest milk as a less-than-ideal source of calcium will come as a surprise to many. Indeed, the review acknowledged that "cow's milk, though rich in many nutrients, including calcium, has issues that render it less than ideal as a dietary staple for many adults."

These issues include milk's dgalactose content, which has been linked to a high mortality rate and high fracture incidence. The European Dairy Association has recognised milk and dairy products as part of a healthy and balanced diet and an important provider of many minerals and vitamins and high quality protein.

The European Dairy Association pointed to numerous studies identifying milk's positive association with cardiovascular conditions, and diabetes. The review, led by Dr James H O'Keefe of the Saint Luke's Mid America Heart Institute, discussed the fundamental role of calcium in cell conduction, muscle function, hormone regulation, and cardiac and blood vessel function.

Here more than 70 studies carried out over a 40year period between 1978 to the present day, were assessed and evaluated. These studies included observational, prospective cohort, double-blind Placebo-controlled and populationbased research.

#### Vitamin K2

Along with calcium's direct benefits the paper also recognised its role in facilitating vitamin K-dependent pathways. Increased vitamin K2 intake has been associated with decreased arterial calcium deposition and the ability to reverse vascular calcification in animal models. "While too much supplementary calcium has been cited as increasing cardiovascular risk, one cannot abandon an essential nutrient for building strong bones. The key here is Vitamin K2," Vitamin K2 is abundantly found in meat, especially liver, chicken and beef along with dairy products. The primary vegetarian source is Nattō, a

Japanese soybean food fermented with the bacterial species Bacillus subtilis var. natto. "The only food that contains enough Vitamin K2 is the Japanese dish Natto," explained Vik, whose company NattoPharma has responded to rising demand for vitamin K2fortified supplements and foods in recent years.

## What is driving interest in turmeric?

Food News Latam AUGUST 17, 2016

For centuries, turmeric has been a key ingredient found in curry. Now, it is rising to fame as Google Food Trends called it the "rising star" of the year. According to the report, consumer interest in this functional ingredient grew about 56% from November to January. So what is driving this growth? Before turmeric was a "superfood", it was used as a traditional Chinese and Indian medicine to treat a wide variety of conditions. It is mainly used to heal wounds, reduce inflammation and treat digestive problems.

Protein Foods & Nutrition Development Association of India

#### Image © iStock.com/puhhha

As health experts began to focus more on this spice, many studies began to take place and discover interesting health benefits you may have. Turmeric has a particular compound known as curcumin, which is not only responsible for the bright orange color of the spice but also serves as a powerful antioxidant.

One of the many things curcumin does is that it reduces the levels of two enzymes found in the human body that are responsible for the inflammation. Curcumin in turmeric can potentially prevent heart attacks, reduce the risk of diabetes, and even fight cancer.

Google Food Trends noted that consumers are "trying to understand how to consume turmeric." Users often investigate different uses, types and recipes for the popular ingredient. Some of the main words associated with turmeric are "the dust, the earth, the drinks and organic." The most common way to enjoy this spice apart from curry is by drinking turmeric tea, used in a smoothie, or as a pasta.

Finally, the Google Food Trends report commented on the recent shift in consumer eating patterns. People are looking for food to satisfy much more than hunger and cravings. They are turning to healthier alternatives and are choosing to learn more about the food they are consuming.

"While they may be more aware of the additional benefits that certain ingredients claim to provide, they go

> online to educate themselves on how to consume these functional ingredients. This behaviour is most likely to occur during the beginning of the week when consumers are, More motivated to restart the system and optimize their lifestyle habits." the study said.

Brain and cognitive health: bright young things By Michelle Knott, 18 Aug 2016 Food Manufacture UK

Long asso<mark>ciated</mark> with older

generations, cognitive health products have a new younger fan-base. There is a growing market for cognitive health products globally and, according to market analysts, demand is expected to continue to rise as the population ages.

But the relevance of cognitive health-related products is not restricted to seniors. "Stress reduction, improved alertness and enhanced cognitive performance are often particular areas of interest for younger adults and millennials," suggests Dr Manfred Eggersdorfer, senior vice president for nutrition science and advocacy at DSM, and professor of healthy ageing at the University Medical Center in Groningen, the Netherlands.

The ageing population is often cited as being behind the boom in products that protect brain health and boost performance. But food manufacturers could be missing a trick if they think this market is all about the over 50s staving off decline and dementia. Clearly, younger people are looking to boost their brain power too.

## Functional food appeals to the young

While older consumers are more likely to stick with supplements, younger consumers are more attracted by functional food and drink, Eggersdorfer believes. "Younger consumers tend to opt for more appealing formats that can be consumed on-the-go, such as fortified beverages, power bars, gums or yogurts," he says.

Image © iStock.com/AD077





## Hot, spicy and delicious.

Wake up to a hot, steaming, delicious bowl of new Saffola Masala Oats. A mouth-watering, unique combination of wholegrain oats, spices and real vegetables. Simply add water, cook for 3 minutes and enjoy a lip-smacking bowlful of health.

Suggested garnishing



Available in many delicious flavours.

Saffola masala oats Consumers of all ages want to stay mentally sharp and focused as they balance their work, family, home and other responsibilities, says Miguel Martinho, marketing manager for Europe at Kemin Human Nutrition & Health. "We see active adults and business professionals interested in brain health supplements. Really, anyone who wants to improve mental performance as they juggle work and family," he says.

Younger consumers, therefore, present an opportunity that ingredients makers are increasingly looking to target. For example, Frutarom says it is aiming its Neuravena green oat-based ingredient at "working professionals in stressful jobs, to help them to stay calm, focused and clever".

"Products that help to increase learning ability by supporting concentration and cognitive performance may also arouse the attention of students and young professionals who want to make sure their minds are sharp," says Yannick Capelle, product manager for Frutarom Health.

How every age group can benefit That's not to say that older people can't benefit too. "Eventually, every age group can benefit from better cognitive performance: young adults and teenagers, working professionals but also the 'golden agers' who want to stay active, vital and focused. Therefore, products that help ensure a sharp mind will advance the brain-health category over the next years," Capelle says.

Neuravena from Frutarom is soluble with a neutral taste and is expected to do well in beverages and food applications. "Monographs report mental and cognitive support, including mild antidepressant effects, reduced anxiety and an increased ability to deal with stress," says Capelle. "Neuravena was the first oat extract to substantiate this benefit with clinical studies. Flavonoids are part of the active constituents of Neuravena but being a multicomponent system, many other molecules, mostly still unknown, contribute also in delivering the benefit," he adds. Neuravena does not currently have an approved EU health claim, but Frutarom says it will submit a dossier "when it is the right time".

#### Age-related memory issues

Kemin's Neumentix proprietary phenolic complex, meanwhile, is derived from spearmint and has been shown in clinical studies to safely support working memory and improve cognitive performance in adults with age-related memory issues. Some of its benefits could be felt by people in their 20s, according to Martinho. A 90dav randomised. double-blind, placebo-controlled study found people who took 900mg of Neumentix showed a 15% improvement in overall quality of working memory, and a 9% improvement in accuracy in spatial working memory compared with subjects who took a placebo. "This is critical, as research shows that working memory can decline by 5–10% every decade, beginning as early as our 20s," says Martinho.

Neumentix was launched in the US in 2014 and arrived in Europe in May last year. It's currently formulated for use in supplements, but the company says it is also being formulated for functional food and beverages, with an expectation of receiving 'generally recognised as safe' status from the US Food and Drug Administration in the coming months. "Due to the distinct line of plants, the tan powder has a hint of a herbal smell and flavour," says Martinho. "It is water soluble, heat resistant and stable across a wide pH range."

Again, Kemin's potential customers must wait for an approved health claim in the EU, with evidencegathering still a work in progress. "At this point, we are very much focused on growing the body of evidence to support Neumentix," says Martinho.

#### Omega3 fatty acids

New ingredients may be coming through the pipeline, but the most popular ingredients for cognitive health remain the omega3 fatty acids. There's also growing interest in the potential of 'old-school' B vitamin fortification. especially as vitamins already enjoy approved health claims. DSM offers omega3s derived from fish oil or algae, as well as a range of other brain health-related vitamins, including B, D and E vitamins and carotenoids. Eggersdorfer says most of the benefits of these ingredients can be enjoyed at all ages.

"There have been several mechanisms identified by which micronutrients affect cognitive function, and all are important to maintaining a healthy brain throughout life," he explains. "For example, long-chain omega3 polyunsaturated fatty acids, such as docosahexaenoic acid [DHA], are important building blocks for neuronal cell membranes and are instrumental in brain development, neuro-transmission, modulation of ion channels and neuro-protection."

Brain DHA levels decrease with age, especially among Alzheimer's disease patients, indicating that a reduced DHA content may contribute to deterioration in memory and other cognitive functions. "On the other hand, energy production in the brain is heavily dependent on several vitamins and minerals, such as the B vitamins and vitamin C," Eggersdorfer adds.

Image © iStock.com/puhhha

#### **B** vitamins

While most advice about vitamins focuses on the long-term benefits, some of the latest research indicates that a hit of B vitamins can produce an almost immediate improvement. At Vitafoods in May, Professor David Kennedy – director of the Brain, Performance and Nutrition Research Centre and professor of biological psychology at Northumbria University – published recent work with Bayer's branded supplements, Berocca and Supradyn.

"Most nutritionists would say you've got to take [vitamins] over a period of time but that's not based on any evidence," says Kennedy. "In one of our studies in children we saw improved function on attention tasks within hours." Kennedy's recent study with Supradyn showed a dose-related response in terms of energy release while performing cognitive tasks. This backs up previous studies that suggest B vitamins could be a winner in brain-boosting products.

#### Ginger nano-particles could help alleviate inflammatory bowel disease: Study

By Gary Scattergood+, 18Aug2016 Food Ingredients Asia

Edible ginger-derived nanoparticles could alleviate symptoms of Crohn's disease and ulcerative colitis, the two main forms of inflammatory bowel disease (IBD), researchers claim. The research team, led by Dr Didier Merlin alongside the Atlanta Veterans Affairs Medical Center and the Institute for Biomedical Sciences at Georgia State University, report their findings in the September 2016 issue of Biomaterials.

Existing treatments for IBD, usually either anti-inflammatory medication or therapeutic measures, are hampered by their side effects. "Thus, there is an unmet need for a carrier system capable of delivering drugs specifically and exclusively to the inflamed regions for a prolonged period of time. Such a system could significantly reduce the side effects of existing, otherwise effective, treatments," states the study. "To address this formidable challenge, targeting drug carriers based on nano-particles have been designed and have shown great promises for improving IBD treatment."

Recent observations suggest that the application of plants as "nanofactories" for the fabrication of medical nano-particles could represent a new approach for IBD treatment, leading the research team to test the suitability of ginger. "Ginger, the rhizome of Zingiber officinale, is one of the most widely used natural products," the study states. "It is consumed as a spice and used as a medicine for the treatment of nausea, as well as other digestive tract problems like colic, flatulence, diarrhoea and dyspepsia. Studies have also shown that ginger and its active components, including 6gingerol and 6shogaol, exert antioxidative, anti-inflammatory, and anticancer activities," researchers note.

#### Ginger juice

They tested three Ginger-derived nano-particles (GDNP), which had been isolated from ginger juice and purified using a sucrose gradient ultracentrifugation method. "GDNPs mainly accumulated at the 8/30% (band 1) and 30/45% (band 2) interfaces of the sucrose gradient a faint band was also detected at the 45/60% interface (band 3)," the study reports. Each ginger-based nano-particle was about 230 nanometers in diameter. More than 300 of them could fit across the width of a human hair.

Fed to lab mice, the particles appeared to be nontoxic and had significant therapeutic effects, with GDNP 2 seemingly the most beneficial. The study shows they were absorbed mainly by cells in the lining of the intestines, where IBD inflammation occurs. The particles were also shown to reduce acute colitis and prevented chronic colitis and colitis-associated cancer, and they enhanced intestinal repair.

Specifically, they boosted the survival and proliferation of the cells that make up the lining of the colon. They also lowered the production of proteins that promote inflammation, and raised the levels of proteins that fight inflammation.

#### Several advantages

"Unlike most IBD drugs, which must be administered systemically and are thus associated with serious side effects, GDNPs 2 are delivered orally, offering several advantages over other therapeutic routes. Importantly, oral administration supports our primary goal of delivering GDNPs 2 to the colon, which is the site of intestinal inflammation in ulcerative colitis," the study adds.

Part of the therapeutic effect, say the researchers, comes from the high levels of lipids in the particles, a result of the natural lipids in the ginger plant. The particles also retained key active constituents found naturally in ginger, such as 6gingerol and 6shogaol. Delivering these compounds in a nano-particle, says Merlin's team, may be a more effective way to target colon tissue than simply providing the herb as a food or as a traditional supplement.

The study concludes: "GDNPs 2, nano-particles derived from edible ginger, represent a novel, natural delivery mechanism for improving IBD prevention and treatment with an added benefit of overcoming limitations such as potential toxicity and limited production scale that are common with synthetic nanoparticles."

#### Protein Foods & Nutrition Development Association of India



India's omega3 deficiency a potential 'public health crisis' By Gary Scattergood+, 23Aug2016 Food Navigator Asia

India's "shockingly low" level of EPA and DHA intake is storing up a potential health crisis, especially because life expectancy and therefore the rate of chronic illness is forecast to rise considerably over the coming decades.

The Omega3 market, both in terms of fortification and supplements, is still in its infancy in the country, despite there being "an overwhelming need" for them in terms of cognitive, cardiac and infant health. So claims Mike Roberts from EPA and DHA manufacturers and marketers association GOED Omega3, who has called on industry and regulators to help tackle the problem.

Speaking at the Fi India show in Delhi, he said efforts to establish a reference daily intake (RDI) for omega3s in the country had stalled in recent years. He added while most European nations, and China, had set RDIs of 250mg a day - with many in the research community pushing for double that – even the biggest consumers of omega3s in India were getting only 50mg. "If you take the 500mg figure, which many scientists recommend, only 800m of the global population is getting that. That leaves another 6.2bn," he added.

"Now if we could get people in

China, the US and India to get up to that level, we'd have solved the problem for half the world," he added.

The latest data form GOED

suggests that just \$343m of the global \$33bn spent on omega3 products come from south Asia – with more than 60% of that figure been spent on fortified infant formula. "What is even more shocking in India is that surveys on pregnant women show an average consumption of just 20mg a day – that's just awful," Roberts said.

#### **Preterm births**

He cited research that showed that if every pregnant woman was to receive the recommended RDI. it would reduce premature births before 34 weeks by 58%, and any preterm birth by 17%. Twenty four percent of the world's preterm births are in India. "The fact that EPA and DHA intake is so low in India is a potential health crisis that needs to be quickly addressed," he added. "No one is saying that EPA and DHA prevent all preterm births, but it does reduce the risk just by adding small amounts to the diet."

Despite the market's low base, Roberts said there were, however, encouraging signs of industry growth. Demand from 2013 to 2014 grew by 11% in value and, more importantly, by 12% in volume, "despite the fact there are not a lot of fortified foods in India." He suggested manufacturers of foods and supplements should target the emerging middle classes in the 24-35 age group. He said there was evidence they were open to health and wellness advances, and that they would be able to educate their young children along similar lines. "Companies need to invest in education and awareness for people

in this age group in India and globally. Traditionally this activity is focused on older people, but this is where a big opportunity lies."

#### Mixing two well-known ingredients could be key to new weight-loss foods: Study By Natalie MORRISON, 22Aug2016 Food Navigator

Combining glucomannan with chitosan could be important for designing new weight loss foods, researchers suggest. The team coupled konjak glucomannan (KGM) with pHsensitive chitosan to create blends known as interpenetrating hydrocolloid networks (IHNs).

These IHNs could be incorporated into foods to help consumers feel fuller for longer. It is now believed the IHNs resulting from glucomannan and chitosan are "promising candidates for the development of satiating ingredients," the scientists, led by Amparo LopezRubio from the Institute of Agrochemistry and Food Technology (IATA), CSIC in Spain, said. Glucomannan is the only EFSA approved ingredient with a weight loss claim due to its properties which increase satiety. It has high water-holding capacity.

#### The study

In the study, the two hydrocolloids KGM and chitosan (a pH-sensitive biopolymer) were blended in various quantities to create different IHNs in film or freezedried solutions. These solutions were then tested in both neutral and simulated gastric conditions. The goal was to better understand KGM and chitosan IHNs, specifically in relation of chitosan molecular weight, the ratios of each ingredient used as well as how sodium carbonate salts could affect formation of IHNs. LopezRubio and his team then looked at the IHNs' ability to swell in stomach acid conditions, hence giving a satiated effect for the consumer. "The interactions between KGM and chitosan IHNs have been thoroughly analysed and correlated with swelling behaviour (in the case of blend films)," the researchers wrote in the journal Food Hydrocolloids. "These IHNs could be useful for the design of satiating ingredients that would swell at gastric pH values."

#### **Promising candidates**

In particular, the team found that when freeze drying KGM/ chitosan solutions with sodium carbonate, the blends with higher KGM content displayed better reactions to pH. The quality seemed to be a result of the added salt promoting inter and intramolecular interactions related to KGM. "The blends with higher KGM content, which developed stronger interactions, were the ones which displayed a better pH-dependent behaviour showing low flow consistency values at neutral pH and higher viscosities in acidic media," the team said.

"Therefore, these compositions are promising candidates for the development of satiating ingredients." In their solid state as films, the KGM/ chitosan solutions' swelling properties also depended on the molecular weight of the chitosan. Other recent research suggests changing the particle size in emulsions could boost satiety.

Modified rye bread found to ease irritable bowel symptoms, study finds By Will Chu, 01 Aug 2016 Bakery & Snacks

Modified rye bread may ease the symptoms of irritable bowel syndrome (IBS) according to a study, which recommends this food as a way to increase fibre

## intake for patients with this condition.

In this study, IBS sufferers ate bread low in fermentable, oligo, di, monosaccharides and polyols (FODMAP) and suffered from less IBS symptoms, which can include flatulence, abdominal pain, cramps and stomach rumbling. IBS is disorder affecting the normal functioning of the gastrointestinal tract. On average, 11% of the adult population in the developed countries are affected by this condition. FODMAPs are simple carbohydrates which are not absorbed in the small intestine but are fermented in the upper colon. Here, intestinal gas, abnormalities in bowel motility and visceral sensitivity develop resulting in symptoms of IBS.

The inclusion of low-FODMAP rye bread in the diet of IBS patients may also be one way that IBS patients could increase their fibre intake. Extensive studies of FODMAPs have also implicated these carbohydrates in roles central to gluten or wheat sensitivity.

#### Study details

Here, researchers from the University of Helsinki used a randomised double blind controlled crossover study, enrolling a sample size of 87 individuals. They were given normal rye bread and low-FODMAP rye bread for one month. Individual symptoms were measured with a symptom severity scoring system (IBSSSS) and visual analogue scale (VAS).

Quality of life was also recorded and degree of colonic fermentation was measured by a breath hydrogen test and dietary intake by food diaries. "Our study shows that reduction of FODMAP content of a major food staple, such as rye bread, may reduce some symptoms of IBS but is not enough per se to reach adequate overall symptom control in IBS, said Dr. Reijo Laatikainen, lead author of the study and dietician at the Aava Medical Centre in Finland.

"It's likely that a holistic low-FODMAP diet is needed in most cases in order to reach adequate control of overall symptoms. Low-FODMAP rye bread seems to be one way to increase fibre intake of patients with IBS. Just like the rest of the population, IBS patients tend to have a lower than recommended intake of fibre," he added.

#### High-fibre rye

Whole grain rye bread is seen as a good source of fibre with content varying between 11 to 14%. In Scandinavian countries, particularly in Finland, rye can account for 28–35% of fibre intake of working age adults. In a recent Danish study, a high intake of rye bread was linked to a lower risk of death in men. Rye bread has demonstrated good satiety qualities, and contributes to an increased intake of cereal fibre which is associated with a reduced risk of colorectal cancer. "The key finding of the study is that the modification of FODMAP content of bread alone does have an observable effect on the symptoms of IBS," the study concluded. "These findings in individual symptoms are in line with the observed difference in breath hydrogen excretion, i.e. less hydrogen was excreted during the low-FODMAP rye bread period confirming the lower level fermentation of FODMAPs in colon and reduced gas accumulation."

The accumulation of gas was of particular significance to the researchers. In using the symptom severity scoring system only pain and overall satisfaction with bowel function was measured. It did not measure individual symptoms other than bloating and abdominal pain. "Our total score of VAS symptoms consisted of 10 different symptoms of which only one (abdominal pain) was included in the IBSSSS," the study noted. "Measurements of individual symptoms and their composite end point may be more sensitive to changes than IBSSSS, which reflects more overall satisfaction and pain during the last 10 days."

The study noted that measurements of individual symptoms were more frequently used in low-FODMAP diet studies than IBSSSS measurements. In addition, the accumulation of gas, measured as bread hydrogen concentration, was an objective method to assess the degree of colon fermentation.

#### Probiotics may promote weight loss and reduce BMI

#### By Nathan Gray+, 29Jul2016 Food Navigator Asia

Consumption of probiotic 'good bacteria' could reduce body weight and body mass index (BMI) scores according to a new Chinese meta-analysis.

The analysis, published in the International Journal of Food Sciences and Nutrition. combined data from 25 randomised trials testing the impact of probiotic consumption on body weight and BMI in more than 1,900 people. Led by Qingqing Zhang from Taizhou People's Hospital, China, the team found taking probiotics reduced BMI and body weight with the greatest reduction in BMI occurring in overweight adults. "To date, quite a few researchers have investigated the effects of probiotics on body weight and BMI, without a consistent result," said Zhang.

"Based on our findings from the included 25 trials, we found that consumption of probiotics significantly decreased body weight and BMI by a modest degree," the research team concluded – adding that a subgroup analysis also showed that consuming more than one type of probiotic and taking

probiotics for eight weeks or more resulted in increased weight loss.

The team noted that although the amount of weight loss documented in the study is minimal, even a small reduction can have enormous public health benefits by reducing obesity-related diseases like type 2 diabetes, high blood pressure, and heart disease.

#### **Meta-analysis**

The team pooled data from 1,931 participants aged 18 years and over who took part in 25 trials investigating the efficacy of probiotic consumption for body weight and BMI reduction. Pooled analysis showed that probiotic consumption significantly reduced body weight by 0.59 kg and BMI by 0.49 kg/m2, on average. "A greater reduction in BMI was found with multiple species of probiotics," said the team – noting that subgroup analysis of trials with intervention duration of more than 8 weeks also found a more significant reduction in BMI.

The team said that the number of probiotic species used in the included trials varied between the trials included in this meta-analysis. but that subgroup analysis of the 13 trials using more than one species of probiotics found a significant reduction in BMI compared with six trials using a single species of probiotics. "Trials with multiple species of probiotics found a significant reduction of BMI by 0.65 kg/m2. Those trials using single species of probiotics as the treatment did not show a meaningful reduction compared with control groups," they revealed.

Zhang and colleagues noted that a 2014 meta-analysis looking at the effect of probiotics and blood pressure also found a greater impact of multiple species of probiotics for the control of blood pressure. "In conclusion, this meta-analysis showed that probiotic consumption could reduce body weight and BMI significantly," wrote the Chinese team – who added that the findings could "make a significant contribution to the application of probiotics as novel therapies in overweight and obesity."

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Sun Magnetica, 'A' Wing, 5th Floor, LIC Service Road, Louiswadi, Thane (W) - 400 604, India. Tel.: +91-22-4170 3200 Fax: +91-22-2583 5159 E-mail: info@advancedenzymes.com • Web: www.advancedenzymes.com RCT supports Ashwagandha root extract's weight management potential By Stephen Daniells+, 28Jul2016 Food Navigator Asia

Supplements of ashwagandha (Withania somnifera) root extract may help people with chronic stress manage their body weight, says a new study from India.

Chronic stress is a major global health concern, and is associated with a number of conditions, including depression, heart disease, and hypertension, and it has also been linked to weight gain and obesity. Stress is responsible for about 225 million lost working days by American workers every year, according to the American Institute of Stress, resulting in about \$80 billion in lost productivity.

New data from a study with 52 people with chronic stress indicated that eight weeks of supplementation with the Ayurvedic herb at a daily dose of 600 mg was associated with significant reductions in food cravings and improves eating behaviours, compared to placebo. Ashwagandha supplementation also led to statistically significant reductions in body weight and body mass index in the study participants, wrote the researchers in the journal Journal of EvidenceBased Complementary & Alternative Medicine.

"Ashwagandha root extract can be useful for bodyweight management in patients experiencing chronic stress. However, further studies are required to bolster the potential of Ashwagandha to prevent weight gain caused by long-term chronic stress," wrote the researchers. The flagship herb of Ayurveda Ashwagandha has been gaining traction in the mainstream US market with consumers embracing its wide-ranging body of health benefits, which include supporting stress, cognitive function, sleep, metabolic wellness, adrenal function, sports performance, and more.

According to a monograph from the American Herbal Pharmacopoeia (AHP), the herb has a history of use in ayurvedic medicine that dates back as much as 4,000 years to the teaching of renowned scholar Punarvasu Atreya, and in subsequent works that make up the ayurvedic tradition. The name of the herb derives from Sanskrit, and means "smells like a horse", which refers to the strong smell of the root which is said to be redolent of horse sweat or urine.

The new study used Ixoreal Biomed's KSM66 Ashwagandha and Kartikeva Baldwa, Director of Ixoreal Biomed, told NutraIngredientsUSA: "It is well known that the ashwagandha root has significant ability to reduce stress and cortisol. On this basis. many practitioners have believed that the root should help combat some of the effects of stress and cortisol, such as reactive eating and the reliance on food as a coping mechanism. However there was no direct evidence of this connection. This is the first study to show that ashwagandha can reduce food cravings and emotional eating mediated by stress relief.

"The authors have made an important contribution to the scientific literature on ashwagandha root extract for stress relief and body weight management, and we feel gratified that they picked KSM66 Ashwagandha for this study."

<sup>/</sup>ziprashc

#### Study details

Over people were included in the double-blind, randomized, placebocontrolled trial. Participants were randomly assigned to receive either 300 mg of Ashwagandha or placebo twice daily for eight weeks, and primary results were assessed using the Perceived Stress Scale and Food Cravings Ouestionnaire. Secondary results were assessed using the Oxford Happiness Ouestionnaire and ThreeFactor Eating Questionnaire, while serum cortisol, body weight, and BMI were also measured. Results showed significant improvements in both primary and secondary measures.

For body weight, a 3% reduction was recorded in the Ashwagandha group after eight weeks, compared with 1.5% in the placebo group. For BMI. a 3% reduction was also recorded in the Ashwagandha group after eight weeks, which was significantly greater than the 1.4% reduction recorded in the placebo group. "The potential of Ashwagandha as a natural antistress and antianxiety therapeutic has been strongly supported by previous researchers The results of the present study have taken this analysis a step further and demonstrated that Ashwagandha may provide a potential additional benefit of supporting the maintenance of normal weight (or even weight loss) in people living with chronic stress," wrote the researchers. "The results of the present study are consistent with those of previous studies, with Ashwagandha exhibiting a good safety profile and negligible adverse events."



Image © iStock.com/GreggErzen csardio-vascular-related

Shilajit may benefit skeletal muscle in obese adults: Natreon study By Adi Menayang, 15Aug2016 Nutra Ingredients USA

The traditional Ayurvedic ingredient Shilajit, a tarlike mineral that oozes out of rocks in the Himalayas, may improve bones and muscles in obese individuals when consumed orally.

In a study partially funded by Ayurvedic supplements company Natreon, researchers tested the company's PrimaVie Shilajit capsules to find out the effect of oral Shilajit supplementation and exercise training on human skeletal muscle adaptation in a group of overweight human participants.

Though Shilajit is a common staple in traditional Indian medicine that dates back hundreds of years, the researchers argued that this current study, for the first time, "presents a mechanism of action of Shilajit in improving skeletal muscle adaptation in overweight/obese subjects exercising 30 min a day 3 days a week for 4 weeks," they wrote in their report , published in the Journal of Medicinal Food.

According to the researchers, the Shilajit supplementation "resulted in skeletal muscle adaptation through up-regulation of ECMrelated genes that control muscle mechano-transduction properties, elasticity, repair, and regeneration."

#### Study design

The longitudinal study involved 16 participant aged 21 to 70 years of both genders with a bodymass index of 2535. Other requirements

disorders, for example) and other conditions that may skew the results for a general obese population, such as pregnancy. Overall, the study had two phases: An initial eight week of PrimaVie oral supplementation, and then an additional four weeks where participants took the supplements along with exercise, 30 min a day for three days a week in that period. They were required to attend four study visits during the 12week study period—the first visit was to take baseline measurements, the second visit was after the eight weeks of oral supplementation, third visit was the penultimate day of the fourweek supplementation plus exercise period, and the final visit was at the very last day after the last bout of exercise

included being free

medications (for

from several

At each visit, data of the participants were collected, which included 50 ml of blood, 5 mm muscle biopsy, and demographic information (age, gender, weight, BMI, blood pressure, and pulse). The 250 mg capsules for supplementation were supplied by Natreon.

Results and observations Compared to the baseline, researchers did not note any significant changes in lipid profile measurements, such as cholesterol, HDLC, and triglycerides, as well as unchanged levels of serum myoglobin and blood glucose. The researchers said these were indicators that "[Shilajit] was well tolerated and maintained physiological body glucose metabolism, homeostasis, and muscle integrity in the skeletal muscle of overweight/class I obese human subjects."

When it came to the muscles, analyses of the biopsy revealed that, after eight weeks of oral supplementation, "significant upregulation of collagen and other extracellular matrix-associated genes was noted" compared to the baseline. They argued that Shilajit supplementation on skeletal muscle adaptation was comparable with exercise by mediating specific synthesis and degradation of the extracellular matrix, but added that "further studies are required to determine exact mechanisms of PVS-induced ECM gene expression changes."

#### Soluble corn fibre shows bone health benefits for older women

By Stephen Daniells, 01Aug2016 Nutra Ingredients USA

Doses of soluble corn fibre may boost calcium retention for postmenopausal women by up to 7%, says a new study from Purdue University and Indiana University.

Data published in the American Journal of Clinical Nutrition also indicated that the intervention was associated with significant increases in a marker of bone-formation of 8%. "Chronic doses of 10 and 20 g fibre from SCF/d were well tolerated by participants and increased bone-calcium retention in free-living postmenopausal women dose dependently. More research is necessary to determine the mechanism that drives the retention, but it likely involves shifts in fibre-fermenting intestinal bacteria or their metabolites as shown in adolescents," wrote the researchers.



#### Fibres and bones

The study adds to an every growing body of science supporting the potential bone health benefits of prebiotic fibre intake. The fibres are reported to help bone strength by changing the flora in the colon. The fibre selectively promotes the growth of beneficial bacteria in the gut, which in turn produce short chain fatty acids. These fatty acids decrease the pH within the intestine, and improve the solubility of the minerals present. Calcium is then better absorbed into the body.

#### Study details

The Indiana-based researchers recruited 14 healthy postmenopausal women to participate in their randomizedorder, crossover, double-blinded trial. The women were randomly assigned to receive either 0, 10, or 20 grams per day of the corn fibre (Promitor Soluble Corn Fibre 85) for 50 days. This was followed by a washout period before crossing over to one other dose. Bone calcium retention was measured using urinary levels of the rare radioisotope 41Ca. "41Ca is a virtually stable, long-lived radioisotope ([half life] = 105 y) that can be measured with great sensitivity via accelerator mass spectrometry," explained the researchers.

Results showed that the 10 and 20 gram per day doses of the soluble corn fibre increased bon calcium retention by 4.8% and 7%, respectively. While bone turnover biomarkers did not change for any of the interventions, significant increases of the bone formation marker, bone-specific alkaline phosphatase, were reported.

"[A] 7% decrease in the urinary 41Ca:Ca ratio, as was observed in the current study, would result in a positive bone balance of approximately 50 mg Ca/d," wrote the researchers. "If the entire effect of SCF is realized within 50 d (i.e., the duration of interventions in the current study), a total of 2.5 g bone calcium or 0.3% of [total-body bone mineral content (TBBMC)] would be retained. However, if the effect persists with continued SCF consumption, it would result in an increased balance of 18.25 g bone calcium/y or 2.5% of TBBMC/y. In comparison, 500 mg Ca supplementation/d reduced bone loss by 5.5% of TBBMC."

#### Study suggests preloading soy protein isolate may benefit post-meal blood sugar levels

By Adi Menayang, 01Aug2016 Nutra-Ingredients USA

In finding new ways to keep blood sugar levels at a normal range after a meal, researchers in Japan found that consuming 40 g of soy protein isolate before a meal improved postprandial glycemic control in healthy young adults.

The researchers are building upon previous studies that suggest "protein preload" (consumption of 5055 g of whey protein before consuming a carbohydraterich meal) reduced the high blood sugar levels after a meal in patients with type 2 diabetes. "This positive whey

protein preload effect on the postprandial hyperglycemic response has been attributed to an enhanced insulin response and delayed gastric emptying with increased glucosedependent insulinotropic polypeptide, glucagonlike peptide1 (GLP1), and cholecystokinin secretion preceding the main meal," the in their study published in the journal Nutrition.

But in many regions of the world, lactose intolerance may prohibit certain populations from safely ingesting whey protein. Hence, the researchers analysed if similar effects can be seen when patients preload with soy protein isolate. The researchers argued that "the present study was the first to evaluate both glucose and insulin responses simultaneously following soy protein preload, because a previous study using a soy protein preload did not evaluate insulin secretion."

#### Study design

The single-blind, randomized, crossover study was done with a total of eight healthy young Japanese adults, four males and four females with the average age of 22. Participants were selected based on being normo-tensive, nonsmokers, not on any medication, and having no history of autonomic dysfunction or cardiovascular disease. The participants fasted for 12 hours overnight and abstained from strenuous exercise, alcohol, and caffeine for at least one day. For the female participants, the study was scheduled during their late follicular phase, as "menstrual cycle affects gastric emptying and blood glucose, insulin, and GLP1 concentrations," the researchers wrote.

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After overnight fasting, the participants consumed a 400mL liquid meal containing a randomly assigned amount of soy protein isolate: 0 g, 20 g, or 40 g from Fuji Oil Co., sweetened with PAL SWEET by Ajinomoto. Thirty minutes after consuming the liquid meal, an oral glucose tolerance test was performed to evaluate each participant's glycemic response.

Observations and results For all doses of sov protein isolate. the blood glucose concentration significantly increased from baseline for all participants. However, between minutes 15 and 45, participants supplemented with a 40 g preload of soy protein isolate experienced lower blood glucose levels than those of the other doses. According to the researchers, their observations and results differ from previous studies done using whey protein-while whey's effect to glucose responses were reduced in a dose-dependent manner, and insulin responses did not significantly differ among various treatments, the soy protein isolate preload enhanced the insulino-tropic effect and suppressed the glucose response according to dose.

"This discrepancy in insulin secretion may be explained by differences in the amino acid compositions between whey and soy proteins. The branched chained amino acids, isoleucine, leucine, and valine are most directly involved in insulin secretion," they argued. The researchers also wrote that differences in the main meal might explain why their results differed from previous, similar studies. While the whey protein trial had participants eat pizza after preloading, this current study used a liquid, carbohydrate-rich meal. But the biggest common trend is that preloading of a protein clearly improved glucose responses during an oral glucose tolerance test compared with lower doses.

#### **Promoting plant-based Diets**

"The consumption of animal protein, such as red meat, is associated with

type 2 diabetes risk in Japanese and U.S. populations," the researchers wrote. "Accordingly, intake of less animal and more plant proteins (e.g. soybean product) has been recommended." Recent data from SPINS estimates the plant-based food and beverage market to be worth \$4.9 billion , having experienced a year-over-year growth of 3.4% ending June 12, 2016.

According to the researchers, the study had several limitations. including a small sample size, and inability to simultaneously measure gastric emptying. But they argue that the results were nonetheless important, especially to diabetics and populations with lactose intolerance. They wrote: "An investigation of the effect of protein preload with different types of proteins is meaningful from the perspective of being able to choose food products according to each country/area, dietary culture and an individual's dietary phenotype."

#### Veg good, meat bad: Dietary patterns determine prediabetes risk, study finds.

By Will Chu, 26Jul2016 Food Navigator

A diet rich in fruit and vegetables may lower the incidences of prediabetes whereas a meatheavy regime may increase the risk of the condition's onset, a study has determined.

Findings from a study involving 150 prediabetic subjects and 150 healthy controls identified two distinct dietary patterns. One emphasised the consumption of vegetables, fruits and legumes (VFL) and the other had a heavy sweet, solid fat, meat and mayonnaise (SSMM) emphasis. The team from the University of Iran found that after adjusting for age, education, physical activity, BMI and energy intake, the VFL dietary pattern was negatively associated with lower prediabetes. On the other hand the SSMM dietary pattern was positively associated with prediabetes.

Focus on diet not nutrients Whilst the news is not unexpected, the findings add weight to the notion that diabetes can be prevented through lifestyle and dietary changes in those who are at high risk of type 2 diabetes. The researchers believe focusing on dietary patterns and establishing how they relate to chronic diseases provides a more effective approach than the condition's link to nutrients. "People do not make use of the concept of nutrients and food separately," the researchers noted. "Nutrients of different foods may have synergistic or interactive effects on each other and it is easier to educate subjects on dietary patterns."

#### Study design

Here, researchers used a matched case-control study design, enrolling 300 individuals (150 prediabetic patients). These subjects were all below the age of 30 and were considered at high risk of developing type 2 diabetes due to being either overweight or obese, having a family history of diabetes or at least two symptoms of diabetes. Body measurements were then taken. This included weight, height, waist circumference (WC) and systolic and diastolic blood pressure. Physical activity was also assessed using a questionnaire Blood samples were then collected after an overnight fast of at least 8 hours for fasting blood glucose (FBG) measurement. Dietary assessment was also carried out via a questionnaire.



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"As well as an inverse and direct relation to prediabetes morbidity observed in VFL and SSMM dietary patterns respectively, we also found the VFL dietary pattern was inversely related to weight, WC, body mass index (BMI), energy intake, diastolic blood pressure, FBG and 2h oral glucose tolerance test (OGTT)," the study said. "Furthermore, the SSMM dietary pattern was positively associated with weight, WC, BMI, systolic and diastolic blood pressures, FBG and 2h OGTT."

#### Supporting evidence

The study's findings are in keeping with findings observed in previous research. A study found that impaired glucose tolerance (IGT) was linked strongly to dietary patterns that included urban living, lower physical activity and higher intake of animal food and soya beans as commonalities. Likewise, a meta-analysis of 10 large studies showed that adherence to a healthy dietary pattern was associated with reduced risk of developing type 2 diabetes.

In addition, the often-mentioned Mediterranean diet showed effectiveness in diabetes prevention in individuals with high cardiovascular disease risk. "The positive relationship found between the SSMM dietary pattern and prediabetes could be a result of high intakes of foods such as red meat, processed meat and animal fat." the researchers theorised. "Likewise, the high intake of whole grains, legumes, vegetables and fruits containing high fibre, owing to their low energy content and high satiety effect.

may decrease food intake and weight gain," they added. The researchers were also keen to note the limitations of this study that included dietary patterns obtained from food intake patterns using a questionnaire. The team pointed to a strong possibility of error because the information collected depended largely on recall. Factor analysis was used to identify the dietary patterns and, as such, food categorisation was vulnerable to change based on the scientists' research interest.

#### Vitamin D status linked to cognitive decline risk in Chinese elderly By Nathan Gray+, 29Jul2016

Food Navigator Asia

Low vitamin D levels could be linked to an increased risk of cognitive decline and impairment in the Chinese elderly, say researchers.

The study published in The Journals of Gerontology Series A, examined data from more than 1,200 elderly Chinese people over who were followed for two years. The team found that regardless of gender and extent of advanced age, individuals with lower vitamin D levels at the start of the study were approximately twice as likely to exhibit significant cognitive decline over time.

In addition, low vitamin D levels at baseline also increased the risk of future cognitive impairment by two to three times, said the team led by Professor David Matchar at DukeNUS Medical School. The team noted that prospective studies from Western countries have suggested an association between lower vitamin D level and future cognitive decline in elderly people, however no prospective study has examined this association in Asia. The new study is the first large-scale prospective study in Asia to study the association between vitamin D status and risk of cognitive decline and impairment in the Chinese elderly, said the team.

"Although this study was conducted on subjects from China, the results are applicable to regions in Asia where a large proportion of the elderly are ethnically Chinese, like Singapore," Matchar said.

#### **Prospective study**

The team analysed data from 1,202 subjects aged 60 years and over who took part in the Chinese Longitudinal Health Longevity Survey. Baseline vitamin D levels were measured at the start of the study, and cognitive abilities were assessed over two years. Cognitive impairment was defined as a MiniMental State Examination (MMSE) test score under 18. while cognitive decline was defined as drop in score of three points or more from baseline level, said the team. This first follow-up study of elderly people, including the oldestold, in Asia shows that low vitamin D levels were associated with increased risk of subsequent cognitive decline and impairment.

#### Supplementation solution

Matchar and colleagues said the new findings reinforce the idea that vitamin D protects against neuron damage and loss, and means that calls for more intensive investigations into the effects of vitamin D supplements on cognitive decline should be acted on. They noted that a better understanding of the mechanism by which vitamin D may protect neurons could help identify effective interventions to stem the rapidly increasing prevalence of cognitive decline observed in aging populations in Asia and around the world.

Last month, research led by scientists at the Beijing Chaoyang Hospital and Capital Medical University, China warned that the rapidly growing urban population in China may be at risk of severe deficiencies in vitamin D. The team said 'targeted prevention' and supplementation strategies are urgent for the growing urban Chinese population.

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## FOOD SCIENCE INDUSTRY NEWS

## Bureaucracy holding back India's huge agricultural research potential

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By RJ Whitehead, 22Aug2016 Food Navigator Asia

India has one of the best-staffed agricultural research and development systems in the world and, with ongoing financial support, and is poised to lead the way in combatting hunger and food insecurity.

Yet bureaucratic issues are still getting in the way of progress. This is according to data from a programme run by the International Food Policy Research Institute (Ifpri) which focuses on agricultural research and development spending, funding sources and human resource capacity.

"As [India's] population grows and climate change advances, it's important for India and the entire region that the national agricultural and education system is adequately funded and works efficiently to face the challenges of today and the years to come," said Kalpana Sastry, joint director of the National Academy of Agricultural Research Management (NAARM), the programme's Indian partner, which is coordinating the project.

The bodies found that India's expenditure on agricultural research has nearly doubled since 2000, but that much of this increase paid for increased salary expenditures rather than research programmes. India's goal in its latest five-year plan has been to invest at least 1% of its agricultural GDP in agricultural research and education by 2017. However this goal appears to be too ambitious, according to Ifpri's data.

India currently spends 0.30% on agricultural research, though this represents a much higher share than neighbouring Pakistan (0.18%), but only half the share invested by China (0.62%). "India has the potential to meet the global challenges ahead, but only if it makes the financial commitment to research," said Gert Jan Stads, senior program manager for Ifpri's Agricultural Science and Technology Indicators programme. "Stable and sustainable levels of funding are critical to supporting effective research that yields increased agricultural productivity."

The project also found that India's agricultural researchers are highly qualified, yet gender imbalance continues to plague the field—only 18% are female and very few women hold research management positions. Increasing women's representation among agricultural researchers and managers will enable the country to more effectively address the priorities and challenges of all farmers, and female farmers in particular, Stads' team learnt.

Long term recruitment restrictions are also among the challenges affecting the country's agricultural research, as are stagnating university budgets that have increased faculty workloads and reduced time available for research. The private sector has a rapidly expanding role in India's agricultural research, making up an estimated 20% of the country's agricultural research spending in 2009, but more recent data on private sector investment are unavailable. "These data are critical to facilitate an accurate assessment of the impact of government policy on private innovation and, in turn, on private innovation's impact on food security, poverty, and other development goals," said Stads.

#### Develop probiotic drink with Aloe Vera and Lactobacillus casei shirota Food News Latam 01 AUGUST 2016

Aloe perfoliata var. vera (aloe vera) one of the species most studied for its benefits, was used by Julia Patricia Gonzalez Guzman, and Marta Susana Sosa Ouintanilla of the Universidad del Salvador (http://ri.ues.edu.sv/) as a non dairy vehicle, so that the probiotic reaches the consumer, because it presents all the characteristics to be considered a good alternative as means of growth of the probiotic microorganism Lactobacillus casei shirota, which is one of the microorganisms widely studied, selected for its innocuousness, ability to survive in the digestive tract, as well as to present immunestimulating, antibacterial,



#### antioxidant activity and to achieve at the end of its useful life at least 107 CFU / g.

In this work a probiotic drink was developed using Aloe perfoliata var. Vera (Aloe Vera) and a lyophilized strain of Lactobacillus casei shirota. The drink was made from the juice of the leaves of the plant Aloe perfoliata var. Vera (aloe); which was used in proportions 10% (50 mL), 15% (75 mL), 20% (100 mL); To which Xanthan Gum was added as stabilizer, Citric Acid as acidity regulator, unrefined cane sugar as a sweetener and purified water. In addition, the beverage was pasteurized for later incorporation of the standardized microorganism Lactobacillus casei shirota at the concentration of 107 CFU / mL. Measurements of pH and Brix Degrees were performed, as well as the determination of Escherichia coli to the juice of Aloe perfoliata var. Vera (aloe) unpasteurized and pasteurized; The stability of the standardized microorganism Lactobacillus casei shirota at the concentration of 10 CFU / mL in the juice of Aloe perfoliata var. Vera, by plaque counting on MRS agar, for the periods of 1, 2, 5, 8 and 15 days.

Finally, the sensorial test of Qualitative Descriptive Analysis was carried out with two groups of tasters, one group consisting of 25 teachers and the other by 25 students, who were given a sample of 30 mL of the beverage to evaluate Sensory characteristics and acceptability of the beverage in relation to appearance, colour, smell, taste (sweet, acid, residual), fluidity, lumpiness and general quality.

Taking into account the study stability of Lactobacillus casei shirota in the juice of Aloe perfoliata var. Pasteurized vera, it was concluded that the sample provides better stability to the probiotic component is sample 2. (15% aloe vera juice) of which an initial concentration of 7.00E + 07CFU / mL which is maintained for 2 days a higher 1.00E + 06 cfu / ml concentration, ending at 15 days with 6.00E + 07UFC / mL, reaching the minimum requirement 106 required for the beverage to be considered as probiotic; In the sensorial test of the quantitative descriptive analysis, sample 2 (15% of aloe juice), presented a good acceptability, both in students and in teachers, both genders; Achieving a generally acceptable quality result: The shelf life of the prepared beverage was 8 days, considering both the pH values and Brix Degrees that showed a decrease after the eighth day of analysis. It is recommended that for the elaboration of Aloe drink have an established culture of Aloe perfoliata var. Vera, and that during the entire process of making the beverage a cold chain is maintained. Likewise, to evaluate the synergic effect that develops between the juice of aloe and the probiotic microorganism; Both in vitro and in vivo.

The juice extracted from the gel of the Aloe perfoliata var.vera (Aloe Vera) plant leaves was a suitable medium for the development of the probiotic microorganism Lactobacillus casei shirota, and was a suitable means to produce a beverage that has the necessary concentration to be a probiotic drink (10 6 CFU / mL). The decrease in pH over time in sample 2 and sample 3 may be related to an increase in lactic acid concentration; Obtaining also values of Brix Degrees in which it is presumed that the L. casei shirota consumes the soluble sugars in the samples that contain juice of aloe during their survival and the metabolizes possibly producing lactic acid.

In the determination of Escherichia coli, it was proved that the beverage processing process did not affect the quality of the product, obtaining a drink that complied with the limit

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required for this microorganism according to the regulations. During the stability development period of the probiotic strain Lactobacillus casei shirota in the juice of Aloe perfoliata var. Vera (Aloe), it was found that the concentration of plant substrate is adequate to obtain optimum growth results.

The juice of Aloe perfoliata var. vera can be used as in vitro growth medium for L. casei probiotic species shirota of reaching the minimum requirement 10 6 CFU / mL required for the beverage is considered as probiotic; Under this criterion sample 2 (15% of aloe juice) was chosen as the optimum formulation for the preparation of the probiotic drink, taking into account that it was the most stable formula in the different parameters determined.

The shelf life of the selected formulation (15% of Aloe Vera juice) is 8 days, considering both the pH values (which showed a decrease in the measurement at day 15); And Brix Grades (which showed a decrease after the eighth day of analysis). The sensorial test of the quantitative descriptive analysis showed that the drink presents a good acceptability, both of students and teachers, of both genders. Presenting an intermediate residual odour and taste, which is maintained in acceptable values; With adequate fluidity and lumpiness.

#### The bitter chemical coating of quinoa called "saponin" Food News Latam 01 AUGUST 2016

The challenge posed by eliminating a crop chemical compound to create a market for quinoa led three innovative farmers to build the largest quinoa

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## AAKKAMANI

processing plant in Australia in the state's south-west. Highbury farmers Ashley Wiese, Dumbleyung and Megan Gooding began testing quinoa (Chenopodium quinoa) in 2009 to diversify a more profitable cereal.

Chenopodium quinoa originated in the mountains of the Andes and has been cultivated for thousands of years. The popularity of grain increased between 2006 and 2013 after being promoted for its nutritional value, with prices that tripled, also the General Assembly of the United Nations declared in 2013 the International Year of Quinoa. However, Mr. Wiese says that it is an extremely difficult crop to grow.

"Quinoa is very close to the way the farmer works" since quinoa does not produce seeds in hot conditions. The upside is that quinoa is resistant to drought and frost and has developed a chemical defense mechanism called saponin. Saponin is a bitter coating that acts as a natural insect and bird repellent. It is a substance similar to soap and specific washing and drying processes are required to make the grain edible.

The altitude at sea level in Narrogin which is the largest city in the wheat belt region of Western Australia, offers the variety of quinoa gold because it has high levels of saponin, protecting the grain of birds and insects found at high altitudes.

The Australians built the first transformation of quinoa plants in Tasmania with a \$ 1.5 million investment in Highbury, 15 kilometers south of Narrogin, where operations began in January.

Mr. Wiese says it has been a steep but rewarding learning curve. "There has been a lot of trial and error in the development of our own machines to remove saponin without damaging the grain" he

#### says.

Their system consists of softening the saponin through scarification, removing about 70 percent in a dry powder form, after washing, rinsing and drying the seed. They currently process 400 tonnes of quinoa a year, but have the capacity to expand it to ten times their production. Its network of 16 farmers between Kununurra and Esperance has increased the area planted from 200 hectares in three years to 1700ha and can meet the growing demand. Since then, he has replaced imported quinoa with the WA product, which Mr. Wiese says is very encouraging for the future of Australia's emerging crop.

#### The consumption of phytic acid or phytate and the detection method Food News Latam AUGUST 18, 2016

#### A strong push in the use of legumes and grain seeds in human food in order to a high-fibre diet have led to increased intake of phytates in the diet.

However, it is important to consider that during the food processing and digestion, the final amount of phytic acid decreases significantly as a result of its hydrolysis, enzymatic or chemical.

Phytic acid or phytate is found in plant seeds and is the main form of storage of phosphorus in seeds. When the seeds germinate, phytate degrades and phosphorus is released to be used by the new plant. Phytic acid is found only in foods of vegatal origin, such as grains, legumes or nuts. At present, since the effects of phytic acid and its dephosphorylated derivatives on human nutrition are different. The interaction of phytic acid with proteins has been extensively studied, mainly in soybean, however its nature is not fully known and the anti-nutritional effects on the availability of such proteins are not yet clear.

In the kidney, phytic acid prevents the formation of kidney stones (stones or crystals) by inhibiting the crystallization of calcium salts, such as phosphates or oxalates, and avoiding their deposit, taking their pro and their counter, on the one hand offers enormous benefits For health and on the other, by consuming it in excess, could hinder the bioavailability or use of vitamins and minerals necessary to maintain our health.

Phytic acid is an anti-nutrient that inhibits metal / mineral absorption affecting nutrition in infants. High performance liquid chromatography with refractive index detection is the most commonly used technique for the determination of phytic acid in infant cereals. However, after numerous studies some problems are still present. Especially the low recoveries reported by some authors.

In the research work conducted by the Central University of Venezuela HPLC-RI methodology focused on improving the factors that affect the accuracy of the method was

optimized. It was observed that for children with a high concentration of minerals, recoveries are obtained between 48 and 57% in contrast to 92% obtained in wheat seeds with a low mineral content. These low recoveries are the result of the precipitation of phytic acid during extraction, generated by the high mineral content in children's cereals. The recovery efficiency of phytic acid in the presence of Fe and Ca increased with the use of trichloroacetic acid. This recovery depends on the concentration of phytic acid in the sample. Zn was not considered in this study because the evaluated cereals presented similar concentration.

#### Geltor seeks to disrupt the gelatin market with potentially gamechanging animal-free alternative

By Elaine Watson+, 16Aug2016 Food Navigator USA

If you think producing gelatin from a genetically engineered microorganism in fermentation tanks doesn't sound like something Grandma would do; hydrolyzing collagen from animal skin, bones and connective tissues on an industrial scale isn't exactly a food marketer's dream either, observes the CEO of Geltor (formerly Gelzen): "You're basically dropping shards of animal waste into an acid or alkaline bath."

And while many people don't have a problem with munching on marshmallows containing fish or pigskin and manufacturers would argue that gelatin is a sustainable value-added ingredient using parts of the animal we don't generally eat there is significant demand for a vegan alternative that can precisely replicate the unique qualities of gelatin, says Alexander Lorestani, who cofounded San Francisco based Geltor (formerly Gelzen) with molecular biologist Nikolay Ouzounov in 2015. "There are already vegan substitutes on the market [agar, agar, pectin, starches, gums]," said Lorestani, who is effectively programming microbes to produce collagen (from which gelatin is derived) via a fermentation process without using or harming animals. "But anyone that's tried a gummi bear made with a gelatin substitute knows they are just not the same, they don't have the same chemical or mechanical properties," he told FoodNavigatorUSA.

He added: "The gelatin market is worth close to \$3bn and it's growing strongly in Asia, so if you can come up with a costeffective alternative, there is massive potential. If you're buying in bulk, the current market price for gelatin is around \$8/kg, and we want to be price competitive with that, which will take time and economies of scale, but people are already paying four to five times this amount for gelatine substitutes, and we can make something that's far superior to them.

"We have a long waiting list of folks excited to test and buy our material. Aside from people wanting alternatives for ethical or religious reasons [pork-derived gelatin is not halal or kosher, while bovine gelatin is only halal if the animals were slaughtered in a certain way], there are also concerns about animal diseases [eg. BSE] and restrictions on supplies, so the demand is definitely there."

\$2.5m cash injection to build a recombinant protein production platform Geltor, which recently completed a \$2.5m funding round led by food and tech investors and now has eight people on its team, is now operating out of a lab with a small-scale production facility in a former Caterpillar construction equipment factory in San Leandro, added Lorestani, who studied medicine at Rutgers and bacterial pathogenesis at Princeton. The key, according to Geltor, which is using synthetic biology techniques to engineer microorganisms to product proteins, is being able to do it at scale.

So how does it work? According to Lorestani: "We start with a suite of microbes that naturally produce proteins but we give them a set of instructions for making collagen [from which gelatin derives] in the form of genes. Collagen has been extensively studied, so the DNA sequences that we're using to 'program' our microbes to produce it they are basically a set of instructions are actually available on the web for anyone to copy and paste. "There are companies out there that print DNA so we just order the DNA from them and they send it to us. So one of the first projects we worked on was making mastodon gelatin. Obviously mastodons no longer exist, but we know the DNA sequence, so we could use that to program our microbes to make mastodon collagen. No actual animals are used or harmed in the process." After a batch has been produced, the product must be purified, which does leave a byproduct, uses for which Geltor is now exploring, he said.

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#### Process can be customized

As it's a proprietary process. Lorestani won't say which microbes [bacteria and yeast] Geltor is using or what's in the feedstock or 'broth' (e.g. what the microbes eat in the big fermenters), but says they need sugars and a source of nitrogen, oxygen, and carbon. As for intellectual property, meanwhile, the process, rather than the end product, is the focus, he said. "Patenting naturally-occurring materials is not a winning strategy, so we are very much focused on patenting the process for the manufacturing, while in fermentation trade secrets are also a large factor. "I can't say what the microbes are, but they are all approved for the production of food in the US. We are basically programming them to build collagen for us. The process can also be customized [so Geltor could make gelatin designed for gummi bears with a specific stiffness or beer clarifying agents with a particular property]."

## Scaling up the fermentation process

As for scaling up, things don't work in an entirely linear fashion, so you can't assume that every time you move to a fermenter double the size of the last one, the results will be predictable, he said, but once you get beyond a certain size, things do start to behave more predictably. "From 10,000 to 50,000 to 100,000 liters is very different from going from 5ml to one litre to 10 litres. "A lot of industries use fermenters that can scale up to 100s of thousands of litres and if we're making tons of the stuff, that's the scale we'll ultimately need to be on."

So does Geltor's process require bespoke equipment? Not necessarily, said Lorestani: "There are standard fermenters out there with some modular aspects so they can meet your needs but some of the technology we are working on might require some new hardware."

The aim is to have significant commercial quantities available within four years or so It's hard to make firm predictions given how young the company is, but the plan is to deliver kilograms of product to customers next summer and to be able to supply truly significant quantities such that big gelatin users could use Geltor's product in their wares "in the next four years or so."

As for the business model, is Geltor going to license the technology to – or partner with a big ingredients company, or is it planning to go into the ingredients manufacturing game directly?

"Right now we're very much interested in the development, manufacturing and delivery of our own material to food producers," said Lorestani. "People don't want to rely on animal derived materials and there is a lot of pressure on companies to switch to plant-based alternatives. It's not just handful of vegans asking for this."

#### India's food trends: What's hot and what's not

By Gary Scattergood+, 23Aug2016 Food Navigator Asia

Indian consumers are increasingly aware that all fats are not bad, are demanding more products that offer "complete wellness" and are becoming increasingly opening to exploring alternative proteins and natural sugars. These four factors will increasingly offer new opportunities for manufactures, both domestic and

Image © iStock.com/Qpicimage

#### international, but food firms need to do more to communicate these trends on pack, according to Mintel.

Speaking at Fi India in Delhi, the research company's food and drink analyst Yogmaya Chatterjee said a number of global trends were filtering down to the Indian market, most notably the understanding that not all fats are bad. "Consumers today are more aware of the different sources of fat and are shedding stigma that all fat is bad," she said. "Meanwhile companies and brands are recognising this by calling out good and bad fats, and we are starting to see this on pack, such as on coconut crisps here in India."

With fat gaining recognition as being the sixth food taste, she said manufacturers would have to play an ongoing role in educating consumers, especially considering India's rising number of obesity and diabetes cases. Chatterjee also said that India was witnessing momentum towards products that promoted complete wellness, but suggested it was still lagging behind many other markets.

#### Added fibre

"This 'from the inside out trend' amplifies the potential for the market for products enhanced with everything from fibre to probiotics

> as more consumers recognise their diets connect with way they feel," she said. The number of high and added fibre products is growing, especially bakery, breakfast cereals and snack products, and Chatterjee suggested this could soon branch out to categories such as juices and ice creams, as witnessed in Europe and Japan.

Probiotics, however, remains at a nascent stage, with the exception of products such as Yakult, she noted. "We are only slowly starting to see it seep into other channels such as tea and enriched water," she added. Two other trends likely to take off in India are alternative proteins and natural sugars. "The demand for more plant-based proteins is growing," she added. "In India we have a large vegetarian population base, but alternative sources are going to be very important. A few to keep an eye on are rapeseed, hemp, pea and lupin. In India this is still quite small but there is huge potential," she said.

In terms of sugar and the sweetness, there has been a surge in the number of products containing stevia since it was approved by the Indian regulator FSSAI last November, and Chateriee also pointed to jaggery and palm sugar as emerging trends. "However, given the rate of diabetes there is still huge potential for stevia and natural sugars in India," she added. One area of concern for the industry, however, is in the use of palm oil. She said consumers were increasingly aware of its environmental impact and pointed out that only 12% of new product launches in Asia contained RSPO certified palm oil.

#### Less fat, more protein: Quinoa can replace fat in dry-cured sausage

By Niamh Michail+, 28Jul2016 Food Navigator

Replacing fat in dry-cured sausages with boiled quinoa could be an effective way to reduce fat and boost protein content without affecting consumer

## liking, Spanish researchers have found.

The researchers say that replacing up to 85% of the fat content with boiled quinoa could be a "feasible strategy" for industry. "Fat replacement resulted in changes in composition, texture, and flavour of sausages. However, consumer tasting showed no differences in preference between reduced-fat and full fat sausages," they write. "These reduced-fat sausages are potentially appropriate to be produced in regions where there is low supply of pork fat or where consumers demand reduced-fat meat products. The use of guinoa as fat replacer provides to sausage manufacturers an added value due to their excellent nutritional quality."

Methods for reducing the fat content can include increasing the proportion of lean meat used in the formulation – although this tends to result in increased dryness and hardness and darkened flavours or adding nonlipid fat replacers. Previous research has looked at the efficacy of using ingredients such as inulin, cereal or fruit fibres cellulose gel or carrageenan. Since starch can also be used, the Spanish researchers from the University of León, decided to test the efficacy of quinoa, a starchy grain.

#### The method

The researchers reduced 50% of the fat in one sausage and 85% in

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another by replacing it with boiled quinoa. One sausage with a normal fat content 30 g of pork backfat per 100 g of sausage mix was used as a control. The sausage meat also contained fresh garlic, paprika, black pepper cumin and sodium nitrate.

After ripening, portions were taken for microbial, colour and textural analyses. Sensory testing was performed by 12 panellists in a testing room under soft white lighting. The panellists had previously been trained in sensory analysis testing and quality traits of dry cured sausages, and evaluated the sausages' texture and flavour. They were asked to pay specific attention to juiciness, ripened flavour and pungent flavour, and were given five sausages purchased in retails markets to test as well.

The scientists found that replacing fat with quinoa increased the protein content of the sausages but did not affect microbial counts. Reducing fat in sausages can have varied effects on colour, depending on the fat replacer used, ripening conditions and the degree of meat pigment oxidation, write the researchers, but here they found adding quinoa to the mix did not significantly affect the colour.

However participants reported higher hardness and higher chewiness in the low fat sausage compared with the half fat version or the control, as well as less

juiciness. "[This is] because fat melts in the mouth being a source of juice from the food, and contains aromatic compounds that stimulate salivation. Finally, in spite of the differences found in the descriptive sensory analysis, fat reduction did not affect the overall acceptability of reducedfat dry-cured sausages with respect to controls."



Falling meat consumption offers new opportunities By Noli Dinkovski, 17Aug2016 Food Manufacture UK

Opportunities to target nonmeat eaters have been highlighted in a new report that showed a 60% increase in global food and drink launches carrying a vegetarian claim between 2011 and 2015.

Launches featuring the term 'vegan' also rose to account for 4.3% of total introductions in 2015, up from 2.8% in 2014 and just 1.5% in 2012, the report by Innova Market Insights found. The trend towards reducing meat intake had led to the emergence of new opportunities to target vegans, vegetarians, nonmeat eaters and non-redmeat eaters, Innova claimed. Another emerging group was the so-called 'flexitarians' – the term for people who mainly eat a plant-based diet, but do occasionally eat meat.

#### Plant-based proteins

The rise of these diets had accelerated the move toward the use of plant-based proteins as meat substitutes, the report said. While the majority of meat substitutes were still based on soy or wheat protein, products with alternative proteins such as egg, pea, ancient grains and nuts were evolving, it added. "This trend represents a growing opportunity for high quality meat alternatives, which is also being reflected in the 24% average annual growth in global meat substitute launches recorded between 2011 and 2015," said Lu Ann Williams, director of innovation at Innova Market Insights.

#### Meatless meals

Germany has been leading the way,

with 69% of consumers claiming to eat meatless meals at least once a week, she said. "Paradoxically, another opportunity may be in targeting meat eaters as much as vegetarians," Williams added. "While many vegetarians may opt for a diet rich in vegetables and beans, meat eaters may turn to meat substitutes if the product is right. Instead of just finding alternatives, technological solutions also need to focus on the development of meat substitutes that closely mimic the taste and texture of meat."

#### Natural ingredients in India: The four hurdles facing suppliers and manufacturers By Gary Scattergood+, 24Aug2016 Food Navigator Asia

Indian food manufacturers face four fundamental hurdles when it comes to expanding their use of natural ingredients, in addition to the extra cost that they can incur.

As a growing number of Indian consumers seek out healthier products and cleaner labels, especially in the wake of highprofile food safety scandals, opportunities abound for suppliers of 'natural' products. However, Kancor Ingredients vice president of technical innovation V Sasheendran said suppliers and manufacturers in India had to overcome four challenges.

The first is supply chain issues, not only in terms of the seasonality of ingredients, but also contamination threats from pesticides and industrial waste. "We are working closely with farmers and different groups to educate them about this and tell them what they should be doing, and will have to continue," he said during a presentation at Fi India in Delhi. He added there could also be process difficulties, especially when trying to create natural ingredients that replicated traditional Indian flavours. "For example, roasted cumin is very popular in north India, but this is very difficult to replicate industrially on a large scale. It is hard to maintain that roasted note in an extract, and food technologists also want it in dry and liquid forms," he said, adding that his firm had developed proprietary technology to achieve this.

#### Taste impact

In addition to supply and process, Sasheendran said the third obstacle was application, notably when it came to natural colours – a trending topic in India. "There is a lot of interest in natural colours but there are also problems around taste impact, PH dependence, and stability and solubility issues." He added that his team had been working to tackle these, as well as providing consistent colour profiles, which can offer vary widely within the same ingredient.

Childrens' products are a particular hot spot for natural colours, he added. Finally, regulation came under spotlight, amid concerns over interpretation when it came to applying the rules for fresh products, such as chili, to their ingredient forms. "The industry as a whole needs to represent itself more," he added, noting that initial colourings regulations from the regulator FSSAI only permitted one chlorophyllin, magnesium. "However, this had stability problems so we had to argue for copper chlorophyllin to be allowed. I think there may be similar problems with emulsion regulations that are coming in to," he warned. Kancor has four manufacturing

sites in India and one in China. In 2014 French firm Mane took a majority stake in the company.

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IP rights can become a 'weapon' in sugar war By Noli Dinkovski, 21Jul2016 Food Manufacture UK

Food manufacturers are increasingly likely to use intellectual property (IP) rights as both an asset and a weapon in the battle to meet reformulation demands over sugar, a lawyer has claimed.

Firms that change their manufacturing processes in a "novel" way, such as by replacing or reducing sugar volume with coconut sugar or sweeteners, may be able to obtain exclusivity over that change through patent protection, according to Edward Carstairs, trade mark attorney at Gill Jennings & Every.

Similarly, companies that develop new and innovative ingredients to add to a food or drink product, such

as new sweetener or flavour modification compounds, can also benefit from patent protections, he said. However, Carstairs cautioned that there would also be "very real clearance and freedom to operate challenges", not only for new brands but also new recipes, as they navigate third party trade mark registrations and patents. "With consumer and regulatory attention increasingly turning to the amount of sugar contained in food and drink, manufacturers are facing new challenges," he said.

#### 'Replace or reduce sugar volume'

"They have a number of ways to respond. Some might replace or reduce sugar volume with coconut sugar or sweeteners. Others will introduce new 'lite' brands, typically marketed with different branding. "Whatever the change, manufacturers must reconcile consumer demand with the legislative requirements for packaging and labelling."

While there were risks to reformulation, Carstairs believed there were new opportunities too. "If a company's research and development department was to come up with a way to replace sugar, then that could form part of an extremely valuable technology that could be monetised, such as through patent licensing.

#### 'Brand name is protected'

"Likewise, ensuring that the brand name is protected for the new product means it is possible to prevent competitors adopting a confusingly similar name." One of the challenges, Carstairs stressed, was that there must be open and regular dialogue between the marketing and legal teams, as IP rights continued to be created as a result of new products and improvements and modifications to established brands. "Freedom to operate searches is crucial. Is the chosen brand name available to use, or is there a third party with a conflicting right? Is the new brand name registrable as a trade mark?" he said.

"If the shape or pattern of the packaging is an important part of the brand identity, then design



protection is recommended. Police your rights – keep an eye on competitors and take necessary action to strengthen your position in the market," Carstairs advised.



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Minister: Manufacturers' responsibility to push food safety awareness By RJ Whitehead, 16Aug2016 Food Navigator Asia

Food manufacturers should invest some of their profits to promote awareness of food safety, and consumers should use gadgets to check for adulteration.

This is according to India's food and consumer affairs minister as he once again put food safety-and the role of manufacturers and consumers in safeguarding it-on the anvil at an event organised by the Confederation of Indian Industry in New Delhi. "Industry should invest a certain percentage in consumer awareness about food safety," said Ram Vilas Paswan, though he declined to suggest exactly how much investment this should involve. The minister said he has also written to state governments and held discussions with street vendor associations to promote safe food.

Turning to consumer empowerment, he also suggested that they should use personal testing equipment to check for adulteration in food products, especially in the most common groups such as milk and water, and during festivals when adulteration is especially rife. "In India, people will not believe that any food product is without adulteration," Paswan said, noting that the challenge was greater in India than many other countries.

Paswan is something of a crusader against adulteration, an ever-present

problem in India. Recently, he announced that the government was planning to amend the Prevention of Food Adulteration Act to safeguard consumers. "The trend of packaged and fast food has caught up in India.

There is a need to prevent adulteration of such eatables. The Centre will bring amendment in the law to ensure that consumers get adulteration-free food," he said at the policy launch in June.

This month, the ruling BJPled government specified that it would fast-track measures to tackle milk adulteration in particular, after high-profile Congress MP Shashi Tharoor cited an official survey that found that "over 60% of the milk produced in India is adulterated, 8% by detergents".

"We have urea, starch and formalin, all of which are going into our milk. Milk is drunk by children, pregnant women, by elderly people. It is a matter of national concern," Tharoor told parliament as he alleged inaction by the government in improving standards. Also speaking at the Delhi event, Pawan Agarwal, chief executive of India's food regulator, said that the FSSAI had been developing new food safety standards in recent months while also building capacity at state level to ensure their effective enforcement. He also spoke about the need for changing public perception about food safety. "Food safety and nutrition should be integral part of people's daily life," he added.

#### Can health pros be trusted with nutritional information? By Bert Schwitters, 26 Jul 2016

By Bert Schwitters, 26 Jul 2016 NutraIngredients

If you can't trust 'health professionals' to sift nutrition data, who can you trust? argues EU food law critic Bert Schwitters after a recent ECJ ruling that potentially shifts the meaning of commercial and non-commercial nutritional communication. When it comes to the beneficial effects of foods, the European Court of Justice (ECJ) warns us that we should seriously distrust 'health professionals' such as medical doctors and other medical or nutritional practitioners.

"Admittedly," wrote the Court in a recent judgement, "health professionals may be considered to have scientific knowledge superior to that of a final consumer, understood as an average consumer, who is reasonably well informed and reasonably observant and circumspect, [...].

"However, those professionals cannot be regarded as being in a position to permanently have all specialised and up-to-date scientific knowledge necessary to evaluate each food and the nutrition or health claims used in the labelling, the presentation or advertising of those foods."

There you have it. Health professionals treat their patients without having up-to-date scientific knowledge necessary to evaluate "each food" and the nutrition or health claims made for that food. Patients consulting health professionals are at risk, great risk, because "it cannot be ruled out that the health professionals themselves may be misled by nutrition or health claims which are false, deceptive, or even mendacious."

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Here, the Court implies that the real culprits are the food manufacturers, a special category of persons and companies who share a natural and untreatable inclination to use false, deceptive and mendacious claims to promote and sell their products.

"Therefore," concludes the Court, "those health professionals risk forwarding, in all good faith, incorrect information on foods which are the subject of a commercial communication to final consumers with whom they have a relationship. That risk is all the more remarkable as such professionals are likely, because of the relationship of trust which generally exists between them and their patients, to exercise significant influence over the latter."

Apparently patients trust health professionals who lack the knowledge to check nutrition and health claims used in "commercial information." At the same time. those health professionals seem to be capable of understanding and correctly evaluating "the objective information for health professionals about new scientific developments, involving the use of a technical or scientific terminology, in the situation where the communication is of a non-commercial nature." Meaning that, when the information is non-commercial, it's automatically "objective." To the contrary, when the information is "commercial" it must be distrusted as potentially mendacious.

## Objective v commercial information

According to the Court, "if the nutritional or health claims addressed to health professionals were not within the scope of [the Nutrition and Health Claims] Regulation No 1924/2006, with the result that such claims could be used without necessarily being based on scientific evidence, there would be a risk that the food business operators would circumvent the obligations laid down by that regulation, addressing the final consumer through health professionals, in order that those professionals recommend their foods to that consumer."

In the field of medicines, i.e. the traditional ones, claims may be based on evidence showing long standing and well-established use by health professionals. In a case that would involve claims made by suppliers of traditional herbal medicines in commercial information exclusively provided to health professionals, the Court could never typify these health professionals as good faith ignorants, because the European legislature respectfully considered these health professionals' knowledge in the field of traditional medicines as sufficient enough to exempt those claims from the "scientific evidence" requirement.

#### Their, their...

So, when health professionals recommend traditional medicines, they are not disqualified as incompetent gullibles. To the contrary, their recommendations are based on their knowledge and practitional skills, and their knowledge forms the basis for the authorisation of indications for the traditional medicines they have been recommending since ages. But, when it comes to nutrition and health claims, "those professionals"

are all of a sudden disqualified as dummies who are intellectually incapable of evaluating health claims not issued and approved by the European Union.

The Court doesn't seem to mind that the Union bases its rejections and authorisations on the opinions of ... health professionals. These, not "those," health professionals are the 21 members of the Panel on Dietetic products, Nutrition and Allergies (NDA) of the European Food Safety Agency (EFSA). They have been selected to fulfil the task of evaluating nutrition and health claims because they are regarded as being in a position to permanently have all the specialised and up-todate scientific knowledge necessary to evaluate each food and the nutrition or health claim used in the labelling, presentation or advertising of those foods. And, they are all saintly non-commercial.

#### 'Full knowledge of the facts'

The Court had to disqualify "health professionals" to erect another judgement concerning the field of application of the nutrition and health claims regulation (NHCR) on the basis of the speculations, allegations and assumptions on which the Regulation was based in the first place. Since the regulation rests on bias and prejudice against food business operators it will continue to further disrupt all forms of normal communication between market participants, health professionals, consumers and patients.

The Court academically qualified the NHCR as contributing to "a high level of consumer protection, in the context of the internal market, whose effective functioning Regulation No 1924/2006 seeks to ensure." And as enabling consumers to "make choices in full knowledge of the facts." However full knowledge of the facts precedes the reduction of that full knowledge to a health claim. In fact full knowledge of the facts is wiped out by the health claim. In the real world, outside the Court's chambers, the NHCR effectively prevents consumers from making choices in full knowledge of the facts. Since the Court's "health professionals" judgment, the NHCR even prevents health professionals from making choices in full knowledge of the facts.

Netherlands-based Bert Schwitters is an industry consultant and author of the book 'Health Claims Censored'.

#### More pictures, less numbers: FSA advises on healthy food labelling

By Natalie Morrison, 24Aug2016 Food Navigator

More visual and less numeric label information could be the way to bolster healthier food choices in Northern Ireland, the FSA say.

In a new study, the FSA (Food Standards Agency) claim food labels are often ignored when buying 'the usual' groceries in the weekly shopping list. Most Northern Irish consumers described their shopping behaviour as routine and repetitive. They tended to use labels just for identifying specific ingredients because of dietary of allergy requirements or occasionally to scrutinise a new product.

However, the new findings suggest more uniformity between labels and better visualisation - for example bigger font sizes for the many shoppers struggling to read the information – could help consumers make better decisions at a glance. "In-store shoppers often only allow seconds to consult a food label before purchasing and participants relayed that any information given should facilitate a snap decision in the food aisle," the researchers said. "As such, there is potential to increase usage of labelling information if it is presented in a more visual format, requiring minimum cognitive effort. (...)

Participants recommended using large and bold fonts to highlight key facts." Less numerical data was one way to facilitate better and faster decision-making, as was ensuring label information is in plain English for quick and easy information without confusion.

The new research involved 64 participants - both supermarket and online shoppers - in eight focus group discussions. Each group contained a mix of socioeconomic backgrounds, with consumers hailing from four Northern Ireland locations: Belfast, Londonderry, Glengormley and Portrush. Participants were presented with a range of food packaging and asked to prioritise information. Some were observed doing a 'normal shop' and a follow-up interview was carried out to help understand purchasing decisions.

"'Use by/best before' and 'nutrition information' were overall the most highly consulted information on food labels. However, there was still confusion over how to interpret this information to enable smarter choices in the food aisle," the team, led by TNS BMRB Research, said.

Study participants thought label information was too inconsistent or numerical to inform their choices. They were often confused around when information should be used, and if it is guidance or strict instruction, the researchers added. "Participants sought out shortcuts for healthiness and quality or relied on their own instincts when confusion arose. This drove a tendency to ignore information presented," they said.

Yet, despite these barriers, consumers wanted more understandable label information, particularly regarding nutrition and portion size, which the researchers believed was due to social trends towards healthy eating.

#### **Online shoppers**

Those who shopped online were less likely to consider food labelling because they prioritised speed and convenience. "Online shoppers had low awareness that labelling information was available to them, and there is potential to raise knowledge levels to encourage usage in this area," the researchers added. "Although as previous research has shown participants may be unlikely to click through or scroll down a webpage to view this information there may be a need to consider providing this without shoppers having to seek it out, for example via hover-over on a main product description page."

#### Food labels under fire

The study is not the first to put UK food labelling under scrutiny, with headlines in recent years branding it "confusing" and blaming it as a contributing factor to unhealthy eating. The new findings compliment another recent study which suggested detailed nutritional fact panels are less likely to influence non-health conscious shoppers than health-focussed people.

However, attempts at more visual dietary guidance have not always been met with open arms – for instance, the UK 'Eatwell' plate. Its usefulness has been the subject of debate. "There seems to be constant criticism of guidelines on nutrition at the moment but the bottom line is that guidelines are meaningless if they are not put into practice. As a nation we know that we still have a way to go before we achieve this," Victoria Taylor, senior dietitian at the British Heart Foundation, said.



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Fish Oil Vs. Krill oil Food News Latam AUGUST 29, 2016

HEALTH

INFOSULES

Fish oil is known to work wonders on your body, it could be used to treat almost everything from eczema to high cholesterol, inflammation, and even heart health. Until the krill oil entered the market.

When krill oil began to gain popularity, people began to doubt the health benefits of fish oil. Consumers began referring to krill oil as the "new main source of Omega-3", and announced that it was superior because it had the antioxidant called astaxanthin. In this way the debate on fish oil against krill oil came into existence.

Fish oil comes from the tissues of fatty fish such as salmon, mackerel, anchovies, sardines and other cold water fish. It mainly serves to lower cholesterol levels in the blood. However, it has numerous health benefits for the body and mind. For example, a study published in the Journal of the American Heart Association,

(http://newsroom.heart.org/news/ omega-3-fatty-acids-from-fish-oilmay-aid-healing-after-heart-attack) Circulation,

(http://newsroom.heart.org/news/ omega-3-fatty-acids-from-fish-oilmay-aid-healing-after-heart-attack) examined the effects of taking a high dose of omega-3 fatty acids in fish oil on patients who had a heart attack. The study looked at 360 survivors of heart attacks, they had to take a fish oil supplement or a

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placebo over the course of six months. Every two months, they had an MRI to check their heart. It is common for the shape and function of the heart to weaken or change after someone has had a heart attack. While therapy can help treat this, it is never safe.

"Heart failure remains a major problem after a heart attack despite all the therapy we have and advances in interventional care," said Raymond Y. Kwong, MD, MPH, senior author of the study and director of Cardiac Magnetic Resonance Imaging, Brigham and Women's Hospital and an associate professor of medicine at Harvard Medical School in Boston. Massachusetts. "Our results show that omega-3 fatty acids are a safe and effective treatment in improving cardiac remodeling, so they can be promising in reducing the incidence of heart failure or death, which remain a significant health burden To patients suffering from a heart attack."

Meanwhile, krill oil is obtained from small crustaceans. Although it is a rich source of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), it does not contain as much as fish oil. However, it does contain the antioxidant astaxanthin, which gives krill oil its bright red color. As an antioxidant, astaxanthin can possibly protect against cell damage and support the immune system. It is also known to treat Alzheimer's disease, Parkinson's disease, cancer, and high cholesterol. An important factor to consider is that krill oil is often more expensive than fish oil, while offering similar health benefits.

If fish oil is better than krill oil or vice versa, it really only depends on the person. Some people may prefer krill oil because it does not leave a strong breath and is easier to digest than fish oil. In any case, fish oil or krill oil are a great alternative for those who are practicing a vegetarian or vegan lifestyle. People who want to avoid fish consumption due to mercury contamination can also benefit a lot from these supplements.

## In the raw: To cook or not to cook?

Yvette Brazier Medical News Today 3 August 2016

Imagine never again savoring the smell of baking cakes or charbroiled steak. Could you? Why would you? Yet some people worldwide are turning away not only from meat and processed food, but also from cooking. Welcome to the raw food diet.

As the Standard American Diet becomes more fat-laden, sugarsated, and processed, the prevalence of metabolic disorders, obesity, type 2 diabetes, and cardiovascular disease (CVD) are soaring.

# Now every dish will be healthy.

## Veg. Manchurian 🗲

Nutrela

#### INGREDIENTS:

For Nutrela Soya Crispies:

- 1 cup cooked Nutrela Soya Chunks
- · 1 cup maida,
- · 3 tablespoon grated carrot,
- 3 tablespoon shredded capsicum,
- 4 tablespoon shredded onion,
- 1 teaspoon chopped garlic,
- 1/2 tablespoon baking powder, salt, water, oil

#### For Sauce:

- 2 tablespoon corn flour mixed with 1/2 cup water,
- 2 teaspoon soya sauce,
- 1½ tablespoon chopped garlic,
- 1½ tablespoon chopped green chillies,
- 1/2 teaspoon pepper powder,
- 1/2 teaspoon sugar,
- 1 tablespoon vinegar, Oil, Water, Salt

#### METHOD

- First fry chopped garlic and chillies for a min then add Soya sauce, pepper powder, sugar, vinegar, salt and cook for few mins.
- Then add water & corn flour mixed with water and boil the sauce to make it slightly thick. Once the sauce is ready pour it hot on Nutrela Soya crispies.





Nutrela



According to the Centers for Disease Control and Prevention (CDC), obesity now affects nearly 35 percent of the population of the United States, over 29 million people have been diagnosed with type 2 diabetes, and heart disease is the number one killer. High levels of LDL (bad) cholesterol and triglycerides and low HDL (good) cholesterol have all been linked to atherosclerosis. the main cause of cardiovascular disease (CVD). Most scientists would agree that less saturated fats, lower sugar and salt

intake, and more fresh fruit and vegetables go a long way to avoiding a range of "lifestyle diseases."

#### National health guidelines

recommend at least five portions, or 400 grams, of fruits and vegetables a day. Some studies suggest that one extra portion of fruit or vegetables daily could lower the risk of ischemic stroke by 6 percent. Others go further. To be healthy, they say, a person should eat only raw food. The principle of a raw food diet is that, just as the human body cannot tolerate temperatures above 40 degrees Celsius, or 104 degrees Fahrenheit, neither can food. Whatever we eat, say advocates, should not be heated above 104 degrees Fahrenheit.

In the raw food diet, foods may be eaten fresh, dehydrated with low heat, or fermented. This, say the raw food dieters, leaves the food "live," and "live" food is full of life energy. Cooked food is "dead." It has no life energy.

## What types of raw food diet are there?

A person on a raw food diet eats between 70 percent and 100 percent of their food raw. Some raw food dieters eat some food cooked, but mainly food is eaten raw. A raw food diet is not "all or nothing." It is about eating as much raw food as possible. A raw food diet can be quite sophisticated, using blenders and smoothie makers to make green smoothies, or dehydraters that blow air through food at a temperature below 115 degrees Fahrenheit, to make it crispy.

In 2010, the U.S. already had over 100 raw food restaurants. Highprofile personalities who follow the diet include Demi Moore and Gwyneth Paltrow. Mainstream magazines provide recipes. The message seems to be: You can fit more raw food into your life.

Elsewhere, people live simply in raw food communities or "eco-villages." Members cultivate their own food, without chemicals. They allow "weeds" such as dandelions to grow for consumption, and they harvest wild food in the mountains. For some, making the raw food diet a total lifestyle choice is more satisfying.

Beetles, worms, insects, and wild bird's eggs are considered "very tasty" by one writer, although he goes on to ask if it is really right to kill and eat animals. He notes that this question is "very disputed in the raw food scene," and he calls on people to respect each others' differences. Some "fully raw" dieters eat only whole foods, without chopping or juicing, to maximize fiber and nutrients. Studies have shown that the body may metabolize juice differently from whole foods.

There are also recommendations about mixing foods, for example, not mixing sweet and acid fruits. Fasting is recommended in some circles. A raw food diet does not have to be only fruit and vegetables. Raw vegans eat no animal produce, but a mixed raw food diet can include meat, fish, liver, and eggs. Clearly, these must be consumed

Image © iStock.com/ bhofack2 fresh, to avoid disease.

#### Raw food dieters may be:

Mixed raw food dieters, consuming small amounts of meat and fish, mostly uncooked

Ovo-lacto-vegetarian raw food dieters, eating no meat or fish
Vegan raw food dieters, avoiding all animal products.

A raw food diet, then, is not a single entity.

## What kind of food do raw food dieters eat?

Foods in their natural state are suitable. Popular foods include fruit, vegetables, nuts, water-soaked and sprouted seeds, beans, and grains. Some recommend fermented foods, such as kimchi and yogurt. "Sprouts" provide protein. They are prepared by soaking and sprouting beans or seeds in large glass containers or "sprouters." Raw nuts provide oil, and dried fruits give energy.

Wild foods such as mushrooms, plantain, and dandelion can be harvested freely, but wild food harvesters are warned to learn what is safe and what to avoid. Some say that water should come mostly from fruit and vegetables, but if extra is needed, it should be purified through distillation to eliminate additional chemicals.

PFNDAI Oct 2016

In one study, a group of 201 "raw fooders" were found to eat 95 percent of their food raw. They consumed between 1,029 and 1,313 grams of fruit a day, and 411 to 457 grams of vegetables. Overall, 97 percent of food consumed was of plant origin, with minimal bread, cereals, rice, legumes, and dairy products, such as unpasteurized milk and raw yogurt.

Their diet was high in fiber and low in energy. Most of the energy was from carbohydrates. Organic produce is preferable where possible, to avoid toxic pesticide residues. However, advocates concede that may nonorganic foods may be appropriate if limited availability would mean going without essential nutrients. Foods should be locally produced to reduce transportation and storage time, as this will start to "kill" the food.

### What are the benefits of a raw food diet?

Raw food dieters say that eating only raw food relieves the body of toxins, as toxins enter the body more slowly than they are eliminated. Websites include testimonials of individuals whose chronic disease disappeared once they started the raw food diet.

One website claims that cooking removes electrons from the food, detracting from the energy it provides. Expressions such as "light," "energy" and "life force" may be used. Sprouts, for example, as the start of a plant, are said to contain all its "life force." Eaten "live," this goodness is supposed to be passed on to the consumer.

Adherents claim that reducing protein intake is beneficial, because too much protein causes fermentation in the digestive system. Moreover, since the body naturally produces enzymes, some say, protein is not really needed. On the other hand, say raw food experts, cooking kills the enzymes in food, so that the body is unable to benefit from them anyway. Not all of these claims are supported by scientific research. Some, for example, regarding "life force," are not verifiable by scientific means. The U.S. Food and Drug Administration (FDA) have previously questioned some of the health claims for bean sprouts on one website.

#### Does it make nutritional sense?

Fresh fruit and vegetables are undoubtedly healthy, but a raw food diet can lead to nutritional deficiencies if not followed with care.

Some raw food proponents urge individuals to make their own diet plan, to avoid nutritional problems. People who are prone to deficiencies may need to adjust their diet, eat some cooked food, or take supplements. Each raw food dieter should be sensitive to their own body and needs.

#### Vitamin B12

Vitamin B12 is needed to keep red blood cells healthy, prevent anemia, and potentially protect against CVD. Animal produce is a good source of vitamin B12. One study found that 79 percent of raw food dieters had low or marginal levels of B12. Some successfully avoided this by using B12 supplements. B12 deficiency was most likely in vegan raw food dieters, and least likely among mixed raw dieters, suggesting that B12 deficiency stems from the lack of animal produce rather than not cooking, although eating only raw food also implies eating less meat.

Triglycerides and cholesterol A diet rich in fruit and vegetables is generally associated with low levels of triglycerides and cholesterol. In one study, 90 percent of raw food had healthy levels of LDL (bad) cholesterol and triglycerides. However, 46 percent also had low concentrations of HDL (good) cholesterol, and the more raw food consumed, the lower the level of both types of cholesterol. HDL is seen as useful in reversing the effects of LDL, but since LDL levels were low anyway, this was not considered a major problem, especially as all the participants had a lower risk of CVD than the general population.

#### Calcium

The intake of calcium, needed for healthy bones, can be low in a plant-based diet. Raw food dieters can get calcium from tofu, mustard and turnip greens, bok choy, and kale. Spinach is high in calcium, but it can oxalate, which inhibits absorption. Careful planning is needed to ensure sufficient calcium.

Carotenoids, and vitamin A Dietary carotenoids and vitamin A are associated with a reduced risk of chronic diseases. Raw food diets are said to be healthy because they provide high levels of carotenoids, but there has been little research to confirm this.

In one study, where 95 percent of dietary intake was raw food, mostly fruits, 82 percent of participants had normal vitamin A levels, and 63 percent had concentrations of bcarotene that are linked with the prevention of chronic disease.

The team concluded that very high consumption of fruit and vegetables in a raw food diet can provide enough vitamin A to protect from disease, as long as it is consumed with fat in the same meal, as, for example, by eating fruits with nuts and seeds.

## What about the benefits of cooking?

It is true that certain nutrients, notably vitamin C, are lost in cooking. The National Cancer Institute warn that charred food can produce carcinogenic substances. However, cooking can make food more suitable for human consumption.

Not only does heat kill bacteria, but it also breaks down fibers and substances that release more nutrients and help digestion. Root vegetables, for example, provide a range of nutrients, but they are hard to digest unless cooked. Some scientists have found that cooking tomatoes makes more lycopene available for the body to use. Lycopene may help to protect against cancer, although this has not been confirmed. One study has found that levels of lycopene were below the recommended levels in 77 percent of raw food dieters.

Some chemicals in food prevent the absorption of minerals such as zinc, iron, calcium, and magnesium, but heat reduces the levels of these substances. Cooking spinach, for example, makes more iron and calcium available. Cooking also makes food safe. Not only meat, but also sprouts can carry salmonella, listeria, and E. coli. Food Safety.gov recommends not giving raw sprouts to children, the elderly, pregnant women, and people with a weakened immune system. Claims that cooking damages or destroys "most" nutrients and leaves "mostly empty calories," do not, perhaps, help the raw food cause, since people have been cooking, eating, and thriving for at least 200,000 years.

**It's a Detox** "Detoxification" is a popular

concept, but there is little scientific evidence that a raw food "detox" eliminates toxins from the body. For one thing, a detox tends to focus on the gut and the liver, but toxins can collect anywhere in the body, not just these two places. As the Mayo Clinic point out, "Detoxification (detox) diets are popular, but there is little evidence that they eliminate toxins from your body." In the British Medical Bulletin, Dr. E. Ernst notes that the benefits of "detox" are unproven. There is a lack of serious research. he says. and it could lead to malnutrition. Dr. Ernst concludes that currently. "Alternative detox is biologically not plausible, and clinically unproved. We should warn our patients from using it."

#### Sustainability

Raw food advocates often note that people did very well before fire was invented. Animals do not cook, they say, so why should we? But the discovery of fire, up to 1 million years ago, radically transformed human life.

Eating raw means less damage to the environment from cooking fuels. But how much of the world's population can be sustained on wild, raw food, straight from the source? And how much transportation and refrigeration would be needed if everyone were to require raw food? As one skeptic notes, "In a natural setting, without electricity, anyone located outside of a narrow belt of land near the equators, which have year-round growth potential, would need to dedicate their entire day to growing, gathering, preserving, and storing food."

#### Raw food in the balance

The raw food diet can be controversial. Few would disagree

that more fresh food is good. Dr. Simon Capewell, of Newcastle University in the United Kingdom, told MNT recently that, as a doctor, he would recommend"almost unlimited" fruit and vegetable consumption. But not everyone finds the "raw" argument convincing.

As Cornell University researcher Rui Hai Liu points out, cooking makes vegetables taste good, and if they taste good, people are more likely to eat them. One research team suggests abandoning terms like vegan and vegetarian, and talking instead about eating healthy, whole, plant-based foods and minimizing the consumption of animal products.

Raw food specialists point out that a raw food diet is not healthful in itself. It must be used in the right way. People must be aware of their own body, how to avoid deficiencies, and how to keep healthy. A raw food diet needs planning, discipline, and a good understanding of what one is eating. It does not have to be extreme: People should just eat as much raw as they can. Any radical dietary change should be discussed first with a doctor.

"Meenhard," from a raw food community in Southern Spain, stresses that eating raw is not about dogma or ideology; it is about being healthy. Making raw food an ideology damages relationships between people. That is not what eating raw is about. Perhaps one day scientific research will prove that raw food really is the healthiest option. Then again, would we really turn away from the smell of freshly baked bread?

#### Written by Yvette Brazier

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PENDALOCT 2016

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