**JAN 2018** 

# **PFNDAI** Bulletin FOOD, NUTRITION & SAFETY MAGAZINE

# STRUCTURE FUNCTION CLAIMS: A BRIDGE BETWEEN SCIENCE AND CONSUMERS



Ways to Nurture & Nourish the Human Microbiome

PROTEIN FOODS AND NUTRITION DEVELOPMENT ASSOCIATION OF INDIA

## **Regulatory Round Up**

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# EDITORIAL

As our understanding of botanicals & herbals improves more health benefits found in them could be used in foods and medicines. Some of them have been used in food preparations traditionally so the line dividing the food and medicine becomes more and more blurred.

Many countries including India have been allowing food products in the categories of functional foods and nutraceuticals allow many botanicals which have health benefits. These foods may contain ingredients which may have the ability to help lower risk factors of health diseases like cancer or heart disease. Thus when these are consumed as part of the diet, these health benefits are the added advantages.

Regulatory agencies try to distinguish between the food and medicine by stating that the substances that cure diseases are medicines but those productsthat help reduce the risk involved in non communicable diseases (NCD's) may be categorized as foods. However, nature does not follow the regulatory orders but only the industries do. There are many substances and ingredients in nature which have been consumed as part of our diet for centuries and may have both values, food as well as medicinal.

Some of the early examples were foods containing vitamins and minerals exceeding the RDA. Some of the fruits are rich sources of vitamin C and amla has several times the RDA of vitamin C. By Indian drug laws it should be a medicine and in fact many ayurvedic medicinal preparations contain amla ingredients. However, the laws made exceptions for these substances or foods.

Again when products from food categories were allowed to use up to 1 RDA per serving or per 100g, the manufacturers need to add overages to ensure that some vitamins even after some degradation during their shelf life would remain above the declared levels. This also would have some problem with the regulation unless the drug regulations are amended to take care of the anomalies like these.

Now the possibilities of crossing the fooddrug boundaries are much more with the health providing ingredients and substances added to food products and supplements. As more research discovers newer substances as well as newer health benefits of known substances there are more chances of such things happening and even when food regulations permit such products, the drug inspector is not bound by food laws and he may declare the product to be drug and start prosecution stating that the food manufacturer making products without drug licence.

In order to avoid such harassments, care should not only be taken by food regulators but also proper amendments should be carried out in drug laws. This would not only make the manufacture of such products without hindrance and consumers can get the benefits of these products to reduce the risk of onset of many diseases whose cure is expensive and prolonged.

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

PFNDAI Jan 2018

# STRUCTURE FUNCTION CLAIMS: A BRIDGE BETWEEN SCIENCE AND CONSUMERS



By

In a globalized and knowledge intensive world, consumers tend to make purchasing decisions based on the information available with them.

In India, consumers collect information about the foods from a wide variety of sources, such as family/traditional knowledge, education, the media and advertisements, food product labels et cetera. Besides the general product and nutritional information, health benefits of a food are becoming important instruments in engaging with consumers. In the global regulatory terminologies, such information is defined as "claims". In order to understand the regulatory frameworks governing claims in general, and structure function claims specifically, the industry needs to comprehend how they are regulated.

Consumers and markets are at different levels of maturity both with regards to their ability to understand claims and enforce very complex mechanisms, hence Dr. Jasvir Singh, Regulatory, Scientific & Government Affairs Leader - South Asia DuPont Nutrition & Health (Danisco India Pvt. Ltd.)

development of national regulations is a vital step. Indian regulatory authorities (Food Safety and Standards Authority of India, Ministry of consumer affairs etcetera) are also discussing to revamp current labelling and claims framework. The new framework is expected to align with modern thought processes and global frameworks to address newer challenges.

Let us take a look at the global frameworks for regulating claims in general and structure/function claims in particular.

## 1. CODEX ALIMENTARIUS COMMISSION:

At a global level, Codex Alimentarius Commission of the Joint FAO/WHO Food Standards Program, is known as the reference point for food standards/ regulations. Although the implementation of the Codex Alimentarius is voluntary, the World Trade Organization has recognized it as a reference in international trade and trade disputes. The Codex Committee on Food Labelling (CCFL) develops guidelines on nutrition labelling and health claims. This committee has developed many standards guiding various aspects of labelling. Claims is one example, in which CCFL has provided guidance in the form of standards.

CODEX STAN 1 – 1985 (General standard for labelling of prepackaged foods) defines "Claim" as "any representation which states, suggests or implies that a food has particular qualities relating to its origin, nutritional properties, nature, processing, composition or any other quality." While this definition plays the role of an overarching guideline, CODEX has laid down another guideline to specifically deal with nutrition and health claims (CAC/GL 23-1997). This guideline has provided the following definitions:

"Nutrition claim" means any representation which states, suggests or implies that a food has particular nutritional properties including but not limited to the energy value and to the content of protein, fat and carbohydrates, as well as the content of vitamins and minerals.

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Claims on Dietary Supplements: Among the claims that can be used on food and dietary supplement labels are three categories of claims that are defined by statute and/or FDA regulations: a. Health claims, b. Nutrient content claims, and c. Structure/function claims.

#### The Dietary

Nutrition claim can be further classified into three types: a. content claim - where emphasis is only on the content of a nutrient, b. comparative claim - where nutrient content in one food is compared to that of another, and C. non-addition claim - where emphasis is on non-addition of an ingredient.

"Health claim" means any representation that states, suggests, or implies that a relationship exists between a food or a constituent of that food and health. Health claims include the following: a. Nutrient function claims – a nutrition claim that describes the physiological role of the nutrient in growth, development and normal functions of the body. b. Other function claims – These claims concern specific beneficial effects of the consumption of foods or their constituents, in the context of the total diet on normal functions or biological activities of the body. Such claims relate to a positive contribution to health or to the improvement of a function or to modifying or preserving health. c. Reduction of disease risk claims -Claims relating the consumption of a food or food constituent, in the context of the total diet, to the reduced risk of developing a disease or health-related condition.

Supplement Health and Education Act of 1994 (DSHEA) established some special regulatory requirements and procedures for structure/function claims. Such claims can be made in either of the following ways:

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i. Role of a nutrient or dietary ingredient intended to affect the normal structure or function of the human body, for example, "calcium builds strong bones." ii. Means by which a nutrient or dietary ingredient acts to maintain such structure or function, for example, "fiber maintains bowel regularity," or "antioxidants maintain cell integrity." iii. General well-being claims describe general well-being from consumption of a nutrient or dietary ingredient. This is allowed only if they also say how widespread such a disease is in the United States.

Such structure/function claims do not require any pre-approval. But the manufacturer is required to submit a one way notification to FDA, along with the text of the claim, within 30 days of introducing the product in market. Such products are also required to carry following disclaimers on the label:

i. FDA has not evaluated the claim.ii. Dietary supplement product is not intended to "diagnose, treat, cure or prevent any disease," because only a drug can legally make such a claim.

#### **Conventional Foods:**

Structure/function claims for conventional foods typically focus on effects derived from nutritive value, while structure/function claims for dietary supplements may focus on non-nutritive as well as nutritive effects. However, the FDA is likely to interpret the dividing line between structure/function claims and disease claims in a similar manner for conventional foods as for dietary supplements.

FDA does not require conventional food manufacturers to notify FDA about their structure/function claims, unlike the case of dietary supplements where such notification is mandatory. There are also no mandatory disclaimers required for claims on conventional foods.

## 3. EU:

EU issued a regulation no: 1924/2006, which revamped the regulatory framework for making claims in 2006. This regulation specified the types of health claims as follows:

a. The so-called 'Function Health Claims'(or Article 13 claims)i. Relating to the growth, development and functions of the body

ii. Referring to psychological and behavioral functions

iii. On slimming or weight-controlb. The so-called 'Risk Reduction Claims' (or Article 14(1)(a) claims) on reducing a risk factor in the development of a disease.

c. Health 'Claims referring to children's development' (Article 14(1)(b) claims).

Out of the above article 13 claims can be made in general, if they are based on generally accepted scientific evidence; and are well understood by the average consumer.





# GOOD BUY! NUTRELA SOYA. GOODBYE! INDIA'S PROTEIN-DEFICIENCY.

Recent survey suggests that 73% of Indian diets are protein-deficient\*. Part of the reason lies in the insufficiency of protein content in conventional protein sources such as eggs, lentils, meat, milk etc. Moreover, the steep cost (per 100 gms of protein) of these sources further makes it difficult for families to fulfil their daily protein need. We at Ruchi Soya; the makers of Nutrela Soya Chunks & Mini Chunks and Soya Granules, help consumers bridge this gap by providing the richest source of protein at the most affordable price. Soya contains 52% protein which is significantly above the protein content in eggs, lentils & milk all put together. We urge you to make soya an integral part of your diet recommendations. Let us join hands to help India say a GOODBYE to protein-deficiency!



| FOOD                   | Approx Protein%<br>/100gm | Approx<br>Price/100gm |
|------------------------|---------------------------|-----------------------|
| NUTRELA SOYA<br>CHUNKS | 52                        | 9                     |
| DAL                    | 25                        | 10                    |
| MEAT                   | 22                        | 45                    |
| PANEER                 | 19                        | 32                    |
| EGG                    | 14                        | 12                    |





## 4. INDIA:

Current Food Safety & Standards (Packaging & Labelling) Regulations, 2011 have provided the following definitions:

(i) "Health claims" means any representation that states, suggests or implies that a relationship exists between a food or a constituent of that food and health and include nutrition claims which describe the physiological role of the nutrient in growth, development and normal functions of the body, other functional claims concerning specific beneficial effect of the consumption of food or its constituents, in the context of the total diet, on normal functions or biological activities of the body and such claims relate to a positive contribution to health or to the improvement of function or to modifying or preserving health, or disease, risk reduction claim relating to the consumption of a food or food constituents, in the context of the total diet, to the reduced risk of developing a disease or health related condition;

(ii)"Nutrition claim" means any representation which states, suggests or implies that a food has particular nutritional properties which are not limited to the energy value but include protein, fat carbohydrates, vitamins and minerals;

However, there is no further detail available relating to the specifics of various types currently. This is mainly because the current framework is a carry-over of the framework which existed in rules under Prevention of Food Adulteration Act. Food Safety & Standards Authority has recently circulated a new draft for comments by stakeholders, to replace the current provisions of labelling and claims.

This document provides the following definitions and examples: 1. Nutrient Function Claim is that which describes the physiological role of the nutrient in growth, development and normal functions of the body. Example:

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nutrient 'A' (naming a physiological role of nutrient A in the body in maintenance of health and promotion of normal growth & development). Food X is a rich source of / high in nutrient 'A'.

2. Other Function Claim - that describe the specific beneficial effects of the consumption of food(s) or their constituents, in the context of the total diet or normal functions or biological activities of the body. Such claims relate to a positive contribution to health or to the improvement of a function or to modifying or preserving health. Example:

"Substance A (naming the effect of substance A on improving or modifying physiological function or biological activity, associated with health). Food Y contains X grams of substance A."

These details are further strengthened by the additional details about claim conditions, and model statements provided in the annexure to the regulations. It is expected that this new regulation will also provide claim approval process, procedure for redressal of non-compliance, advertisement correction if required. A separate guideline for operations of claims approval and complaints redressal will also be available. In addition, this document is expected to cover a list of approved nutrition claims, health claims and conditions for making claims regarding use of words like natural, fresh, pure, original, traditional, premium, real etcetera.

As we can see, the same area of structure function claims has been named in different ways by different geographies. While the US calls it structure function claim, Codex calls it as nutrient function and other function claims, EU defines it as article 13 claims and India will probably call it as nutrient function and other function claims similar to the Codex.

We also need to realize that whichever framework is enforced, that framework will become dated one day. This is especially important in today's age, when scientific developments are occurring at a much faster pace compared to developments in regulatory frameworks. New scientific developments require newer claims to be created, approved and regulated.

Therefore, there will always be a need for two approaches at all times. First, how can we govern existing claims and second, how can we approve new claims.

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## COVER STORY

To address this need, a general guidance is available in Codex Guidelines for use of nutrition and health claims (CAC/GL 23-1997) in two forms.

1. Guidelines for making nutrition and health claims

2. Recommendation on scientific substantiation of health claims Codex has provided general guidelines on making claims in CAC/GL 1-1979, and specific guidelines on making nutrition and health claims in CAC/GL 23 – 1997.

In summary, while many skeptics view them as mere marketing techniques used by food companies, nutrition and health claims on foods do have the potential to contribute to the achievement of public health objectives. Nutrition labelling provides consumers with information about the nutritional properties of a food, and nutrition and health claims provide information to consumers about the nutritional and health advantages of particular foods or nutrients. However, this role will only be effective when there are clear guidelines, and the industry takes responsibility in adhering to the guidelines, regardless of them being voluntary or mandatory. Many countries have already adopted frameworks to govern this area, and India is in the process of putting up a framework. Initial signs do suggest that India is on the right track, as it seems to have adopted the global best practices in a very pragmatic manner.

These developments augur well, both for providing a level playing field to the industry and a trustworthy mechanism to ensure ethical delivery of promise to the consumers. Hopefully this will also result in expansion of market for products based on scientific claims. Apart from ensuring availability of products to consumers, success of such products may also result in increased investment in science and technology by the companies involved.

#### **References:**

1. Food Safety & Standards (Packaging and Labelling) regulations, 2011

2. Regulation (EC) No: 1924/2006 of the European Parliament and of the Council, of 20 December 2006, on nutrition and health claims made on foods

3. https://www.fda.gov/Food/ IngredientsPackagingLabeling/Lab elingNutrition/ucm2006881.htm 4. Codex Guidelines for use of nutrition and health claims (CAC/GL 23-1997)

# EVENTS

राइक,

#### Vibrant Saurashtra Expo & Summit 2018

April 20-23, 2018 Race Course Ground Rajkot, Gujarat M: +91 82384 98958 E: sanjay.octagon@gmail.com W: http://www.vibrantsaurashtra.com/

#### F&B Pro World Expo Expo & Conf in Mumbai & Goa May 11-13, 2018 World Trade Centre, Cuffe Parade, Mumbai

## Nutraceutical and Functional Food Asia Pacific

June 6-8, 2018 Singapore Novotel Singapore Clarke Quay T: +86 21 5580 0330 Ext: 8033 E: mia.shen@nutraceutical-food.com

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IFT 18 A Matter of Science + Food July 15-18, 2018 Chicago, IL, USA W: Iftevent.org

21st World Congress on Nutrition & Food Sciences July 09-10, 2018 Sydney, Australia E: worldnutrition@ conferencesworld.org

## 15th India Hospitality F&B Pro Expo, Goa

August 2-4, 2018 Dr Shyama Prasad Mukherjee AC Stadium, Panaji, Goa T: +91 9769555657 E: cmd@trinityworld.biz W: www.trinityworld.biz

#### Conference on Recent Advances in Food Processing Technology August 16-18, 2018

Indian Institute of Food Processing Technology Thanjavur, Tamil Nadu E: icrafpt@iifpt.edu.in Aahar: International Food & Hospitality Fair August 23-25, 2018 Chennai Trade Centre, Chennai Thanjavur, Tamil Nadu T: +91 87440 88116 E: maurya@aifpa.net

#### National Seminar on Indian Dairy & Food Industry September 14-15, 2018

NDRI Grad. Association National Dairy Research Institute, Karnal **T:** +91 9812077005 **E:** ndri.grads@gmail.com **W:** www.ndrigrads.com

## IUFoST 2018 India World Congress of Food Sci & Tech October 23-27, 2018 Mumbai W: https://www.iufost2018.com/ index.php

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# WAYS TO NURTURE & NOURISH THE HUMAN MICROBIOME

Microbes were considered undesirable in foods as they produce pathogenic infections severely compromising human health and even cause death. They also spoil foods making them unsafe and/or unfit for consumption. Thus food scientists spent a lot of time investigating ways to destroy or stop microbes. Consumers have been using hygiene products as well as antimicrobial agents to avoid these microbes. However, of late there has been significant interest in sustaining and even empowering microbes that have been colonising humans for millennia: the human microbiome.

Human microbiome research is still in infancy hence very little about it is definitively understood. As details emerge, it is becoming clear that the relationship between microbiome and the human host is multifaceted and mostly beneficial to human health. Nurturing and nourishing microbiome can help it function optimally and emerging research shows ways to accomplish it.

First, it is important to understand the term human microbiome. Ecologically it is an array of bacteria, viruses, fungi, archaea and single-celled eukaryotes living in and on the human body. However, some do not accept this connotation and refer to the microbes inhabiting humans as microbiota. They consider microbiome encompasses not only the vast array of microbiota but also all their genes. Reason for this nitpicky may be that although human body has 37 trillion cells making up skin, blood, nerves, muscles, tissues and organs with same DNA and same genes, but as cells differentiate into different tissues and organs and will determine the kind of microorganisms that reside in and on human body. Thus each person's microbiome is at least as unique and diverse as the person's genome.

Human genome contains about 20,000 genes but for each of these there may be as many as 300 microbial genes. Estimates of microbes living in and on humans vary but all agree that it is a huge number, approximately 1013 or 100 trillion microbes.

#### Forming Human Microbiome

Microbes inhabited earth long before plants and animals and were everywhere. When plants and animals came into existence, these provided them new habitats. Each animal and plant has its own set of microbiota with which it has symbiotic partnership. The symbiosis between humans and their microbiota begins mostly at birth. As the baby travels through the birth canal, it is exposed to a set of microbes residing in mother's urogenital and intestinal tracts. Baby delivered by caesarean section obtains a different set of microbes: mostly those residing on human skin and not necessarily the mother's.

Microbiota on skin are not the same as those in urogenital tract and this may have a profound effects on a child's digestion, immune system and perhaps long-term health. Whether or not infants receive breast milk, another early microberich exposure, also may have lasting impact on babies' microbiome development and health. Studies indicate that infants born via caesarean section and formula-fed babies have increased risk for allergies, asthma, cardiovascular disease, obesity, immune deficiencies. leukemia and inflammatory bowel disease (IBD).

After they are born, young infants acquire microbes from breast milk or formula, family members, pets and their immediate surrounding environment. As they grow they start acquiring microbes from soil, water, external surfaces and solid food. For babies food not only provides microbes but also nourishes microbes growing in intestines, changing environment of gut microbiota. By three years of age, microbiota of children closely resembles those of adult and in

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The Value Adding Partnership The Co-Development Company adulthood, each has a microbiome that is diverse and unique. The microbes in adults are result of microbiota encountered at birth and also influences like antibiotic use. stress, illnesses, intimate contact with others and dietary intake. Thus no two human microbiomes are exactly alike. There may be similarities and even a core microbiota shared among individuals in a population, the gut microbiota is like a fingerprint: unique. Even twins or people with similar diets will have different microbiota



Different microbes grow best on different sites. Some grow best on skin while others adapt to environment inside nose or mouth. The most densely and diversely populated place is gastrointestinal tract. Experts believe that intestinal microbiota may play the most important role in maintaining human health, aiding in digestion, nutrient absorption, immune responses and even brain function.

## Effect of Diet on Microbiome

Gut microbiome is very much responsive to dietary intake as different foods sustain different microbiota. The microbiota survive on the diet humans consume and in doing so, consume part of food that humans could not digest without them. In healthy normal individuals, most carbohydrates, proteins and fats are digested in the mouth, stomach and small intestine. But some carbohydrates like resistant starch, cellulose, etc. can be digested only in colon. Gut microbiota, mostly anaerobic and their genes facilitate fermentation of these molecules, creating substances like short chain fatty acids that nourish good bacteria.

In a sense a person eats not just for own but also for trillions of microbes. Food choices are important as some promote growth of microbes associated with good health while others promote growth of those associated with poor health outcomes. Diet is thus the most powerful way to change the composition of gut microbiota and activate their genes. Diet that seems to be most beneficial to health-promoting gut microbes is one that is rich in high-fibre foods like vegetables, fruits, legumes and whole grains. Each contains dietary fibre with a unique fibre profile with varying soluble versus insoluble, viscous versus non-viscous. fermentable versus nonfermentable fibres, and impacting microbiota and the host in unique ways.

Fibre-rich foods are incredibly beneficial to gut microbiome as they travel beyond stomach, and small intestine, into the colon where most gut microbes live. These foods provide fuel that these microbes need to grow and function properly. While all plant foods contain fibre, some are better as these contain non-digestible soluble fibre or probiotics.

Probiotics are non-digestible fermentable food substances that favourably alter the number and activity of gut microbes leading to improvement in host health. Colonic fermentation by gut microbes produces gases like methane and carbon dioxide along with short chain fatty acids. These fatty acids lower the pH of colon making gut inhospitable acidic environment for pathogenic bacteria like Salmonella, Vibrio and Heliobacter. It also fortifies intestinal lining and regulates immune responses.

Without the fermentation of probiotics, pathogenic bacteria could outgrow beneficial intestinal microbes. This causes intestinal dysbiosis i.e. an imbalance in microbiota often observed in disease states. Intestinal dysbiosis is associated with increased risk of cardiovascular disease, colorectal cancer, IBD and type II diabetes.

Some undigested proteins also are fermented in the colon, but this appears to promote the growth of pathogenic bacteria. Although it is not clear but when diet is high in protein, some proteins are easily digestible but others are not. Thus less digestible proteins reach the colon and get fermented producing end-products, some of which are beneficial helping microbiota's digestion of fibre and branched chain fatty acids but some other compounds that are thought to contribute to colorectal cancer.

While low-carb high-protein diets may be effective for weight control, they may not be so good for gut microbiota. Influence of dietary fat is not adequately researched nor is fully understood. Although bacteria do not use lipids for energy, their presence may impact their activity as well as the host.

## Gut Microbiota

Gut microbiome is closely connected with human genetic landscape and helps shape metabolism throughout life. Genes of gut microbes facilitate metabolic pathways allow digestion of certain compounds which humans genes cannot. Besides, certain nutrients from diet that are essential for human life such as vitamins folate, B12 and K can be manufactured only through gut-residing microbes. It has also been suggested that they also influence the tendency to store fat or burn it and to stimulate lowgrade inflammation, both being important in management of obesity and other metabolic diseases. Studies of lean and obese mice seemed to suggest that imbalanced proportion of two microbial groups may determine obesity.

Later studies on mice and humans seemed to confirm this. Soon a hypothesis emerged that preventing obesity may be as simple as altering the proportion of microbial phyla in the gut, but recent studies dispels that theory when they found no common microbial attributes in obese people that would make their gut microbiota distinct from that of leaner individuals. More specific information down to genus, species and strain levels may be needed to understand the bacteria present and their role in the gut including host appetite, metabolism, energy balance and other physiological effects.

It has been accepted that high-fibre diets lead to weight loss, decreased blood lipids etc. which are healthy. Some may be due to reduced caloric intake but much may probably due to positive effects of short chain fatty acids produced from fibre by gut bacteria. Gut bacteria affect how much energy is derived from diet and how it impacts our metabolism. Further research on humans is needed to determine whether and how composition of microbiota affects caloric intake, fat storage and obesity.

Although scientists may not tell what is a healthy balanced gut microbiome or whether imbalanced microbiota cause obesity, they are certain about an association between intestinal dysbiosis and gastrointestinal diseases. Research has pointed that people with IBD have certain markers of intestinal dysbiosis especially too many or too little of certain microbes common in gut are associated with IBD. The scientists however do not know whether they are the cause or effect of disease.

IBD have been used as models for understanding the interaction between gut microbiota and the immune system as the disease is caused by inflammation which is an automatic response of immune system. Besides gut microbes, stress, infections, genetic factors and even diet play roles in the manifestation of IBD. While scientists agree that high fibre foods like vegetables, fruits, legumes and seeds are beneficial for healthy gut microbes, people diagnosed with IBD are advised to avoid such foods. However, some studies suggest that probiotics may be helpful in management of IBD, obesity and other manifestations of intestinal dysbiosis as well as for improving immunity and digestive health.

Probiotics are live microbes that when administered populate the gut with good microbes that benefit the host. The idea that certain types of microbes confer health benefits has boosted growth of probiotics market. Efficacy of various products with probiotics may be uncertain and regulatory environment is dicey, but most believe that these products may be

able to maintain gut health or prevent dysbiosis. Research is ambivalent right now. One of the reasons for this is that very few probiotics can survive the journey through the GI tract. It is a harsh environment made up of digestive enzymes, bile acids and hydrochloric acid that destroys many microbes – both pathogenic and beneficial. Another

Image © 1Stock.com chombosan reason is that the microbiota of healthy humans differ greatly, so no one strain or strains can be touted as universally beneficial to every human's intestinal microbial habitat. In other words, a microbial strain that benefits one person may not be effective or beneficial in another person.

Though studies suggest association between composition of gut microbiota and other complex diseases, evidence for support is limited and mostly in mice. Also no one is sure that the gut microbiota acts alone in the manifestation of a disease as microbiota from other sites in body also play roles as they are not passive bystanders. They play active roles in the dynamic balance between health and disease. Still gut microbiome research is intriguing and indicates complex interactions between diet, intestinal microbiota, metabolism, inflammation and disease. Scientists around the world have committed significant resources to unravel the mysteries of human microbiome and conclusive data will emerge in near future.

Condensed from article: "What Makes a Robust Microbiome?" by Toni Tarver in Food Technology November 2016, Volume 70, No.11



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# REGULATORY ROUND UP

## Penning this

Regulatory Round up has been one great learning process for me. It requires that I go through all the regulations in detail

By

REQUIRE

to put down the salient points. I have also attempted to highlight non FSSA regulations which has impact on food business like Standards published by Bureau of Indian Standards (BIS), Ministry of Environment and Forestry, etc.

## Standards

Final notification amending the pesticide residues in different primary food, food products and categories. 20 pesticides have been moved to banned pesticide listmeaning they should not be used. To take care of the residues on account of past application, a maximum limit of 0.01.mg/kg ( 0.05 mg/kg for DDT) has been set.

Final notification amending the standards of Iron fortified salt.

Final notification permitting additives in Ready Drink Infant formula, permitting yeast in biscuits, etc.

Draft regulation on Packaging has been released. FSSAI is in the process of splitting the present Packaging and Labelling Regulation into two separate regulations. Standards for different food contact material including overall and

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

specific migration limits of contaminants have been set in the draft regulation. Cross references to BIS standards are given. Please note that IS standards have to be purchased. One new aspect of the draft is that printing inks used on the packaging material has to comply with the IS 15495. These aspects need to be discussed with the vendors of packaging material.

## Draft Gazette notification on claims

and advertisement. One more opportunity to send in the comments and suggestions. The last date is 13th April 2018.

## Draft notification on the standard

of vegetable oils. Standard of Identity of number of oils like Kachi ghani mustard oil, Palm stearin, Palm kernel olein, Palm kernel stearin, Superolein, etc. Vanaspati standard has been modified so that any oil listed in the regulation could be used in its manufacture. The draft stipulates limit for Peroxide value in all standard vegetable oils.

## General

FSSAI has constituted a working group to develop procedures for the use of Ethylene for controlled ripening. FSSAI has requested comments and suggestions from the stakeholders. <u>FSSAI has issued a</u> warning on currency notes and coils being a source of microbial contaminants. This is

critical where the currency and the food is being handled by the same person like street vendors.

Protein Foods & Nutrition Development Association of India

FSSAI has issued a list of 200 Indian FBOs who have been asked to submit the details of their Recall Team within 30 days and the detailed Recall Plan within 60 days. Please check whether your organization is in the list. For the recall plan, Recall Regulation can be referred to.

BIS makes voluminous number of standards practically in every field including Food and Agriculture. The Food and Agricultural committee is known as FAD. Within FAD there are number of committees handling different sectors in Foods. A few IS standards like that of Packaged drinking are mandatory. <u>BIS periodically revises</u> <u>its standards and the drafts are put</u> <u>at the website for wider circulation</u>. It is worth to have a periodical look.

Ministry of Environment and Forestry has amended the Plastic Waste Management Rules 2016. The amendment introduces a new definition "Alternate Use" of plastic. Now the manufacturers or producers can either recycle or find a safe alternate use for packages made out of plastic. Regret not able to give a link to the Regulation.



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# RESEARCH IN HEALTH &NUTRITION

Caffeine may prolong life for kidney disease patients Medical News Today 4 November 2017 By Honor Whiteman

Chronic kidney disease is one of the leading causes of death in the United States.

But a new study suggests a simple strategy that may help patients with the condition to improve their survival: drink more coffee. Researchers found that patients with chronic kidney disease (CKD) who consumed the highest amounts of caffeine saw their mortality risk cut by almost a quarter, compared with those who consumed the lowest amounts.

Study co-author Dr. Bigotte Vieira, of the Centro Hospitalar Lisboa Norte in Portugal, and colleagues recently presented their findings at Kidney Week 2017 — the annual meeting of the American Society of Nephrology, held in New Orleans, LA. CKD is a progressive condition wherein the kidneys gradually lose their ability to filter water and waste products from the blood. Over time, CKD may progress to kidney failure, or endstage renal disease, making kidney transplantation or dialysis the only treatment options. It is estimated that more than 30 million adults in the U.S. have CKD, and around 661,000 U.S. individuals have kidney failure. In 2014, more than 48,000 people in the U.S. died from kidney disease, making it the ninth leading cause of death in the country.

Mortality risk reduced by up to 24 percent

Numerous studies have hailed caffeine for its potential lifeprolonging benefits, but Dr. Vieira and colleagues note that it is unclear whether or not patients with CKD may reap such rewards. To find out, the researchers analyzed data from the 1999–2010 National Health and Nutrition Examination Survey, identifying 2,328 patients who had CKD.

The daily caffeine consumption of participants was assessed at study baseline, and subjects were divided into four groups based on these data:

First quartile, who consumed under 29.5 milligrams of caffeine daily

> second quartile, who consumed 30.5 to 101 milligrams of caffeine daily

> third quartile, who consumed 101.5 to 206 milligrams of caffeine daily

> fourth quartile, who consumed 206.5 to 1,378.5 milligrams of caffeine daily

The researchers then looked at the mortality of each participant and how this was associated with caffeine intake. Compared with subjects in the first quartile of caffeine consumption, those in the fourth quartile were 24 percent less likely to die of all causes, while those in the second and third quartile had a 12 percent and 22 percent lower risk of all-cause mortality, respectively. According to the team, these findings remained after accounting for participants' age, gender, race, blood pressure, smoking status, body mass index (BMI), and many other possible confounders.

Findings show promise

Dr. Vieira and team caution that because their study is observational. it is unable to prove cause and effect between higher caffeine consumption and reduced mortality in patients with CKD. That said, the researchers believe that their results indicate that drinking an extra cup of joe or two each day may offer health benefits. "These results suggest that advising patients with CKD to drink more caffeine may reduce their mortality. This would represent a simple, clinically beneficial, and inexpensive option, though this benefit should ideally be confirmed in a randomized clinical trial." Dr. Bigotte Vieira

## Grandparents, are you putting your grandchildren at risk of cancer?

Medical News Today 19 November 2017 by Maria Cohut

Grandparents should be more aware of the long-term health impact that their behaviour has on their grandchildren, a new study says.



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## **Research in Health & Nutrition**



Researchers suggest that the bad habits of part-time carers may lead to a raised risk of cancer in children later in life. Grandma and grandpa keep your bad habits in check or you may harm your grandchildren's longterm health. At least, this is what new research from the MRC/CSO Social and Public Health Sciences Unit at the University of Glasgow in the United Kingdom indicates.

Usually, and quite intuitively, research focuses on the impact of primary carers, such as parents, on the development of the children's health over time. This makes a lot of sense; children watch the people that they live with every day, and parents' behaviours can influence children's attitudes to food, their eating patterns, and their pull toward harmful habits such as smoking. Diet, smoking, drinking, and physical exercise can all become risk factors for a range of diseases later in life, from metabolic diseases such as obesity and diabetes to different forms of cancer.

Lead study author Dr. Stephanie Chambers and her colleagues have now evaluated the long-term health risks posed to children by grandparents who act as part-time carers. More specifically, they wanted to see how grandparents influence the risk of their grandchildren developing cancer. "Currently grandparents are not the focus of public health messaging targeted at parents and in light of the evidence from this study, perhaps this is something that needs to change given the prominent role grandparents play in the lives of children," Dr. Chambers says. The paper was recently published in the journal PLOS ONE.

Cut down on the sweet treats The researchers reviewed a total of 56 different studies from across 18 countries, all focusing on the impact of grandparents on the long-term lifestyle-related health risks in grandchildren. Dr. Chambers and her team focused on how grandparents' behaviour with and around grandchildren might contribute to long-term lifestyle patterns that could lead to a heightened risk of cancer. Such risks include smoking, an unhealthful diet, and lack of exercise.

Although grandparents may be wellintentioned when they pamper their grandchildren and shower them with sweets, or give them a break from the strict parental rule that may prohibit certain foods, sugary drinks, or harmful behaviours, this is precisely the sort of conduct that can lead to negative health outcomes in the children. The researchers found that grandparents who habitually give children "treats," overfeed them, or allow them to "chill out" and avoid physical activity negatively influence the grandchildren's weight gain and dietary patterns. Another harmful grandparent habit that the researchers identified was smoking around their grandchildren, thus exposing them to passive smoking and possibly influencing them to find cigarettes desirable.

Behaviours that encourage overeating and sedentarism and implicitly condone harmful habits such as smoking can all lead to unhealthful lifestyles associated with an increased risk of cancer. Still, Dr. Chambers notes that grandparents don't intend to harm their grandchildren in any way. "While the results of this review are clear that behaviour such as exposure to smoking and regularly treating children increases cancer risks as children grow into adulthood," she says, "it is also clear from the evidence that these risks are unintentional."

## Listen to the parents' concerns, too

Another issue brought to light by the research team was the fact that parents are often aware of the grandparents' undesirable behaviours around the children and vehemently oppose them. That being said, parents sometimes find it difficult to broach these topics openly, and to urge the grandparents to change their tack or stop exposing the children to tobacco smoke in the home.

Misguidedly generous grandparents, or grandparents who didn't mind indulging in their own bad habits around children, also appeared to be the focus of family tensions. "From the studies we looked at, it appears that parents often find it difficult to discuss the issues of passive smoking and over-treating grandchildren. Given that many parents now rely on grandparents for care, the mixed messages about health that children might be getting is perhaps an important discussion that needs to be had." Dr. Stephanie Chambers

While the studies reviewed by the team do not discuss "the emotional benefit of children spending time with their grandparents," it is important to consider how this relationship can influence the children's health trajectory. Prof. Linda Bauld, from Cancer Research UK, comments that more attention should be paid to how grandparents, as well as parents, act with and around children. "Children's health can be affected by range of factors, and this study reinforces the importance of the broader family picture," she says. "Children should never be exposed to secondhand smoke," stresses Prof. Bauld. "But," she goes on to say, "it's also important for children to maintain a healthy weight into adulthood. If healthy habits begin early in life, it's much easier to continue them as an adult."



Salt raises blood pressure, but our gut bacteria can stop it

Medical News Today 16 November 2017 by Ana Sandoiu

It's a known fact that too much salt can increase blood pressure. But new research brings gut bacteria into the mix, and some good news along with it: probiotics may help to reverse the harmful effects of excessive salt.

An overwhelming proportion of existing studies warn that a high intake of sodium drastically increases your chances of high blood pressure. Here at Medical News Today, we have reported on studies showing that too much salt can double your chances of heart failure, and that even a low intake of salt may still put you at risk of adverse cardiovascular events. But new research adds another key element to this dynamic: gut bacteria. Researchers from the Massachusetts Institute of Technology (MIT) in Cambridge, MA — together with researchers from various institutions in Germany — examined the effect of a high-salt diet on certain healthful gut bacteria.

## Studying salt, gut bacteria, and hypertension

Muller and colleagues fed two groups of mice a diet high in sodium and a normal diet, respectively, over a period of 14 days. Up to 4 percent of the former diet consisted of sodium chloride which is what we have as table salt — while only 0.5 percent of the normal diet consisted of sodium chloride. A fecal analysis revealed that high-sodium mice lacked a beneficial bacterium called Lactobacillus murinus. Additionally, the mice had more of the so-called Th-17 cells, a proinflammatory type of "T helper cells."

T helper cells are part of our immune system and they help create a pro- or anti- inflammatory response to a foreign agent in our body. They are called "helper" cells because they help other cells elicit an immune response.

Finally, in the experiment described in the study, the rodents that had been fed a diet high in sodium also had high blood pressure, or hypertension. Significantly, when the hypertensive rodents were administered doses of a probiotic containing Lactobacillus bacteria, the pro-inflammatory T helper cells decreased, as did the mice's blood pressure. To investigate further, the researchers conducted a pilot study in humans, in which they added 6,000 daily milligrams of sodium chloride in the diet of 12 individuals for a period of 2 weeks.

## Probiotics may reverse salt's harmful effects

Muller and colleagues found that adding salt created the same changes in humans as it did in mice: high blood pressure, a high number of Th-17 cells, and lower numbers of the helpful Lactobacillus bacteria. Interestingly, however, when people consumed a commonly available probiotic for a week before starting their highsodium diet, both their blood pressure and the Lactobacillus levels remained within normal limits.

While the effects of too much salt on Th-17 cells have been shown in previous research — also conducted by Muller — and this new study brings this knowledge further, the exact mechanism by which these immune cells drive hypertension have yet to be unveiled.

On this, study co-author Eric Alm, director of MIT's Center for Microbiome Informatics and Therapeutics, comments, "We're learning that the immune system exerts a lot of control on the body. above and beyond what we generally think of as immunity. The mechanisms by which it exerts that control are still being unravelled," he says. However, Alm notes, "If you can find that smoking gun and uncover the complete molecular details of what's going on, you may make it more likely that people adhere to a healthy diet."

The study's co-author also advises that the findings be taken with, well, a grain of salt: "I think certainly there's some promise in developing probiotics that could be targeted to possibly fixing some of the effects of a high-salt diet, but people shouldn't think they can eat fast food and then pop a probiotic, and it will be canceled out." Eric Alm

Lose fat, preserve muscle: Weight training beats cardio for older adults November 1, 2017 Science Daily

A new study by researchers at Wake Forest University suggests combining weight training with a low-calorie diet preserves much

needed lean muscle mass that can be lost through aerobic workouts. The findings, "Effect of Exercise Type During Intentional Weight Loss on Body Composition in Older Adults with Obesity," appear in the November issue of the journal Obesity.

"A lot of older adults will walk as their exercise of choice," said Kristen Beavers, assistant professor of health and exercise science at Wake Forest and lead author of the study. "But this research shows that if you're worried about losing muscle, weight training can be the better option."

In this 18-month study of 249 adults in their 60s who were overweight or obese, restricting calories plus resistance training in the form of weight-machine workouts resulted in less muscle loss, but significant fat loss, when compared to weight loss plus walking or weight loss alone. Losing weight is generally recommended for those with obesity, but preserving muscle -- while losing fat -- is particularly important for older adults in order to maximize functional benefit. Beavers said. "Surprisingly, we found that cardio workouts may actually cause older adults with obesity to lose more lean mass than dieting alone."

Loss of lean mass could have important consequences given the high risk of physical disability among the growing population of older adults. The findings: > Total fat loss was much greater when participants combined diet plus walking (about 16 pounds) and diet plus weight training (about 17 pounds). Diet alone resulted in about 10 pounds of fat lost over 18 months. > Muscle mass loss was greatest with diet plus walking (about 4 pounds) compared with diet alone or diet plus weight training (each about 2 pounds). Put another way, the percentage of weight loss coming from muscle mass was 20% in the weight loss plus walking group, 16% in the weight loss alone group, and 10% in the weight loss plus weight training group.

> Loss of fat was associated with faster walking speed, while loss of muscle was associated with reduced knee strength.

These results may be even more important for older adults who gain and lose weight with frequency, because seniors typically don't regain muscle -- they regain fat mass -- which is "all the more reason for older adults to try and preserve muscle mass during weight loss," Beavers said.

This is the latest study from the Cooperative Lifestyle Intervention Program (CLIP-II), a single-blind, randomized controlled trial. The participants were randomly assigned to one of three groups: a weightloss-only group, who followed a calorie-restricted diet with no exercise regimen; a weight loss plus cardio (i.e., walking) group; and a weight loss plus weight-training group.

## Study lists foods for fighting rheumatoid arthritis symptoms and progression

Science Daily November 8, 2017

A list of food items with proven beneficial effects on the progression and symptoms of rheumatoid arthritis is provided in a new study published today in Frontiers in Nutrition.

The authors suggest incorporating these foods into the diet to support the management of this debilitating autoimmune disease. "Regular

consumption of specific dietary fibers, vegetables, fruits and spices, as well as the elimination of components that cause inflammation and damage, can help patients to manage the effects of rheumatoid arthritis," says Dr. Bhawna Gupta, who completed this study together with Ms. Shweta Khanna and Mr. Kumar Sagar Jaiswal at the Disease Biology Lab, School of Biotechnology, KIIT University, India. "Incorporating probiotics into the diet can also reduce the progression and symptoms of this disease."

She continues, "Patients suffering from rheumatoid arthritis should switch from omnivorous diets. drinking alcohol and smoking to Mediterranean, vegan, elemental or elimination diets, as advised by their doctor or dietician." Rheumatoid arthritis causes pain, swelling and stiffness in the joints, severely impacting quality of life. It is difficult to detect the early onset of the disease and if undetected or misdiagnosed has a rapid rate of progression in the first few years. The first line of treatment includes disease-modifying anti-rheumatic drugs, but these can be expensive.

"Supporting disease management through food and diet does not pose any harmful side effects and is relatively cheap and easy," Dr. Gupta explains. "Doctors, physicians and dieticians can use our study to summarize current proven knowledge on the links between certain foods and rheumatoid arthritis. Knowing the nutritional and medicinal requirements of their patients they can then tailor this information for the betterment of their health."

Image © iStock.com/SoumenNath

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Various dietary plans for rheumatoid arthritis, such as vegan, 7-10 days fasting and Mediterranean, have long been recommended. This study -- only the second overall assessment of diet and food on this disease -provides a very thorough evaluation of current scientific knowledge and makes a point of only reporting dietary interventions and specific foods that clearly show proven longterm effects.

Foods highlighted as reducing the progression and symptoms of rheumatoid arthritis range from fruits such as dried plums, blueberries and pomegranates, to whole grains, the spices ginger and turmeric, as well as specific oils and teas. They can provide a range of beneficial effects, such as lowering inflammatory cytokines (chemicals released by the immune system that can cause problems in rheumatoid arthritis patients), reducing joint stiffness and pain, as well as lowering oxidative stress -- the ability of the body to counteract or detoxify harmful chemicals.

The authors hope the study can also be used as a reference for the development of new medicines. "Our review focused on specific dietary components and phytochemicals from foods that have a proven beneficial effect on rheumatoid arthritis," says Dr. Gupta. "Pharmaceutical companies may use this information to formulate 'nutraceuticals'. Nutraceuticals have an advantage over chemically-tailored medicines as they are not associated with any side effects, originate from natural sources and are cheaper."

Dr. Gupta concludes by offering some advice for those hoping to use the findings of their study. "We reviewed research from several laboratory experiments under different conditions. Dietary components vary according to geography and weather conditions, so patients should be aware of their nutritional requirements, allergies and any other food-related disease history. We strongly suggest the general public consult doctors and dieticians before following any diet program or food compounds discussed in the study."

## Proteins in breast-milk protect offspring against food allergy

Science Daily November 20, 2017

Research published in the Journal of Experimental Medicine indicates that a mother's diet can protect nursing newborns against food allergies.

Conducted by researchers at Boston Children's Hospital and Harvard Medical School, the study offers an explanation for how breastfeeding can promote tolerance to the foods that most often cause allergies. The study received support from Food Allergy Research & Education (FARE), the world's largest private source of funding for food allergy research. Michiko Oyoshi, the senior author of the study, received FARE's Mid-Career Investigator in Food Allergy Award in 2015.

In mice, milk from mothers exposed to egg protein gave protection against egg allergy not only to the mothers' own offspring, but also to fostered newborns whose birth mothers had not received egg. Newborns gained an insignificant degree of protection from mothers who were exposed to egg during pregnancy but did not breastfeed them. The protective effect was strongest when the newborns were born to and nursed by mothers who were exposed to egg before and during pregnancy and breastfeeding.

The study's findings are consistent with new dietary recommendations for pregnant and nursing mothers. Previous research had not been



conclusive, with some studies indicating a protective role for breast-milk, and others suggesting that children could become allergic to foods they encountered through their mother's diet.

Pregnant and breastfeeding mothers were sometimes cautioned against consuming foods that commonly cause allergy, such as milk, egg, peanut, tree nuts, soy, wheat, fish and shellfish. More recently, feeding peanut foods to infants at high risk for peanut allergy was shown to decrease, not increase, the babies' likelihood of developing allergy to peanut. Allergists now recommend that, unless mothers already have diagnosed food allergies, they should not avoid allergenic foods while pregnant and nursing.

"This elegantly designed and controlled study shows that mothers should feel free to eat a healthy and diverse diet throughout pregnancy and while breastfeeding," said Dr. James R. Baker, Jr., FARE CEO and Chief Medical Officer. "Eating a range of nutritious foods during pregnancy and breastfeeding will not promote food allergies in developing babies, and may protect them from food allergy."

At the same time, Baker notes that maternal and early childhood diets do not cause food allergies in children. Most children do not develop food allergies, regardless of how they are fed., while some children develop allergies even when fed an optimal diet. "More research is needed to untangle the factors contributing to make food allergies much more prevalent in recent decades."

The food allergy protections described in the study are dependent on specific proteins, some provided by the mother, others by the offspring. By identifying these proteins and proposing a mechanism through which mother and offspring contribute to the development of food tolerance in the newborn mouse, the research opens new opportunities to study how the protections break down in the case of food allergy and how such breakdowns might be prevented. Preventing food allergy is critical because there are no approved treatments for this serious and potentially life-threatening condition that affects 15 million Americans.

The mouse study found that when a nursing mother is exposed to a food protein, her milk contains complexes of the food protein combined with her antibodies, which are transferred to the offspring through breastfeeding. Aided by a protein in the offspring's gut lining and some immune cells, the food protein-antibody complexes are taken up and introduced to the offspring's developing immune system, triggering the production of protective cells that suppress allergic reactions to the food. These protective cells persist after antibodies from the mother are gone, promoting longterm tolerance to the food.

A similar mechanism may offer protection to human infants. "Humanized mice," in which some proteins of the mouse immune system have been replaced with human immune proteins, were protected from egg allergy by human breastmilk containing complexes of egg white protein and human antibody. Oyoshi's research team is now enrolling human mothers in a study that will compare breast-milk from mothers of children at low risk or high risk for food allergy and will examine the contents of breast-milk before and after the nursing mother eats peanuts.

## Cinnamon turns up the heat on fat cells

Science Daily November 21, 2017

New research from the University of Michigan Life Sciences Institute has determined how a common holiday spice -- cinnamon -- might be enlisted in the fight against obesity. Scientists had previously observed that cinnamaldehyde, an essential oil that gives cinnamon its flavor, appeared to protect mice against obesity and hyperglycemia. But the mechanisms underlying the effect were not well understood.

Researchers in the lab of Jun Wu. research assistant professor at the LSI, wanted to better understand cinnamaldehyde's action and determine whether it might be protective in humans, too. "Scientists were finding that this compound affected metabolism," said Wu, who also is an assistant professor of molecular and integrative physiology at the U-M Medical School. "So we wanted to figure out how -- what pathway might be involved, what it looked like in mice and what it looked like in human cells."

Their findings, which appear in the December issue of the journal Metabolism, indicated that

Image © iStock.com/SrdicPhoto

cinnamaldehyde improves metabolic health by acting directly on fat cells, or adipocytes, inducing them to start burning energy through a process called thermogenesis.

Wu and her colleagues tested human adipocytes from volunteers representing a range of ages, ethnicities and body mass indices. When the cells were treated with cinnamaldehyde, the researchers noticed increased expression of several genes and enzymes that enhance lipid metabolism. They also observed an increase in Ucp1 and Fgf21, which are important metabolic regulatory proteins involved in thermogenesis.

Adipocytes normally store energy in the form of lipids. This long-term storage was beneficial to our distant ancestors, who had much less access to high-fat foods and thus a much greater need to store fat. That fat could then be used by the body in times of scarcity or in cold temperatures, which induce adipocytes to convert stored energy into heat. "It's only been relatively recently that energy surplus has become a problem," Wu said. "Throughout evolution, the opposite -- energy deficiency -- has been the problem. So any energy-consuming process usually turns off the moment the body doesn't need it."

With the rising obesity epidemic, researchers like Wu have been looking for ways to prompt fat cells to activate thermogenesis, turning those fat-burning processes back on. Wu believes that cinnamaldehyde may offer one such activation method. And because it is already used widely in the food industry, it might be easier to convince patients to stick to a cinnamon-based treatment than to a traditional drug regimen. "Cinnamon has been part of our diets for thousands of years, and people generally enjoy it," Wu said. "So if it can help protect against

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## **Research in Health & Nutrition**

obesity, too, it may offer an approach to metabolic health that is easier for patients to adhere to."

Now, before anyone goes dumping tons of extra cinnamon in their egg nog in hopes of keeping holidayseason pounds at bay, Wu cautioned that further study is needed to determine how best to harness cinnamaldehyde's metabolic benefits without causing adverse side effects.

## Type 2 diabetes: It all starts in the liver

Science Daily November 28, 2017

## Affecting as many as 650 million people worldwide, obesity has become one of the most serious global health issues.

Among its detrimental effects, it increases the risk of developing metabolic conditions, and primarily type-2 diabetes. If the strong links between obesity and type-2 diabetes are well known, the cellular and molecular mechanisms by which obesity predisposes to the development of insulin resistance were so far poorly understood. Today, scientists from the University of Geneva (UNIGE) unravel the factors linking obesity and insulin resistance, as well as the key role played by the liver in the onset of the disease. By deciphering how the

protein PTPR- $\gamma$ , which is increased in the context of obesity, inhibits insulin receptors located at the surface of liver cells, the scientists open the door to potential news therapeutic strategies. These results can be read in Nature Communications.

The expansion of fat cells, a characteristic of obesity, leads to an increase in inflammatory signals that have effects on the liver as well as on several other organs. Obesityinduced inflammation triggers the activation of a transcription factor

called NF-k $\boldsymbol{\beta}$ , which seems to be

instrumental in the development of diabetes. But what are the exact cellular and molecular mechanisms at stake and how could they lead to new therapeutic strategies? "To answer these questions, we focused

on a protein called PTPR- $\gamma$  (for Protein Tyrosine Phosphatase Receptor Gamma), which is a target

of NF-k $\boldsymbol{\beta}$ ," explains Professor Roberto Coppari, coordinator of the UNIGE Faculty of Medicine Diabetes Centre. "We first examined various human cohorts: these human studies indicated that

PTPR- $\gamma$  content in liver increases upon inflammation, an effect that could directly affect insulin receptors by inhibiting insulin action," he adds.

No diabetes without PTPR- $\gamma$ To test their hypothesis, the scientists modified the levels of

PTPR- $\gamma$  expression in mice, by either suppressing, normally expressing or over-expressing it, and observed the effect on insulin resistance. "The mice totally lacking

PTPR- $\gamma$ , when put on a highcalorie diet, did develop obesity. But they did not show any sign of insulin resistance and seemed to be entirely protected from diet-induced diabetes," explains Xavier Brenachot, a researcher at UNIGE Faculty of Medicine and first author of this study. The scientists also administered lipopolysaccharide, a toxin pertaining to certain bacteria of the gut microbiota associated with obesity and insulin resistance. Once

again, the animals lacking PTPR- $\gamma$  did not develop insulin resistance.

To fine-tune their analysis, Roberto Coppari and his colleagues reconstituted the expression of

PTPR- $\gamma$  at normal levels, but only in hepatocytes (liver cells). The mice were again prone to insulin resistance, indicating the pivotal

# Image © iStock.com/Jan-Otto

role of the liver. Moreover, a twofold over-expression in the liver (mimicking the natural pathophysiology of obesity) was sufficient to cause insulin resistance.

A new therapeutic target The metabolic functions of this protein were never characterized: this discovery therefore opens the door for potential new therapies. Previous studies had already studied PTP proteins in search for diabetes treatments, unfortunately to no avail. However, contrary to some of its family members that are intracellular, the protein identified in Geneva is located on the cell membrane. It is therefore of much easier access for therapeutic molecules. Interestingly, the very form of this protein allows for potential inhibition strategies: when

two independent PTPR- $\gamma$ molecules are brought together by a ligand, they cannot act any more. The researchers are now working on identifying the endogenous ligand produced by the body, or on developing molecules that could mimic its function.

From bedside to the lab, and back: how translational research shapes tomorrow's medicine "This study would not have been possible without the UNIGE Faculty Diabetes Centre, established in 2015 to enhance interactions between clinical and basic researchers," indicates Roberto Coppari. "Indeed, our research started with clinical observations made by Prof. Francesco Negro -also a member of UNIGE Faculty Diabetes Centre -- at the University Hospitals of Geneva. We now hope that our pre-clinical and clinical

results will in turn be translated into clinical progress and contribute to a better management of type-2 diabetes that, today, affects 1 in 11 adults globally, or 422 million people."

## Brain's appetite regulator disrupted in obese teens



Researchers using advanced MRI to study obese adolescents found disrupted connectivity in the complex regions of the brain involved in regulating appetite, according to a new study presented today at the annual meeting of the Radiological Society of North America (RSNA).

According to the Centers for Disease Control and Prevention (CDC), obesity has more than quadrupled in adolescents over the past 30 years. It is estimated that more than one-third of children and adolescents in the U.S. are overweight or obese. Obesity in adolescence is associated with a number of health risks, including cardiovascular disease and diabetes. The study at the University of Sao Paulo in Brazil included 59 obese adolescents between the ages of 11 and 18 and 61 healthy control adolescents matched for gender, age, socio-economical classification and education level. The adolescents were classified by the World Health Organization criterion for obesity. They had no other known chronic diseases or conditions. The study participants underwent diffusion tensor imaging (DTI) of the brain to evaluate white matter integrity.

DTI is a type of MRI exam that measures functional anisotropy (FA), the microscopic motion, or anisotropy, of water molecules within and surrounding the brain's white matter fibres. Low FA values indicate greater disruption within the white matter. "DTI is a relatively new MRI

technique not widely used in clinical diagnosis," said study author Pamela Bertolazzi, a biomedical scientist and Ph.D. student in the neuroimaging laboratory at the University of Sao Paulo.

The results showed loss of white matter integrity in several brain regions in the obese patients. Compared to the healthy controls, the brains of the obese adolescents showed a decrease in FA values in areas of the brain including the amygdala, hippocampus, thalamus, cingulate gyrus, fornix, insula, putamen, orbital gyrus and bilateral hypothalamus. Several of these regions are involved in appetite regulation, impulse control, emotions and reward and pleasure in eating.

"The data reveal a pattern of involvement among brain regions that are important in the control of appetite and emotions," Bertolazzi said. "There was no region of higher FA in obese patients compared to the control group," she added. The researchers hope that these findings will offer new tools to combat this global public health crisis. "Childhood obesity has increased 10 to 40 percent in the last 10 years in most countries," Bertolazzi said. "If we are able to identify the brain changes associated with obesity, this DTI technique could be used to help prevent obesity and avoid the complications associated with the condition."



Drinking coffee may reduce risk of heart failure and stroke, research suggests 14 Nov 2017 Nutrition Insight

Drinking coffee may be associated with a decreased risk of developing heart failure or having a stroke, according to preliminary research presented at the American Heart Association's (AHA) Scientific Sessions 2017, a global exchange of the latest advances in cardiovascular science for researchers and clinicians.

Researchers used machine learning to analyze data from the longrunning Framingham Heart Study, which includes information about what people eat and their cardiovascular health. They found that drinking coffee was associated with decreased risk of developing heart failure by 7 percent and stroke by 8 percent with every additional cup of coffee consumed per week compared with non-coffee drinkers. The AHA also points out that it is important to note this type of study design demonstrates an observed association but does not prove cause and effect.

Coffee decreases risk consistently Machine learning works by finding associations within data, much in the same way that online shopping sites predict products that users may like based on their shopping history. It is one type of big data analysis, the AHA notes. To ensure the validity of their results and determine the direction of risk, the researchers further investigated the machine learning results using traditional analysis in two studies with similar sets of data – the Cardiovascular Heart Study and the Atherosclerosis Risk in Communities Study. The association between drinking coffee and a decreased risk of heart failure and stroke was consistently noted in all three studies.

While many risk factors for heart failure and stroke are well known, the researchers believe it is likely that there are as-yet-unidentified risk factors. "Our findings suggest that machine learning could help us identify additional factors to improve existing risk assessment models," says Laura M. Stevens, B.S., first author of the study, a doctoral student at the University of Colorado School of Medicine in Aurora, Colorado. "The risk assessment tools we currently use for predicting whether someone might develop heart disease, particularly heart failure or stroke, are very good but they are not 100 percent accurate," Stevens adds.

## Red meat presents additional risk

Another potential risk factor identified by machine-learning analysis was red meat consumption, although the association between red meat consumption and heart failure or stroke was less clear. Eating red meat was associated with decreased risk of heart failure and stroke in the Framingham Heart Study but validating the finding in comparable studies is more challenging due to differences in the definitions of red meat between studies. Further investigation to better determine how red meat consumption affects risk for heart failure and stroke is ongoing, according to the AHA.

The researchers also built a predictive model using known risk factors from the Framingham Risk Score such as blood pressure, age and other patient characteristics associated with cardiovascular disease. "By including coffee in the model, the prediction accuracy increased by 4 percent. Machine learning may be a useful addition to the way we look at data and help us find new ways to lower the risk of heart failure and strokes," says David Kao, M.D., senior author of the study and an assistant professor at the University of Colorado School of Medicine in Aurora, Colorado.

When it comes to overall diet, the AHA suggests limiting red meat, which is high in saturated fat, as part of a healthy dietary pattern that should emphasize, fruit, vegetables, whole grains, low-fat dairy products, poultry and fish. Coffee's health benefits may not stop at heart health, as recent research has suggested that it could help to delay the onset of Type 2 diabetes and prevent liver fibrosis. An example of a recent product launch in the coffee space with a health positioning is CoffeeFruit Pure's namesake antioxidant-rich super fruit ingredient.

## Researchers call for establishment of dietary reference intake for lutein 21 Nov 2017 Nutrition Insight

Establishing a recommended dietary reference intake (DRI) value for lutein is "critically important" for advancing and improving public health, assert the authors of a new paper published online in the European Journal of Nutrition.

"Lutein is ready to be considered for intake recommendations," note the authors of the carotenoid found in egg yolks, colourful fruits and vegetables, and dietary supplements. Lutein has gained attention from the nutrition research community for its potential role in reducing the risk of agerelated macular degeneration (AMD) and other eye issues. For example, it has been suggested that savings of €6.20 billion (US\$7.33 billion) a year could be generated through the daily consumption of 10mg of lutein in combination with 2mg of zeaxanthin by adults aged 50 and older in the EU who are suffering from AMD.

"AMD is the leading cause of agerelated blindness in industrialized countries," says Jim Griffiths, Ph.D., Vice President, Scientific & International Affairs. Council for **Responsible Nutrition International** (CRN-I), and one of the paper's six co-authors. "Establishing intake guidelines for lutein could encourage the consumption of lutein-containing foods and subsequently decrease the risk of age-related visual degradation and improve overall visual health," Griffiths continues. "We hope policymakers and stakeholders take note of the strong research supporting the benefits of lutein and move forward with setting a DRI."

## Lutein satisfies criteria for recommendations

In the paper, the authors cite a previously-developed set of nine criteria used to determine whether a bioactive is ready to be considered for DRI-like recommendations, and illustrate the ways in which lutein satisfies each.



## Research in Health & Nutrition



These criteria include: 1) an accepted definition; 2) a reliable analysis method; 3) a food database with known amounts of the bioactive; 4) cohort studies; 5) clinical trials on metabolic processes; 6) clinical trials for dose-response and efficacy; 7) safety data; 8) systematic reviews and/or meta-analyses; and 9) a

plausible biological rationale.

Based on the careful review of the literature supporting the criteria, the authors conclude that lutein should join the roster of those nutrients that already have DRI recommendations. "Establishing a DRI recommendation for lutein would provide the public with yet another reason to eat more of the colourful fruits and vegetables lacking in our diets," explain the coauthors. "Many consumers purchase products containing lutein but they may not be aware of the science that supports its role in health or know the appropriate intake level."

## Vitamin K2 could be novel therapeutic target for common cardiovascular condition

23 Nov 2017 Nutrition Insight

The European Heart Journal has published a review paper that highlights the potential of vitamin K2 supplementation for calcific aortic valve stenosis (CAVS), a common cardiovascular condition in the aging population where no medical therapy currently exists.

According to researchers, once symptomatic severe CAVS has developed, there is a dismal prognosis without intervention. Currently, the only treatment for (symptomatic) severe CAVS is surgical or trans catheter aortic valve replacement (AVR), but it is an intervention to which not all patients are suited.

While multiple trials have attempted to repurpose commonly used pharmacological interventions to slow CAVS progression, pharmacological interventions have thus far failed to alter the course of CAVS. The review paper notes that studies have demonstrated that statins, widely used for lipid lowering in atherosclerosis and inflammation, have no effect on CAVS progression or clinical outcomes, and might actually exacerbate the condition.

However, the researchers noted promise with vitamin K2, specifically the long-chain menaquinones (Mk7), as they are transported efficiently beyond the liver. "Vitamin K supplementation is an attractive option to replenish vascular vitamin K stores to ensure optimal calcification inhibition," the researchers write. "Recognizing that medical therapies are proving ineffective, researchers are shining a light on efficacious supplemental alternatives, which leads them to the clinical research that NattoPharma has spearheaded," says Dr. Hogne Vik, Chief Medical Officer with Norwegian-based NattoPharma ASA, a company targeting vitamin K2 research and development.

"Specifically, our three-year cardiovascular study in healthy postmenopausal women taking just 180 mcg daily of Vitamin K2 as MK-7 (as MenaQ7) demonstrated a cessation and even

regression in arterial stiffness," Dr. Vik adds. "The relevance of our three-year study has resulted in several studies by the medical community for patients with existing coronary artery calcification, aortic valve calcification, and peripheral artery calcification."

The review paper concludes: "The patho-physiological mechanisms involved in CAVS initiation and progression are being rapidly elucidated and include inflammation, fibrosis, and calcification. With this advancing knowledge, we have identified novel therapeutic targets like vitamin K and new imaging techniques that can be used to test the efficacy of novel agents and further inform our patho-physiological understanding."

In an interview with NutritionInsight earlier this year, Eric Anderson, Senior Vice President of Global Marketing and Business Development at NattoPharma, underlined the company's commitment to supporting research into the benefits of vitamin K. "When we look at vitamin K2 as menaguinone-7, we believe this is everything that is good about the natural products industry," Anderson said. "Researchers discovered K2, and NattoPharma supported its substantiation."

"We're only supplying the active, menaquinone/vitamin K2; these studies are being paid for by traditional medical doctors who are treating diseased patients, and the only active is a vitamin," Anderson said. "That's what it really should be about: You have science, science leads to discovery, which in turn leads to an investment into proving that [an active] works as a dietary supplement."

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Modifying gut microbiome may eventually prevent asthma in infant boys 29 Nov 2017 Nutrition Insight

The family risk for asthma typically passed from mothers to babies - may involve the microbes found in a baby's digestive tract.

This is according to a new University of Alberta study, funded by the Canadian Institutes of Health Research (CIHR) and AllerGen and published in the European Respiratory Journal. Maintaining a healthy gut microbiome the community of microorganisms or bacteria that live in the digestive tracts of humans has been linked recently with a number of health benefits. For example, it may help to track and treat Parkinson's and Alzheimer's according to studies presented at Neuroscience 2017, the annual meeting of the Society for Neuroscience, and it has also been linked to preventing MS and hypertension.

AllerGen investigator and U Alberta microbiome epidemiologist Anita Kozyrskyj led a research team which found that Caucasian baby boys born to pregnant mothers with asthma who are typically at the highest risk for developing asthma in early childhood - were also one-third as likely to have a gut microbiome with specific characteristics at three to four months of age. "We saw a significant reduction in the family of microbes called Lactobacillus in Caucasian baby boys born to pregnant women who had asthma, and this was especially evident if the asthmatic mother had allergies or was

overweight," says Kozyrskyi, senior author of the study and researcher on the gut microbiome.

First results to show link, but caution urged These findings provide the first

evidence that maternal asthma during pregnancy may be

associated with changes in an infant's gut microbes, according to Kozyrskyj. "Our discovery, with more research. could eventually lead to a preventative approach involving

modifying the gut microbiome in infants to reduce the risk," she explains. She also cautions, however, that it is too early for parents to be seeking probiotic treatments for their infants to address this particular concern. Kozvrskvi and her team's research involved over 1.000 mothers and their infants participating in AllerGen's CHILD Study, a national population-based birth cohort.

Kozyrskyj said that she and her team were motivated to study the gut microbiome-asthma link by the well-established fact that maternal asthma affects infant birth weight in a sex-specific manner. "The Caucasian male fetus is more likely to have a lower birth weight in response to maternal asthma, so we knew there were already sex-based differences occurring, and we decided to study them further," Kozyrskyj notes.

The study also found that maternal asthma had an impact on the gut bacterial profile of baby girls, but in a different way. "Baby girls were more likely to have higher amounts of bacteria in the Bacteroidaceae family, which are important for maintaining the mucus barrier that protects gut cells from damage by harmful substances," says Kozyrskyj. "We speculate that this

may protect baby girls from developing asthma in early life. On the other hand, changes to bacterial composition specific to baby girls may increase their risk for developing asthma during puberty, when the gender switch in asthma occurs," Kozyrskyj adds.

## 'Clinical Significance': Dietary magnesium linked to stronger muscle and bones

By Stephen Daniells 09-Nov-2017 NutraIngredients USA



While the potential bone health benefits are well reported, the new study, published in Nutrients , is reportedly the first to concurrently investigate the relationship between dietary magnesium and skeletal muscle and bone health.

"Our research has found positive associations between greater intakes of dietary Mg and grip strength, indices of skeletal muscle mass, and BMD in men and women in middle and older age groups," wrote the researchers. "These findings are of potential clinical significance when compared the annual losses of BMD and skeletal muscle with age. To our knowledge, this is the largest study to date to investigate dietary Mg with skeletal muscle, grip strength, and bone health in men and women independently. Our findings indicate that it is likely to

be important to consume sufficient Mg as well as protein for the health of skeletal muscle, as well as calcium for bone."

## 'Necessary for over 300 biochemical reactions'

The results add to an ever growing body of science supporting the potential health benefits of the mineral. The National Institutes of Health (NIH) lists magnesium as being necessary for more than 300 biochemical reactions in the body, from helping maintain normal muscle and nerve function, to keeping heart rhythm steady, supporting a healthy immune system, and keeping bones strong. The mineral is also needed for blood sugar management and healthy blood pressure.

The science and positive regulatory decisions have led to increased interest from consumers in magnesium and this has led to increasing sales. And with 70-80% of the US population not meeting their recommended intakes of magnesium, the market is expected to continue to grow. Indeed, some industry experts are predicting that magnesium sales in the nutrition market will surpass calcium by 2020.

The researchers, led by Ailsa Welch from the University of East Anglia (UK) analyzed data from 156,575 men and women aged between 39 and 72. Dietary magnesium intake was assessed using the Oxford WebQ, a computerized 24-hour recall questionnaire. Results indicated that higher intakes of dietary magnesium were positively associated with increased grip strength, measures of skeletal muscle mass, and bone mineral density (BMD) in both men and women.

Specifically, grip strength was 1.1% and 2.4% greater in the highest average intake group compared to the lowest for men and women, respectively. In addition, free fat mass as a percentage of body weight (FFM%) was 3.0% and 3.6% greater in the highest average intake group compared to the lowest for men and women, respectively. Bone mineral density was 2.9% and 0.9% greater for the highest versus lowest average magnesium intakes for men and women, respectively.

"These associations are as much or greater than annual measured losses of these musculoskeletal outcomes, indicating potential clinical significance," wrote Welch and her co-workers. "Our study suggests that dietary magnesium may play a role in musculoskeletal health and has relevance for population prevention strategies for sarcopenia, osteoporosis, and fractures."

## Antioxidant rich diet linked to lower diabetes risk in women

by Tim Cutcliffe 09-Nov-2017 NutraIngredients

Consuming a diet rich in antioxidant foods is associated with a reduction in risk of typediabetes (TD) in middle-aged women reports a new study in Diabetologia.

Women with the highest quintile of dietary antioxidant intake, measured by total antioxidant capacity (TOC), reduced their risk of T2D by 27, found researchers from the Health Across Generations (HAG) Team, Centre of Research in Epidemiology and Population Health, Villejuif, France (an INSERM team).

Total antioxidant capacity (TOC) is an index which estimates the aggregated antioxidant capacity from the sum of all the individual antioxidant components in the diet. "Our findings suggest that the TOC may play an important role in reducing the risk of T2D in middleaged women," wrote first author Francesca Romana Mancini. The development of T2D may involve oxidative stress, recent evidence has suggested. A diet containing fruit, vegetables and beverages including tea contains a variety of compounds with antioxidative properties.

In this study, "the food groups that contributed the most to the TOC were fruit 23, vegetables 19, alcoholic beverages 15 and hot beverages such as tea, chicory and hot chocolate 12," wrote the researchers. "In our population study, women with higher levels of total antioxidant capacity measured excluding the contribution of coffee, were characterised by a high consumption of fruit and vegetables and tea, which are known to be rich in antioxidant compounds," they added.

The T2D risk reduction benefit of a higher antioxidant intake plateaued at a TOC level of 15 millimoles day (mmold), the team reported.

Results Build on Earlier Findings Earlier research had identified an inverse relationship between TOC and components of metabolic syndrome. However, this is the first study to examine the relationship of TOC with T2D risk directly. Previous studies had also shown that intake of various forms of vitamin E, but not vitamin C, flavonoids or lycopene, had an association with lower T2D risk. This work complements our current knowledge of the effect of isolated foods and nutrients, and provides a



## Protein Foods & Nutrition Development Association of India

more comprehensive view of the relationship between food and type 2 diabetes explained lead researcher Guy Fagherazzi, in charge of the diabetes research and complications programme in the Health across Generations team. "This link persists after taking into account all the other principal diabetes risk factors smoking, education level, hypertension, high cholesterol levels, family history of diabetes and, above all, I, the most important factor", commented Mancini.

Perhaps surprisingly, the researchers excluded coffee from the calculation of TOC. This was because coffee has such a high antioxidant content, that it would have driven the association with T2D on its own, distorting the results. Furthermore, inclusion of coffee may have introduced confounding due to its known associations with smoking, high alcohol consumption and stressful lifestyle.

The study population comprised of 64,223 French women from the EN-EPIC cohort aged between 40 & 65. The participants were free of diabetes and heart disease at baseline, and were followed for 15 years between 1993 and 2008. Dietary intake from a questionnaire completed by the subjects was used in conjunction with an Italian database (providing the antioxidant capacity of different foods) to calculate TOC.

"We have shown that an increased intake of antioxidants can contribute to a reduction in diabetes risk." However, the mechanisms are not fully understood. "We know that these molecules counterbalance the effect of free radicals, which are damaging to cells, but there are likely to be more specific actions in addition to this, for example an effect on the sensitivity of cells to insulin. This will need to be confirmed in future studies," concludes Mancini. Ayurvedic extract shows joint mobility and comfort improvement in study by Hank Schultz 03-Nov-2017 NutraIngredients USA

A new study on Natreon's Ayuflex botanical ingredient shows decreased joint pain and increased mobility among a study population of overweight adults.

It's part of the company's strategy to support entry into new markets with hard data on its ingredients. AyuFlex is, as one could guess from the name, an ingredient that comes out of the Indian Ayurvedic medical tradition. The branded ingredient is an extract of the edible fruits of Terminalia chebula, a deciduous tree species native to mountainous regions of South Asia and Southeast Asia. The antioxidant bioactives within the fruits include a variety of triterpenes and gallic acids. It formed a key component in the ancient Ayurvedic formula called Triphala, which was most commonly thought of as a bowel tonic.

## Significant improvement on mobility/comfort scores

The study, published in the journal BMC Complementary and Alternative Medicine studied two doses of AyuFlex, a 500 mg daily dose and another of 1,000 mg. It was conducted through The Center for Applied Health Sciences in Stow, OH. Researchers recruited 105 overweight but apparently health study subjects, divided between men and women. The subjects had no knee joint pain at rest, but reported pain and mobility impairment with moderate exercise. The 14-week, double blind, crossover study design included a two-week placebo run-in period to improve data quality. Primary outcome measures included symptoms of joint health and



function as measured by modified-Knee Injury & Osteoarthritis Outcomes Score (mKOOS) global & modified-Western Ontario and McMaster Universities Arthritis Index (mWOMAC) sub scales (discomfort, stiffness and function). Secondary outcomes included AS guestionnaires on overall/wholebody joint health, low back health, knee mobility, willingness and ability to exercise, 6-min walk test for distance and range of motion (ROM) of pain-free knee flexion/extension. Tertiary outcome measures included inflammatory (high sensitivity C-reactive protein (hsCRP), tumour necrosis factor

(TNF)- $\boldsymbol{a}$ ) and extracellular matrix (ECM)/Connective Tissue (COMP) biomarkers, and safety (vital signs and blood markers) & tolerability (Adverse Event (AE)/ side effect profiles).

"AyuFlex improved mKOOS global scores, knee joint discomfort with activity/exercise, 6-min walk test distance covered and discomfort post-6 min walk test, overall whole-body joint function, knee soreness following leg extension resistance exercise in a healthy, overweight population, without AE. Differences between 250 mg/BID and 500 mg/BID were nonsignificant for most of the outcome measures, validating the efficacy of the lower dose," the researchers concluded. Study design boosts statistical power

"This study represents a thorough effort to explore the potential of AyuFlex (patented, aqueous extract of Terminalia chebula) dietary supplementation to augment joint health and function in a healthy population. The study design included a randomized, placebocontrolled trial with a placebo leadin period, rigorous exclusion / inclusion criteria, validated outcome measures and markers of joint health, mobility and functional capacity and was well powered with N=105 and 2 dose groups. Taken together, these parameters lead to high-quality, reliable and clean data that can be interpreted with substantial validity," said lead researcher Hector Lopez, MD, chief medical officer and partner in The Center for Applied Health Sciences. Lopez is also cofounder of the consulting firm Supplement Safety Solutions.

#### Move toward sports nutrition

The study fits in well with Natreons overall strategy to move more into sports nutrition markets and their adjuncts, joint support and mobility support for healthy aging, said Natreon CEO Bruce Brown, who spoke with NutraIngredients-USA at the recent SupplySide West trade show in Las Vegas, N. Brown said there is a hunger in the marketplace for natural solutions to replace apparently synthetic ingredients with long, complicated chemical names.

"Probably 40% of our customers now are using our ingredients in sports nutrition and performance products, "Brown said. "We've taken our top products that deliver on those benefits and have developed a marketing approach around them. Our goal is to make it easier for formulators and brand owners to understand what we have."

"We have to learn how and

understand how consumers in these markets think. We see a general trend toward botanical ingredients merging into sports nutrition. Ingredients with the names ' natural ' and ' botanical ' are associated with being cleaner as well," he said.

Brown said marketing that capitalizes on consumer associations is all ne and good, but doesn't mean much in the end without demonstrated benefits. And claims on products can't be supported with data, he said. "We want to highlight clinical trials that focus on the actual benefits. Our customers are excited that we plan to engage consumers directly on clinical benefits," he said.

## Global opportunity

Brown said the market opportunity in sports nutrition supports both investment in research and continued product development. He said he doesn't see the growth flattening out anytime soon, and the opportunity is a global one. "We have continued to see the sports nutrition category outpace other categories in North America. We have seen impressive growth in South America, in Brazil. And we have seen especially strong growth in Australia, where we are seeing a lot of new innovation in finished products," he said.

Flaxseed may reduce oxidative stress for patients with metabolic syndrome IFT Weekly Nov 1, 2017

Flaxseed (Linum usitatissimum L.) is a functional food that has attracted growing interest from researchers because it contains biologically active components such as dietary fibres, plant proteins, polyunsaturated fatty acids, and lignans, which play a beneficial role in the organism, enabling disease prevention.

A study published in the Journal of FoodScience evaluated the protective effect of flaxseed oil and flaxseed lignan secoisolariciresinol diglucoside against oxidative stress in rats with metabolic syndrome.

Studies have shown that flaxseed can reduce oxidative damage. including in patients with metabolic syndrome (MS), but some of the studies attribute these effects to flaxseed oil (FO) and its high ALA concentration, while other studies indicate that the antioxidant effects of flaxseed are due to the presence of its lignans, especially secoisolariciresinol diglucoside (SDG). Thus, to clarify the component responsible for the antioxidant effects attributed to flaxseed in MS, the main objective of this study was to evaluate the comparative effects of FO and flaxseed lignan SDG on oxidative parameters in rats with this disorder.

The researchers assigned 48 rats to six groups: Groups 1 (control), 5 (FO), and 6 (SDG) received water and were treated daily orally with saline, FO, and SDG, respectively.



Groups 2 (MS), 3 (MS+FO), and 4 (MS+SDG) received 30% fructose in drinking water for MS induction and were treated daily orally with saline, FO, and SDG, respectively. The researchers recorded the body weight of the rats weekly and, after 30 days, they collected blood for biochemical and oxidative analysis. In addition, they measured the rats' systolic blood pressure (SBP) before and after treatment.

The researchers found that that treatment with a 30% fructose solution for 30 days is effective for MS induction and the oxidative stress is involved in the pathophysiology of MS induced by fructose-rich diets. Additionally, they found that FO and SDG prevented changes in SBP, lipids, and glucose. Flaxseed oil and SDG prevented oxidative damage to lipids, and only FO prevented oxidative damage to proteins associated to MS. Both FO and SDG improved enzymatic antioxidants defenses and reduced glutathione levels, which was greater with SDG. Total polyphenol levels were enhanced in groups that received SDG.

The researchers concluded that the "antioxidant effects attributed to flaxseed are mainly due to its high lignan content especially that of SDG, suggesting that this compound can be used in isolation to prevent oxidative stress associated with MS."

## Need to cut down on salt? Try something spicy instead

Medical News Today 31 October 2017 by Ana Sandoiu

New research published in the journal Hypertension shows that eating spicy food may "trick" the brain into craving less salt.

Consuming too much salt is known to be bad for you. And according to

a study recently covered by Medical News Today, too much sodium can significantly increase the risk of type 2 diabetes, and the mineral which is usually derived from salt — can double the risk of heart failure.

In fact, the effect of excessive sodium is thought to be so bad for the heart that the World Health Organization (WHO) believe that we should all lower our salt intake by 30 percent if we want to avoid chronic disease. The WHO also want tobacco use lowered by the same percentage.

The Centers for Disease Control and Prevention (CDC) warn that a high concentration of sodium in one's diet "can raise blood pressure," which is a "major risk factor for heart disease and stroke." The American Heart Association (AHA) also cautions that people should not consume more than 2,300 milligrams of sodium every day. But is simply knowing that we need to cut down on salt enough to be able to do so?

Not quite. Salt cravings are underpinned by a complex neurological process, parts of which we have only just started to identify. Now, however, researchers think that they have found a way to "rig" this neurobiological process: eating spicy foods seems to be tricking our brain into not wanting salty foods as much.



The new study was supervised by Dr. Zhiming Zhu, a professor and director of the Department of Hypertension and Endocrinology at the Third Military Medical University in Chongqing, China. Dr. Zhu explains the motivation for his research, saying, "Previously, a pilot study found that trace amounts of capsaicin, the chemical that gives chili peppers their pungent smell, enhanced the perception of food being salty. We wanted to test whether this effect would also reduce salt consumption," adds Dr. Zhu.

## 'Spicy foods may reduce salt preference'

Dr. Zhu and team examined 606 Chinese adults as part of a "multicenter, random-order, doubleblind observational and interventional study." They analyzed the participants' preferences for spicy and salty tastes and found that those with a high preference for spicy tastes tended to consume less salt than those with a low preference for spicy food. Also, the systolic blood pressure of those who preferred spicy tastes was lower by 8 millimeters of mercury, and the diastolic blood pressure was lower by 5 millimeters of mercury than that of participants who preferred salty tastes.

To examine the effects that spicy food would have on the brain, Dr. Zhu and team administered capsaicin to the participants and used imaging techniques to examine their brain activity. They found that the induced spicy taste activated the same brain areas as those activated by salt: the orbitofrontal cortex and the insula. "In conclusion," write the authors, "enjoyment of spicy foods may significantly reduce individual salt preference, daily salt intake, and blood pressure by modifying the neural processing of salty taste in the brain."

"Application of spicy flavour may be a promising behavioural intervention for reducing high salt intake and blood pressure," they conclude. "If you add some spices to your cooking, you can cook food that tastes good without using as much salt. Yes, habit and preference matter when it comes to spicy food, but even a small, gradual increase in spices in your food may have a health benefit." Dr. Zhiming Zhu. However, the authors also admit that the study sample was limited to the Chinese population, so future studies should aim to investigate whether or not these findings can be replicated in other populations.

consumption of astaxanthin for only four weeks resulted in RSSC residual skin surface components changes consistent with the reversal of ageing process we have successfully confirmed our hypothesis, which can thus be accepted," wrote the researchers, led by Natalya Chalyk from Lycotec (UK) and the Saratov State Medical University (Russia). "The results also demonstrate that morphological investigation of the RSSC is a useful tool for assessing skintargeting effects of dietary factors. Although we strongly

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## Continuous astaxanthin consumption linked to 'skin rejuvenation

By Stephen Daniells 08-Nov-2017 -NutraIngredients USA

Daily supplementation with the pinkish-red pigment astaxanthin may improve facial skin health in middle-aged subjects, suggests a new study from scientists in the UK and Russia.

Four weeks of supplementation with a daily astaxanthin dose of 4 mg per day resulted in significant reductions in markers of oxidative stress of over 20% in facial skin, according to results published in Nutrition Research . The researchers also looked at peeling of the outermost layer of the skin (corneocyte desquamation) and levels of bacteria on the skin, both of which are characteristics of older facial skin, and found that astaxanthin was also associated with significant reductions in both measures.

"By demonstrating that continuous

believe that these findings are very useful for developing new approaches to skin ageing prevention, larger studies are needed for further characterizing the described phenomena.

Astaxanthin's features make it an ideal approach to managing skin health"

Commenting independently on the study's findings, Dr Mark Miller, PhD, Principal of Kaiviti Consulting, LLC, ftold us: "Skin is lipidic in nature, indeed which is an important component of its barrier function. Therefore, it is reasonable to hypothesize that a lipid soluble antioxidant, in this case the carotenoid astaxanthin, would provide protective benefits. This study delivers additional information to the beauty field where it is clear that astaxanthin's features, namely a profoundly potent free radical scavenger and its lipid solubility, make it an ideal approach to managing skin health.

"The limitations of the study center on its lack of a placebo control, but the sequential analyses over 29 days helps address that. Astaxanthin clearly reduced oxidative stress, determined systemically. Associated with that were structural changes to skin morphology that are consistent with an action that reflects a restoration of a more youthful structure and form, and in both males and females." Chalyk and her co-workers recruited 17 men and 14 women over the age of 40 to participate in their study. The men and women were all assigned to receive 4 mg per day of astaxanthin for four weeks.

Results showed that plasma levels of malondialdehyde (MDA), a marker of oxidative stress, decreased by 11% after two weeks and by 22% after four weeks. Statistically significant reductions in corneocyte desquamation and microbial presence were also measured at the end of the study. The effects were even more pronounced in obese participants, said the researchers.

Commenting on this last result, Dr Miller said: "The suggestion that those that are overweight or obese presented with greater benefits was intriguing but speculative. One needs a larger, longer and better controlled study to truly evaluate if this is more than a trend. Contributing to that speculation one could hypothesize that obese individuals may present a greater underlying inflammatory process and a higher lipid level within the skin. Both of which could be improved by sustained astaxanthin supplementation."



# FOOD SCIENCE INDUSTRY NEWS

## Chinese scientists develop rice that can grow in SeaWater IFT Weekly 11/9/2017

According to The Independent, Chinese scientists have developed several types of rice that can be grown in seawater, potentially creating enough food for 200 million people.

The rice was grown in a field near the Yellow Sea coastal city of Qingdao in China's eastern Shandong province. The scientists planted 200 different types of the grain to investigate which would grow best in salty conditions.

The new type of rice was developed by a team led by Yuan Longping, who has spent decades trying to breed rice to grow in different conditions. The team pumped sea water into the fields, diluted and then channeled into the rice paddies. They expected to produce 4.5 tons of rice per hectare but the crops exceeded expectations, in one case delivering up to 9.3 tons per hectare.

There are one million square km of land in China where crops do not grow because of high salinity. Scientists hope the development of the new rice will allow some of these areas to be used for agriculture.

## Fighting obesity by mimicking a high-protein diet

Medical News Today 7 November 2017 by Tim Newman

A high-protein diet can help to keep you feeling fuller for longer, helping to fight obesity. A new study uncovers the mechanisms involved and offers hope of a safer, easier alternative.

## Can we replicate a high-protein diet safely?

More than a third of adults in the United States are classed as obese. And with obesity comes an increased risk of a range of potentially life-threatening conditions. Therefore, finding ways to reverse this epidemic is paramount. High-protein diets are known to keep you feeling fuller for longer. In some people, this can lead to reduced overall calorie intake and weight loss. However, diets focused on a heavy protein load can be difficult to maintain and often carry their own health risks. Some of these risks include constipation due to a lack of dietary fibre, increased heart disease risk (with higher red

meat consumption), and reduced kidney function for people already at risk of kidney problems. A protein-free, high-protein diet Because of the dangers and difficulties of a high-protein diet, researchers are keen to understand how they work with the hope of replicating their effects. Mariana Norton, one of the researchers from the current study, explains, "Diets high in protein are known to encourage weight loss but adhering to them can be difficult. Identifying the mechanisms that sense the protein may allow us to use drugs or functional foods to hijack appetite regulation and treat obesity."

## In effect, the aim is to keep the beneficial effects of protein without the protein.

To this end, Prof. Kevin Murphy and his colleagues — from Imperial College London in the United Kingdom — focused on phenylalanine. They chose this compound because previous studies had shown that it can reduce appetite. It appears to manage this feat by triggering the release of appetite-related hormones in the gut.

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# From FLOURISHING FIELDS

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During digestion, proteins are broken down into amino acids, and one of these is phenylalanine. It is classed as an essential amino acid because our bodies cannot manufacture it, and therefore need to consume it. In the gut, phenylalanine is detected by calcium-sensing receptors. Activation of these receptors stimulates the release of glucagonlike peptide-1 (GLP-1) in the brainstem. GLP-1 helps to improve glucose tolerance, among other tasks.

Although researchers believe that phenylalanine helps to influence appetite through GLP-1, the exact mechanisms have not been uncovered. There seems to be more involved than just one hormone pathway. The current study takes a fresh look. The study paper is titled "Rectal and oral administration of L-phenylalanine suppresses food intake and modulates neuronal activation in appetite-regulating brain regions in rodents," and the findings will be presented by Norton at the 2017 Society for Endocrinology annual conference, held in Harrogate, U.K.

## Phenylalanine and appetite examined

Mice were administered phenylalanine either orally or rectally. The two different routes allowed the team to assess its effects on different parts of the gut. Over the following 24 hours, the mice's food consumption was measured, and the parts of the brain involved in appetite were monitored.

Phenylalanine, given both orally and rectally, reduced the rodents' appetite and increased activity in the parts of the brain known to be involved in regulating appetite. Even when a quantity of phenylalanine 10 times less than the daily levels expected from a highprotein diet was administered rectally, these effects were still measurable. "Understanding how food is detected in the gut may help to identify ways of treating or preventing obesity. The next step is to establish whether phenylalanine can drive similar appetite-reducing effects in humans." Mariana Norton

It seems that phenylalanine works to suppress appetite using a number of pathways in the gut. Of course, the study does not prove that phenylalanine has the same effect in humans, so more work will need to be done. However, the findings are intriguing and raise further questions to be answered. For instance, as previously mentioned, the release of GLP-1 with phenylalanine was expected, but the researchers also measured a reduction in levels of gastric inhibitory peptide, which is a hormone that induces insulin secretion. This was a surprising result and warrants further investigation.

## Purdue scientists work to develop versatile sorghum varieties

IFT Weekly Nov 15, 2017

Purdue University scientists will develop stronger, more versatile varieties of sorghum that have the potential to reach millions of African farmers, thanks to a \$5 million, five-year grant from the

Image © iStock.com/rvimages

## Bill & Melinda Gates Foundation.

The foundation's grant is the second for Gebisa Ejeta, a distinguished professor and director of the Purdue Center for Global Food Security. Ejeta, the 2009 World Food Prize laureate, was recognized for his work in developing and distributing high-yielding varieties of sorghum that are also drought-tolerant and resistant to striga, a parasitic weed that robs maize, sorghum, rice, pearl millet, and sugarcane of necessary nutrients. Striga can devastate a crop and impacts more than 100 million people in Africa.

Over the past four years, Ejeta, along with his students and research collaborators, uncovered the basic genetic and biological processes that control striga resistance in sorghum. They identified a gene involved with the release of a chemical from sorghum roots that signals striga seed to germinate and attach to those roots.

That has led to the creation of new sorghum varieties that combine striga- and drought-resistance more readily using molecular technology. So far, 961 tons of seed have been distributed to more than 400,000 farmers in Ethiopia and Tanzania.

This next phase of the program will focus on advancements in biological research, specifically identifying more genes involved in imparting

broad-based and durable striga resistance in sorghum and other crops. The new project will expand to support researchers in Tanzania, Kenya, Rwanda, Sudan, Niger, Nigeria, Burkina Faso, and Mali to develop a breeding pipeline for more highyielding, nutritious, diseaseresistant, and drought-tolerant varieties of crops.

PFNDAI Jan 2018

Food Science & Industry News

The project plans to support private seed systems that will distribute high-quality hybrid sorghum seeds more effectively in those countries.

# Diet trends result in growth for the protein industry

By Katy Crouch, for Linx Printing Technologies 02-Nov-2017 - Dairy Reporter

As gym-goers and healthconscious millennials embark on high-protein diets, we've seen a positive outlook for the dairy sector, with global demand for dairy expected to increase by 2.5% per annum to 2020.

The UK has seen a rocketing demand for high-protein consumables, resulting in food brands such as Weetabix, Mars and Batchelors launching enhanced protein versions of their products. Research has found that individuals tend to receive more of their daily calories from proteins (which includes dairy) rather than carbohydrates (such as grains).

Lindsey Ormond, business development manager for health & performance nutrition at Arla Foods Ingredients, said dairy proteins hold an attraction for consumers seeking a more natural, nutritious and longterm way to manage their weight, instead of a quick-fix.

UN Sustainable Development Goals improve environmentallyfriendly working practices A further demand on the dairy industry is a rapidly increasing need for transparency across food chains. Consumers now look to access information about the companies they buy from, such as nutritional information, as well as where the ingredients were sourced. Organizations are recognizing the value of consumer confidence in their company and its brand, and are taking steps to improve their



supply chain traceability.

Many dairy companies are taking further steps and are starting to use sustainable nutrition (healthy food that has been produced in an environmentally-friendly way), in line with the UN's 2030 Sustainable Development Goals. The Sustainable Development Goals set by the UN also include achieving sustainable management and efficient use of natural resources, as well as halving per capita global food waste at retailer and consumer levels by 2030. This also covers reducing food losses along the production and supply chains. These targets give great insight into how the future looks for the dairy sector. The UN's goals, as well as environmentally-conscious consumers, suggest the shift towards environmentally-friendly working practices and transparency amongst brands is set to continue long into the future.

#### Growing need for convenience

Health-conscious yet time-poor consumers are also influencing dairy industry trends. Our growing need for convenience food has seen a move towards new product developments, new packaging formats and 'grab and go' solutions. On-the-go consumption is growing, as is the demand for smaller portions and convenience solutions. Examples include resealable standup pouches for cheese, 'snack' cheeses in small portions, individual 4oz yoghurt pots, probiotic drink bottles, and miniature ice cream tubs, to name but a few.

The knock-on effect is that brands need to be ever more innovative in their packaging approaches, production methods, and marketing. One such company taking a strong and innovative approach is India's Goodness! Beverages, which has recognized a gap in the market for on-the-go breakfast products. Its range of breakfast smoothies includes oat and yogurt varieties that have a 90day shelf-life without any artificial ingredients, and contain at least 5g of protein.

#### The future of the protein market

The dairy industry's response to protein market trends, such as the move toward smaller portion sizes, may in turn counter issues such as food waste and rising obesity levels. Food legislation and targets, such as those set by the UN, play a big part in dairy industry changes. However, it appears that consumer trends and food preferences are the main cause of change in the sector. As well as on-going changes in existing dairy and protein consumer markets, emerging markets - such as the growing popularity of dairy products in Asia - are set to mean future growth for the sector. Katy Crouch is a marketing executive writing on behalf of www.linxglobal.com/, which produces coding solutions for dairy products globally.

## Food Science & Industry News



## Natural coating preserves fish meat longer Food News LATAM 02 NOVEMBER 2017

Extracts of propolis help conserve fish meat preventing microorganisms and natural processes from damaging the product which will help Orinoquia fishermen to market their merchandise for a longer time.

With the immersion in this natural product that bees produce in the hive to defend themselves from external agents of the environment, fish meat can be stored for up to 12 days at room temperature, when under normal conditions only four can be kept.

David Piedrahita Márquez, a master's degree in Food Science and Technology from the National University of Colombia (UN). explains that in his study he used propolis from beehives in Santander. This compound has flavonoid molecules, which have beneficial biological activity for the body counteracting free radicals, substances that the body releases in its various metabolic processes damaging the walls of cells and tissues. In his study, the researcher discovered that the natural extracts obtained in the hives of this department have higher bioactive contents than other samples present in the tropics, such as the Brazilian propolis, which are the best known and studied.

"Propolis, through these flavonoids, prevents oxidation and counteracts the action of bacteria that affect the quality of food, providing the conditions to be stored for longer without losing its texture or colour," the researcher adds.

## Edible films

To conserve the product, propolis is encapsulated in a degradable material or biopolymer, which contributes to counteracting microorganisms that can both have a negative impact on degenerative processes in the body and slow down dehydration. The compound was applied to the edible films of aquaculture meat matrices such as cachama, tilapia and bocachico. "This showed that propolis flavonoids protect the organism and that, thanks to the encapsulation, the fish meat retained its natural characteristics and flavour," added the expert.

## **Propolis of Santander**

The researcher of the UN tells that the exudates \_ vegetal substances \_ that the bees obtain in Colombia have a particularity that little is found in the world. Because it is a tropical area with a high variety of plants, the propolis that comes from the Santander allows the bees to extract various "juices" that create that element that helps the preservation of fish meat.

For the next two years, said the expert from the UN, will seek to learn more about the geographical origin of propolis and thus be able to apply the coating of products to both beef and cheese and vegetables, so that the conservation of food contributes to the food wellbeing of the country.

## Indian plant extract's antimicrobial properties superior to that of standard drug

15-Nov-2017 - NutraIngredients Asia by Cheryl Tay

The ethyl acetate extract from the plant Ulmus wallichiana Planch has been shown to possess significant antimicrobial properties, say researchers in India.

U. wallichiana is found in Uttarakhand in India, and its bark is often used as a traditional remedy for bone fractures in both humans and animals, as well as to heal wounds. Based on this, researchers from the Sardar Bhagwan Singh Post Graduate Institute of Biomedical Sciences & Research designed a study to investigate the antimicrobial potential of different U. wallichiana bark extracts.

## Plant versus bacteria

They collected the plant bark and pulverised it to obtain a powder, which they then used to prepare the different extracts to be tested: petroleum either, chloroform, ethyl acetate, ethanol, and aqueous. They subsequently found that the ethyl acetate extract "exhibited the highest significant antioxidant activity".

Image Source: en.wikipedia/ulmusenthu PFNDAI Jan 2018

Food Science & Industry News

The extract exhibited antibacterial activity against the bacteria Escherichia coli, Bacillus subtilis, Staphylococcus aureus and Pseudomonas aeruginosa. Compared to the rest of the extracts, it also displayed a superior zone of inhibition against the aforementioned bacteria. While the chloroform extract had a moderate inhibition zone against the bacteria. the ethyl acetate extract's inhibition zone was better than that of the standard drug chloramphenicol, an antibiotic used to treat bacterial infections.

#### Fighting the fungus

The different extracts' antifungal properties were also tested against Aspergillus flavus and Aspergillus fumigates. Once more, the researchers observed that among all the extracts, the ethyl acetate extract displayed the maximum inhibition zone. The chloroform extract exhibited mild antifungal activity, while the ethyl acetate extract's antifungal activity was comparable to that of the antifungal medication nystatin.

#### Isolation needed

The researchers stated that the ethyl acetate extract of U. wallichiana exhibited the strongest antimicrobial properties, and as such, "should be further investigated for isolating active compound(s) responsible for antimicrobial activity". They added that the "phytochemical screening of ethyl acetate extract indicated the presence of mainly phenolic and flavonoid compounds", saying that these active constituents might be behind U. wallichiana's antimicrobial properties. They concluded: "Based on the findings of this study, future prospects of the current investigations suggested that ethyl acetate extract of the plant should be further analysed to isolate the specific antimicrobial principle(s) present in the plant."

Indonesian Seaweed Species has high-protein, Iow-fat health food potential 14-Nov-2017 - Food Navigator Asia by Cheryl Tay

A type of seaweed found in Indonesian waters

could have potential as a health food, according to new research.

The dried seaweed Ulva lactuca derived from the waters of Pameungpeuk in Java — is said to have prospects for human nutrition. Ulva lactuca has been consumed by Pameungpeuk's coastal communities for many years, but a researcher from the Indonesian Institute of Sciences sought to detail its nutritional composition, with the intention of determining its possible uses.

Composition analysis A sample of the seaweed was procured from Pameungpeuk waters and thoroughly washed and cleaned, first with seawater and then with distilled water. After this, it was air-dried in the sun for five days before being ground in a blender. The powdered samples were then kept in a dark container at room temperature to be analysed for ash, moisture, protein, dietary fibre, fat, carbohydrates (proximate analysis), vitamins and minerals.

The sample was found to be high in carbohydrates (58.1%), dietary fibre (28.4%), moisture (16.9%) and protein (13.6%). It was also shown to contain vitamins A, B1 (thiamine) and B2 (riboflavin). In terms of its mineral content, calcium was the main component (1,828mg/100g), significantly higher than potassium



(467mg/100g), sodium (364mg/100g), iron (14mg/100g) and phosphorus (0.05mg/100g).

Nutritional breakdown Its high dietary fibre content also led the researcher to state that Ulva lactuca could be considered an alternative source of dietary fibre that is high in protein but low in fat (0.19%). Another important consideration was its moisture level. Moisture content is vital to determining the shelf-life and quality of processed seaweed, since high moisture may "hasten the growth of microorganisms", thereby shortening shelf-life.

However, Ulva lactuca 's moisture content was relatively low when compared with other seaweed species sold commercially in Indonesia, such as Eucheuma sp. (32%), Gracilaria sp. (25%), Turbinaria sp. (20%) and Sargassum sp. (20%).

It was also observed to be low in heavy metals like cadmium, mercury, arsenic and lead, which were present in amounts that fell below the maximum levels permitted, as per the limits set by the National Standardization Agency of Indonesia. As such, the study concluded that Ulva lactuca "may be considered to be developed as an alternative source of a healthy food for human in the future".

## Innovation in noodle production could help fight diabetes in Asia

08-Nov-2017 - Food Navigator Asia by Cheryl Tay

Researchers are hoping that increasing the protein content in wheat crops will improve the nutritional benefits of noodles and help slash the risk of diabetes

A team at Curtin University intends to find a way to add protein to the wheat prior to its growth, to produce naturally occurring protein within the crop. One of the researchers, Carly Bourgy, told Australian media: "The (more) protein you add will make the food digest slower in your body and break down slower, so you don't get a rise in blood glucose."

This will in turn minimise diabetes risk for those who consume such noodles. At the same time, the added protein will make the noodles firmer, thereby minimising the sogginess most people dread. There is also a possibility that such noodles would not only be a more nutritious alternative, but also taste better.

Curtin University lecturer Dr Haelee Fenton said, "In the production of noodles, lots of different sciences play a role. We try to understand the grain and the flour chemistry, so (we are) looking at protein and starch components Image © iStock.com/suraj1989



and how that impacts the end quality of the noodle."

## A grainy situation

As a leading wheat grain producer, Western Australia is responsible for an annual 12

million tonnes of the crop. This accounts for 40% of Australia's total exported grain, with an overwhelming majority delivered to Asia. Figures from the Department of Primary Industries and Regional Development reveal that \$250 million worth of wheat grain was exported to Japan last year, most of it for noodle production. In fact, wheat grain from Western Australia plays such a prominent role in noodle-making that the Australian **Export Grains Innovation Centre** (AEGIC) holds a yearly event solely for noodles.

AEGIC's wheat quality technical markets manager Dr Larisa Cato said: "The Japanese industry demands high quality noodles made from high-quality wheat flour, and the strong relationship between Australia and Japan ensures a highquality product reaches Japanese consumers." Japan is Asia's third largest buyer of wheat grain in Asia, with Indonesia buying around \$650 million last year.

Protein to protect against diabetes According to the International Diabetes Federation, 80% of instant noodle consumption occurs in Asia, where 60% of the world's diabetic population live. The federation also claims that in China alone, there are 98.4 million diabetics. If the current research pays off, the \$3bn worth of wheat grain exported from Western Australia could contain added protein, and therefore contribute to reducing diabetes in Asia. Scientists 'teleport' lemonade by sending flavour and colour Online 10-Nov-2017 -Food Navigator by Niamh Michail

Scientists have developed a way of 'teleporting' lemonade by digitally sending the flavour and colour from one internet user to another - and the technology could be used to tackle the double burden of over and under nutrition, they say.

Food and drink are often the centrepoint of social interactions - but if these interactions are increasingly happening online, should eating experiences also become virtual? Led by Dr Nimesha Ranasinghe, a team of scientists at the National University of Singapore's Interactive and Digital Media Institute and the Georgia Institute of Technology have found a way to do so, developing a protocol for teleporting lemonade - also known as digitally sharing the flavour experience of a glass of lemonade among remote individuals.

## How does it work?

"Our approach is to augment the beverage flavour experience by overlaying external sensory stimuli," Ranasinghe told FoodNavigator. The scientists created a sensor which captures key information about the lemonade, such as the colour and the pH value. The person who wants to send the drink virtually dips the sensor into the beverage and then sends this data to a friend who, when taking a sip of water from a special custommade, connected glass, will taste the same flavour as the original lemonade.

The electronic tumbler electrically stimulates the user's taste buds in order to replicate the sour taste sensations in the mouth. It is also fitted with LED lights to simulate the colour of the lemonade. "Flavour is mainly how we perceive food or beverages in our mind and it consists of multisensory information including visual, taste, smell among others," Ranasinghe said. "Therefore, we hypothesised that by overlaying and enabling users to control these attributes via a mobile app, the flavour experiences can be augmented or adjusted according to their preferences.

The researchers have already tested the teleportation in a scientific setting, and say there was "no statistically significant difference between the real and virtual lemonades with regards to the perception of sourness when both the pre-taste and actual taste feedbacks are combined". Future work could focus on smell, temperature and other factors such as fizziness, they say.

Virtual solutions to real problems The team of researchers believe their also findings have the potential for practical applications that go beyond social media marketing and virtual interactions. "This also gives users to experimentally create new flavours. Imagine if you can taste food or beverages on the internet or in a virtual reality environment or eat healthier food - even you don't like the flavour - but you still perceive them as your favourite food."

Simulating the taste of food virtually could be one solution to two of the great challenges facing the food industry – overnutrition and undernutrition. Ranasinghe and his team have used the same technology and principles to develop healthy foods that are palatable, particularly among the elderly whose sensory receptors diminish with age, making eating a much less pleasant experience. Food often becomes bland which has an impact on hunger levels. The Singapore-based researchers therefore developed a modified soup bowl that replicated the taste of traditional miso soup but with reduced salt levels. Ranasinghe presented the virtual lemonade at International Conference on Tangible, Embedded and Embodied Interactions (TEI), held in Yokohama, Japan in April this year.

## Up to half of India's milk and vegetables wasted from poor cold chain infrastructure

14-Nov-2017 - Food Navigator Asia by Lester Wan

About 40% to 50% of India's total annual production of milk, fruit and vegetables, worth \$440bn, ends up wasted.

A joint-study between ASSOCHAM, the Associated Chambers of Commerce & Industry of India, and MRSS, an independent market research agency, highlighted the scale of the problem. "The situation is severe in the southern part of India due to unavailability of cold storage units, moreover as the climate is far more hot and humid (there)," the study stated. India is the world's largest producer of milk and the secondlargest producer of fruit and vegetables. "India has about 6,300 cold storage facilities with a capacity of 30.11 million metric tonnes, which are only able to store about 11% MachineHeadz of the country's total perishable produce," mage © iStock. explained D. S. Rawat, secretary general of ASSOCHAM.

The study estimated that

the cold chain market in India valued at \$167.24bn in 2016 is projected to grow to \$234.49bn by 2020. Nonetheless, high operating costs is a great limitation. "Shortage of adequate infrastructure, lack of trained personnel, outdated technology and inconsistent power supply are other major obstacles in growth of cold chain infrastructure in India," said Rawat. He added that setting up a cold chain involves a higher infrastructure cost for operations. "Given the expected growth in grocery retail to hit \$847.9bn by 2020 from \$500 bn in 2012, there are some changes expected by the industry as a whole to ensure that the three significant areas of handling food collection, storage and transportation will be more cost effective for retailers," he said.

How to address the challenge

Technology such as GPS and sensors could be used to centrally monitor and track the temperature and the position of the truck to ensure better control over the condition of the produce. Furthermore, by implementing selfupdating and hosted computer systems, cloud storage would offer many benefits to warehousing such as cutting down on the maintenance, infrastructure and labour costs that come with the installation and upgrading of warehouse management systems. The study also suggested that instead of the process being man-togoods, India's industry should evolve to become goods-to-man and robotics and automation could help to revolutionise the logistics and supply chain.



# REGUILATORY NEWS

WHO issues new recommendations for animal antibiotic use IFT Weekly 11/9/2017

The World Health Organization (WHO) is recommending that farmers and the food industry stop using antibiotics routinely to promote growth and prevent disease in healthy animals.

The new WHO recommendations aim to help preserve the effectiveness of antibiotics that are important for human medicine by reducing their unnecessary use in animals. According to WHO, in some countries 80% of total consumption of medically important antibiotics is in the animal sector, largely for growth promotion in healthy animals.

A systematic review published in The Lancet Planetary Health found that interventions that restrict antibiotic use in food-producing animals reduced antibiotic-resistant bacteria in these animals by up to 39%. This research directly informed the development of WHO's new guidelines.

WHO recommends an overall reduction in the use of all classes of medically important antibiotics in food-producing animals, including complete restriction of these antibiotics for growth promotion and disease prevention without diagnosis. Healthy animals should only receive antibiotics to prevent disease if it has been diagnosed in other animals in the same flock, herd, or fish population.

Where possible, sick animals should be tested to determine the most effective and prudent antibiotic to treat their specific infection. Antibiotics used in animals should be selected from those WHO has listed as being "least important" to human health, and not from those classified as "highest priority critically important." These antibiotics are often the last line, or one of limited treatments, available to treat serious bacterial infections in humans.

"The WHO guidelines are not in alignment with U.S. policy and are not supported by sound science," wrote Chavonda Jacobs-Young, acting chief scientist at the U.S. Dept. of Agriculture (USDA), in response to the WHO recommendations. "The recommendations erroneously conflate disease prevention with growth promotion in animals."

Current U.S. Food and Drug Administration (FDA) policy states that medically important antibiotics should not be used for growth promotion in animals. However, the agency allows for the use of antimicrobial drugs in treating, controlling, and preventing disease in food-producing animals under the professional oversight of licensed veterinarians. Jacobs-Young believes the WHO recommendations would impose unnecessary and unrealistic constraints on the veterinarians' professional judgment.

"USDA agrees that we need more data to assess progress on antimicrobial use and resistance, and we need to continue to develop alternative therapies for the treatment, control, and prevention of disease in animals," wrote Jacobs-Young. "We remain committed to addressing antimicrobial resistance in people and animals. We will continue to work with the WHO. World Organization for Animal Health, and Food and Agriculture Organization to promote antibiotic stewardship to avoid the further emergence and spread of antibiotic resistance."

FSSAI accused of taking wrong approach to sodium labelling By RJ Whitehead 22-Nov-2017 Food Navigator Asia

Plans by the Indian food regulator to enforce the publication of sodium content on food labels have come under fire two weeks before a draft policy is released.



The revised packaging standards will also require other nutritional facts, including carbohydrates and fat to be listed, as India prepares to end its current policy of voluntary nutritional labelling. But leading campaigners claim that the Food Safety and Standards Authority of India is taking the wrong approach by demanding sodium content be listed. "It should be salt, not sodium," said Graham Macgregor, professor of cardiovascular medicine at the Wolfson Institute of Preventative Medicine, at a conference in Chennai.

A leading advocate for low-salt foods in Britain, Canada and Australia, Dr Macgregor argued that sodium levels show a fraction of a product's actual salt content. Indeed, a food's sodium level must be multiplied by 2.4 times to give a realistic illustration of salt, he warned. "Britain had sodium on food labels more than two decades ago. They changed it to salt because no one knew what they were eating," he added.

Following amended labelling regulations, and in the wake of legislation and concerted public health campaigns, Britain has witnessed a significant decrease in average salt consumption over the last decade. "There's been a 40% reduction, though most people did not realise that their food contains less salt. But we have seen a 25% reduction in health spending due to high blood pressure and its complications," he said.

Indians consume more than twice the World Health Organisation's recommended daily salt limit of 5 grams, leaving them prone to heart, kidney and vascular diseases. Dr Macgregor's view has been backed up by Rajan Ravichandran, chief nephrologist at the Sapiens Foundation, who said policymakers must aim to reduce average salt consumption by at least 2 grams over the next five years. To stand a chance of achieving this, he called for labels standards that reflect actual salt content, while also warning consumers of high levels.

"We want all food products to list the amount of table salt, besides preservatives like sodium bicarbonate," Dr Ravichandran said. "If the product uses above the prescribed level, it should be labelled red and those below should be labelled green," he said.

## Not your mother's soy milk: The evolving market for dairy

alternatives

By Sean Riley, senior director, Media and Industry Communications, for PMMI, The Association for Packaging and Processing Technologies 17-Nov-2017 - Dairy Reporter

The market for dairy alternatives, valued at \$7.37bn in 2016, is predicted to boom to \$14.136bn in 2022.

This market growth can be attributed to the rising inclination toward vegan, plant-based food, increased instances of lactose intolerance and rising demands for innovative dairy-free applications. Soy milk dominates as the largest segment of dairy-free products, most likely due to rising awareness about the nutritional benefits of soy-based foods.

However, the flavoured and sweetened dairy-free segment—including dairy-free yogurt, milk and frozen desserts—accounts for the largest segment by value. The opening of these new markets offers ample opportunity for creativity and new product introductions in the dairy industry.

Moving to the mainstream

Sales of alternative beverages—like almond milk, soy milk or lactosefree milk—have grown by approximately 250% since 2000, reaching \$894.6bn. Dairy milk alternatives are popular with both health-conscious and more adventurous shoppers. In a (indicate year or month) Packaged Facts survey of users of dairy alternatives, 70% of respondents said they try to eat healthier foods and 63% said they like to try new food products.



Over the past decade, non-dairy and plant-based milk has become commonplace in mainstream supermarkets. Unlike the unrefrigerated, boxed and powdered soy milk introduced in the 1970s, next-generation refrigerated plant milk brands can package their products just like their traditional, dairy-based counterparts and position them in the dairy aisle of stores. This influences customers to view dairy-free milk as a fresh, equal alternative to traditional milk.

#### Ice cream, no cream

As dairy-free milk becomes more ubiquitous in the refrigerated aisles, dairy-free ice cream is claiming space in the freezers. New launches of dairy-free ice cream varieties now make up 4% of all ice cream launches. Many of the new products come from established ice cream brands. Häagen-Dazs,

Nutrition

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tion Facts

Breyer's and Ben & Jerrys have all launched their own non-dairy ice cream lines. Interestingly, dairy-free ice cream is not marketed as vegan, but instead as dairy-free. According to research by Mintel, consumers view dairy-free ice cream to be a more permissible dessert. Brands avoid putting vegan labels on the packaging because of the healthy, non-indulgent connotation. Brands do better marketing dairy-free ice creams as plant-based treats.

## Is the milkman okay?

Some traditional dairy manufacturers are turning to legal action to solidify their position in the newly disrupted dairy foods landscape. Domestic dairy leaders in the US have proposed the "Defending Against Imitations and Replacements of Yogurt, Milk, and Cheese to Promote Regular Intake of Dairy Everyday Act (Dairy Pride Act)" to standardize the legal definition of milk. Industry leaders argue that plant-based milk products could potentially mislead consumers into thinking they are purchasing dairy milk, since the products are packaged similarly and are both labeled as milk. The act argues that 80% of the US population fails to meet their daily dairy recommendation. It calls on the Food and Drug Administration (FDA) to reinforce their definition of milk across the packaging of dairy and dairy alternatives products.

How necessary or helpful the act would be is up for debate. Michael Lynch, vice president of marketing at dairy alternative leader Daiya Foods, believes re-labelling will create more confusion, and argues that plant-based consumers actively seek those products and make informed purchase decisions. Other dairy industry leaders, instead of fighting alternative dairy's market growth, seem to be taking advantage of dairy's market shift—like the established ice cream brands investing in dairy-free ice cream lines.

Nutritional fact panel update? 'Single design not uniformly effective, says study

acts

17-Nov-2017 - Food Navigator by Will Chu

In a comparison of current and modified NFP that better

emphasise key information like calories and serving sizes, the team found much more attention was paid to healthier items with the modified NFP In contrast for less healthy items less attention was paid to the modified NFP than to the current NFP suggesting that a single NFP design may not be uniformly effective.

"Salad is easy to identify as very healthy, chips are easily identifiable as a very unhealthy product for consumers," said the study, led by Dr George Davis, professor at the department of human nutrition, foods, and exercise at Virginia Tech University. "Consumers may already hold the opinion that products are healthful or unhealthful. "However, consumers might infer health using the halo effect, e.g., a fat free product is considered overall as healthier, because it is fat free-even though it might have more calories due to added sugar, compared to a whole fat product. In those cases consumers can be misled when using the heuristic to make a decision instead of using information, such as, the NFP."

#### Labelling situation in the EU

Labelling food with nutrition facts is a means to support consumers making healthier food choices. NFPs are mandatory in countries within the EU member states and the introduction of three regulations (Regulations No. 1924/2006, 1169/2011, and 432/2012) providing the platform for a mandatory rollout of NFP for packaged foods in December 2016. Subsequent studies looking into their effectiveness have questioned whether the method of presenting this information matters, regardless of the country.

Research from Europe provides evidence that most consumers do not generally attend to nutrition when grocery shopping with one study conducted in six European countries, found less than one third of consumers paid attention to this information when buying food. Similarly, a review of consumers' understanding of EU legislation on nutrition and health claims, pointed out that nutrition labels were unlikely to lead to an improvement in healthy food choices if consumers did not pay attention to them.

#### Eye-tracking technology

Using eye-tracking technology in a between-subjects experiment, the team tested for differences between attention to the current and modified NFP but also for differences across food items. Generally NFPs, in particular calories per serving and serving size for the modified NFP received more attention when placed on healthier items (salad, yogurt, and healthy frozen meal), in comparison to current NFP. For less healthy items (cereal, cookies, chips), less attention was generally paid to the overall NFP, calories per serving, and serving size for the modified NFP in comparison to the current NFP.

In terms of across items, the items that are considered the healthiest (salad) and unhealthiest (chips) generally receive much less attention across both the current and modified NFP. While there are some statistical differences, the other items (yogurt, healthy frozen meal, cereal, and cookies) receive much more comparable attention levels in each of the areas of interest, and across the current and modified NFP.

"Consumers could attempt to avoid confronting unpleasant information, hence, they pay less attention to the NFP for the unhealthiest item," the study said. "Consumers have a bias toward confirming preconceived notions, and thus are likely able to process the information faster or decide to avoid unpleasant information. However, further research is needed to tease out this possible asymmetric explanation for less attention to nutrition facts for the healthiest product (just confirming prior knowledge) and for the least healthy product (information avoidance)."

## WTO members raise trade concerns on EU pesticide MRLs 14-Nov-2017 - Food Quality News by Joseph James Whitworth

Peru voiced concerns over the European Union's maximum residue levels (MRLs) for acrinathrin, matalaxyl and thiabendazole. Thiabendazole is used to control fungal infection in mangoes and the low

## residue limits imposed by the EU have caused a decline in Peruvian mango exports.

Peru said the requirement set more stringent limits than is recommended by the Codex Alimentarius and is more traderestrictive than necessary. The concern was shared by Bolivia, Brazil, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Nigeria and the US. Negative trade impact

The US said the standards have a negative impact on trade of a number of agricultural products and the new standards also affected its sweet potato exports. The EU replied that the stricter standards were based on studies by the European Food Safety Authority (EFSA) and provided information on alternative plant protection products to replace thiabendozole use on mangoes.

Members were unable to reach a consensus to endorse a decision on pesticide MRLs which was hoped to be put forward to trade ministers at the 11th WTO Ministerial Conference in Buenos Aires in December. The proposal from Kenya, Uganda and the US said agricultural producers report growing concerns on the impact of missing and misaligned MRLs on their exports. Missing or differences between MRLs applied in different

Image © iStock.com/ugurhan



countries can impede international trade in agricultural products. Meanwhile, the US Food and Drug Administration found that 98% of domestic and 90% of imported foods tested in FY 2015 were compliant with pesticide residue limits.

No pesticide chemical residues were found in 49.8% of the domestic and 56.8% of the imported human food samples analysed.

The agency found residue levels above the tolerance or residues for which no tolerance has been established in less than 2% (15 of 835) of domestic samples and less than 10% (444 of 4,737) of import samples. Pesticides most often found included Imidacloprid, Thiophanate-methyl, Boscalid, Chlorpyrifos, Acetamiprid, Azoxystrobin, Tebuconazole, Cypermethrin and Fludioxonil.

#### Glyphosate delay

At the WTO meeting, Argentina and the US took issue with delays in the European Union to renew the authorization for glyphosate. The concern was echoed by Australia, Brazil, Canada, Colombia, New Zealand, Peru and Uruguay. The US said actions to restrict the use of glyphosate appear to lack scientific justification. It said the scientific body assessing risks that international standards rely on – the Joint FAO/WHO Meeting on

Pesticide Residues (JMPR) - concluded that glyphosate does not pose a risk to consumers or public health when used appropriately.

## Cadmium in chocolate

Peru also questioned the European Union on its maximum permitted level of cadmium in foodstuffs, particularly in cocoa products. The country is one of the major cocoa producers and said it was concerned the EU's intended requirements could impede exports and were affecting the international price of the commodity. This concern was echoed by other Latin American and African cocoa exporters including Colombia, Costa Rica, Cote d'Ivoire, Dominican Republic, Ghana, Guatemala, Madagascar, Nigeria and the Economic Community of West African States (ECOWAS). Costa Rica said cadmium is naturally present in cocoa due to soil conditions.

The EU will introduce limits on cadmium in cocoa products from January 2019 . A 100g bar of dark chocolate containing more than 50% cocoa solids must not have more than 0.08mg of cadmium. The EU said it had already deferred the implementation of the maximum cadmium limits until 2019 due to concerns by its trading partners. The regulation also set limits on blended products, such as cocoa powders or chocolate products, rather than on cocoa beans, to facilitate compliance.

Meanwhile, training for government officials from WTO members covered SPS issues ranging from national implementation to the identification of SPS-related market access difficulties. Wai Yee Lin, assistant director at the department of consumer affairs of Myanmar's Ministry of Commerce, said: "This advanced SPS course has enhanced our understanding of SPS measures and has equipped us with the necessary tools to deal with SPS issues in trade in food." Kenrick Witty, a plant health officer in Belize's Agricultural Health Authority, said the course gave participants the know-how to address agricultural health issues when they return to their countries.

Acrinathrin, Metalaxyl and Thiabendazole MRLs in EU Regulation 2017/1164 In citrus fruit, strawberries the MRL for acrinathrin has been lowered from 0.2 to 0.02 mg/kg in pome fruits from 0.1 to 0.02 mg/kg. For metalaxyl for some pome fruits the MRL was lowered for quinces, meldars, loquats from 1 mg/kg to LOQ level of 0.01 mg/kg. For apples and pears the MRL remained at 1 mg/kg. The MRL for thiabendazole in citrus fruits has been elevated from 5 to 7 mg/kg as well as for some pome fruit like as for quinces, meldars, loquats from 0.05 to 3 mg/kg.

A lower MRL has been set for mango from 5 mg/kg to 0.01 mg/kg, potatoes from 15 mg/kg to 0.04 mg/kg and chicory from 1 mg/kg to 0.05 mg/kg. The regulation will be in force by 21 January 2018.

## Study finds 'next DMAA' in tainted sports, weight loss products 09-Nov-2017 - NutraIngredients USA by Hank Schultz

The group, which consisted of Cohen, of the Harvard Medical School, John Travis, PhD of NSF, an expert from the US Department of Defense and two Dutch researchers, published their findings Wednesday in the journal Clinical Toxicology.

The researchers bought products being marketed as dietary supplements from online outlets. Of the six products, two were marketed for weight loss whereas the other four were categorized as pre workout products. After analysis, the products were found to contain the following ingredients: 2-amino-6-methylheptane (also known as octodrine), 1,4-dimethylamylamine (1,4-DMAA), 1,3dimethylamylamine (1,3-DMAA) and 1,3-dimethylbutylamine (1,3-DMBA). Family tree of dodgy ingredients DMAA has been ruled by FDA to be an illegal dietary ingredient since 2013, when it was taken the market because of safety concerns. But it still continues to show up at the fringes of the dietary supplement industry. The lone high pr le holdout was Hi Tech Pharmaceuticals, which had openly sold products containing the ingredient while a legal wrangle with FDA ran its course. Hi Tech founder Jared Wheat reportedly agreed in early October to stop selling products containing the ingredient as part of a bail deal associated his recent indictment on money laundering and mail fraud charges. Wheat was among the promoters of the ingredient who claimed to have evidence that



DMAA is a constituent of geranium, something that FDA has disputed.

DMBA has been in FDA's crosshairs almost as long as DMAA. Purported to be a constituent of dendrobium, an orchid species, DMBA is not a legal dietary ingredient because FDA has ruled that it is a New Dietary Ingredient for which no notification is on file. In both cases, these ingredients were initially brought to market purporting to be botanical

**Regulatory News** 

extracts, something which experts disputed. Nevertheless, that marketing strategy appears to be aimed at what promoters see as a weakness in the regulatory structure, namely that a pre-DSHEA positioning affords an easier path to market.

Octodrine is another case entirely. The paper says this substance was once briefly marketed as a drug in the US in the early 1940s, and was mentioned in the 1947 edition of the Physicians Desk Reference, a compilation of manufacturers' prescribing information on drugs. The drug was used in a nasal spray to treat bronchitis symptoms. The study also mentions that the drug was an ingredient in oral preparations in Germany and elsewhere up to the mid 2000s in formulas marketed to treat hypotension, asthma and other conditions. While octodrine is clearly an Active Pharmaceutical Ingredient (API), there have been allegations that it is a naturally occurring substance. Some references-none of which have been confirmed, the researchers said—link it to one of several species of botanicals and even to fish or shellfish.

## Finding the next new thing

One of the paper's co-authors, John Travis. PhD. senior research scientist for NSF, said the group had been on the lookout for what might replace DMAA in the market. "We were on the lookout for the next new ingredient would be. We were hoping to catch it just as it entered the marketplace and, with octodrine, it looks like we did." Travis told NutraIngredients-USA. "The really troubling thing is that these people are using ingredients for which there is no real safety information. For drugs back in the 1940s, they didn't do safety trials like we do today. And we found octodrine at three times the levels of the 1940s drug. It's important to note that these products were freely

for sale. We didn't have to go somewhere on the 'dark Web' to find them, " he said.

#### Flip sides of the coin

Amy Eichner, PhD, the special adviser on drugs and supplements for the United States Anti Doping Agency, said she applauds the researchers' efforts to shine a light on a troubling issue. "It's both a happy and a sad day. Studies like this are

great because it shows that various groups of scientists and clinicians are aware of this problem and they think it's important enough to study. But it's a sad day for athletes, members of the military and general consumers because marketers continue to flood the market with products that contain active pharmaceuticals," she said.

Duffy MacKay, senior vice president of the Council for Responsible Nutrition, said Cohen et al. identified something that no one in the responsible industry can condone. While it is painful to see these issues continue to plague the market, MacKay said it's necessary to keep shining a light on these practices. "As much as Dr Cohen has been an adversary of the industry you have to respect his intent here. He's trying to point out dangerous behaviour by outliers in our industry. As much as we have as an industry spent time trying to point out that these are really outliers, this is still our problem. We need to continue to support any effort to protect consumers," he said.

## Chink in the regulatory armour

To some degree, MacKay agreed with the notion that underhanded players like these have found a niche in which they can operate, one created by the regulatory structure as it stands. Ingredients

Indee © istock.com/

that look more and act more like pharmaceuticals but fly the wispiest of botanical flags are difficult to deal with within the present regulatory and enforcement structure. Perhaps it's time regulations evolved to keep step with the times, though MacKay said he wasn't sure what a new structure might look like.

"I don't think it's going to be acceptable in the next 20 years to have ingredients showing up on the market in this way. The current regulatory structure is not appropriate for ingredients like this. Our structure is intended for foods and food ingredients. When DSHEA was written, when the GMPs were written, the structure was more appropriate," he said. "Then again, if you were to go to these companies and ask to see their following any rules anyway," MacKay said.

Corrine Newhart, a spokewoman for FDA, said the agency will add the information in Cohen's paper to the growing literature on the subject of stimulant-like ingredients. "In general, the FDA does not comment on specific studies, but evaluates them as part of the body of evidence to further our understanding about a particular issue and assist in our mission to protect public health," she said. "Firms can often lawfully introduce dietary supplements to the market without even notifying FDA; however, premarket notification is required when a dietary supplement contains a new dietary ingredient. To date, we have never received a new dietary ingredient notification for a product containing 1,3-DMAA, 1,4-DMAA, 1,3-DMBA, DMHA, or octodrine, the compounds highlighted in the Cohen study, " Newhart said.

Dan Fabricant, PhD, president and executive director of the Natural Products Association, said finding stimulants of this kind is not terribly surprising, and he disputed the notion that these products are 'flooding' the market. "The position of the agency has been very clear on DMAA and this is nothing new. The fact that it is still out there is troubling, but people make this out to be a bigger concern than it is," he said.

## 'A useful regulatory guidepost': NPA publishes book listing pre-DSHEA ingredients Stephen Daniells 08-Nov-2017 NutraIngredients USA

The Natural Products Association has released a book compiling a list of pre-DSHEA (old) dietary ingredients to provide a "useful regulatory guidepost" for industry and regulators.

Using original source material predominantly collected from the NPA's own printed magazines and newsletters, some dating back to the

1950s, Dr Dan Fabricant, PhD and Dr Corey Hilmas, PhD have alphabetically organized a list of more than 1,850 pre-DSHEA or old dietary ingredients (ODIs) that were marketed and sold prior to October 15, 1994.

"This book is the first of its kind and should serve as a valuable tool for industry regulatory divisions, retailers, industry consultants, as well as state and federal regulators," said Dr Fabricant. NPA's president and CEO. "NPA continues to work with the FDA in their quest to develop a list of its pre-DSHEA dietary ingredients that are exempt from notification. This book represents a considerable investment of NPA's resources and took over 2 years to develop. We look forward to releasing new editions of the book as we add new independently verified ingredients to this extensive collection."

## FDA's Response

Responding to NPA's announcement, a spokesperson for the US Food and Drug Administration, told NutraIngredients-USA: "As we said in the revised draft NDI guidance, and in the Federal Register notice announcing our recent public meeting, we are aware that, over the years, several trade associations and industry groups have independently developed their own unofficial lists of ingredients that they believe were marketed before October 15, 1994. We are unable to verify the accuracy of those lists and therefore have never recognized or sanctioned any of them.

"Our October 3, 2017 public meeting was an important first step toward the goal of developing an authoritative list of pre-DSHEA dietary ingredients in a manner that will be transparent to and will



benefit all of our stakeholders. The comment period on that meeting remains open through December 4, and we hope that NPA will share on the public docket the methods and sources that it used to compile its latest list so that all interested stakeholders can evaluate the quality of its evidence."

Dr Fabricant told NutraIngredients-USA that discussions have already taken place with FDA regarding the list and NPA would indeed be sharing the methods and sources on the public docket.

"We predicted FDA would go this way two years ago, so the timing has been good, coming so close to the public meeting [on October 3 at the Center for Food Safety and Applied Nutrition campus just outside of Washington, DC]," he said. "FDA isn't going to come up with their own list and the old ads, which come primarily from the old NNFA retail magazines, support the active moiety and the intended use," he added.

The NPA book, titled Pre-DSHEA List of Old Dietary Ingredients, is available for pre-sale. It will also be available as a searchable database for NPA members only. The book is available at \$2,000 for members and \$10,000 for non-members. There will be an additional upcharge for industry consultants, state and federal regulatory agencies, libraries, and NGOs.

#### **Public Comments**

Speaking at the recent IPA Workshop in DC, Dr Cara Welch, Senior Advisor for the Office of Dietary Supplements at the FDA, told attendees that the ODI or pre-

DSHEA of "grandfathered" list is "not necessarily a list of safe ingredients. It also doesn't mean that anything that isn't on the list is new." The public comment period is open until Dec 4, 2017, and can be accessed at Regulations.gov under Docket No. FDA-2017-N-

# HEALTHRITES

## What makes moringa good for you?

Medical News Today 4 November 2017 By Bethany Cadman

Moringa oleifera is a plant that is often called the drumstick tree, the miracle tree, the ben oil tree, or the horseradish tree.

Moringa has been used for centuries due to its medicinal properties and health benefits. It also has antifungal, antiviral, antidepressant, and anti-inflammatory properties.

Fast facts on moringa:

- The tree is native to India but also grows in Asia, Africa, and South America.
- Moringa contains a variety of proteins, vitamins, and minerals.
- Moringa oleifera has few known side effects.

• People taking medication should consult a doctor before taking moringa extract.

What is in moringa? Moringa has medicinal properties and contains many healthful compounds. Moringa contains many healthful compounds such as:

- vitamin A
- vitamin B1 (thiamine)
- B2 (riboflavin)
- B3 (niacin), B-6
- folate and ascorbic acid (vitamin C)
- calcium
- potassium
- iron
- magnesium
- phosphorus
- zinc

It is also extremely low in fats and contains no harmful cholesterol.

What are the benefits? Moringa is believed to have many

benefits and its uses range from health and beauty to helping prevent and cure diseases. The benefits of moringa include: 1. Protecting and nourishing skin and hair

Moringa seed oil is beneficial for protecting hair against free radicals and keeps it clean and healthy. Moringa also contains protein, which means it is helpful in protecting skin cells from damage. It also contains hydrating and detoxifying elements, which also boost the skin and hair. It can be successful in curing skin infections and sores.

2. Treating edema

Edema is a painful condition where fluid builds up in specific tissues in the body. The anti-inflammatory properties of moringa may be effective in preventing edema from developing.

3. Protecting the liver

Moringa appears to protect the liver against damage caused by antitubercular drugs and can quicken its repair process.

4. Preventing and treating cancer Moringa extracts contain properties that might help prevent cancer developing. It also contains niazimicin, which is a compound that suppresses the development of cancer cells.

5. Treating stomach complaints Moringa extracts might help treat some stomach disorders, such as constipation, gastritis, and ulcerative colitis. The antibiotic and antibacterial properties of moringa may help inhibit the growth of various pathogens, and its high vitamin B content helps with digestion. 6. Fighting against bacterial diseases

Due to its antibacterial, antifungal, and antimicrobial properties, moringa extracts might combat infections caused by Salmonella, Rhizopus, and E. coli.

7. Making bones healthier Moringa also contains calcium and phosphorous, which help keep bones healthy and strong. Along with its anti-inflammatory properties moringa extract might help to treat conditions such as arthritis and may also heal damaged bones.

8. Treating mood disorders Moringa is thought to be helpful in treating depression, anxiety, and fatigue.

9. Protecting the cardiovascular system

The powerful antioxidants found in Moringa extract might help prevent cardiac damage and has also been shown to maintain a healthy heart.

10. Helping wounds to heal Extract of moringa has been shown to help wounds close as well as reduce the appearance of scars.

#### 11. Treating diabetes

Moringa helps to reduce the amount of glucose in the blood, as well as sugar and protein in the urine. This improved the hemoglobin levels and overall protein content in those tested.

12. Treating asthma

Moringa may help reduce the severity of some asthma attacks and protect against bronchial constrictions. It has also been shown to assist with better lung function and breathing overall.

## 13. Protecting against kidney disorders

People may be less likely to develop stones in the kidneys, bladder or uterus if they ingest moringa extract. Moringa contains high levels of antioxidants that might aid toxicity levels in the kidneys.

14. Reducing high blood pressure Moringa contains isothiocyanate and niaziminin, compounds that help to stop arteries from thickening, which can cause blood pressure to rise.

15. Improving eye health Moringa contains eyesightimproving properties thanks to its high antioxidant levels. Moringa may stop the dilation of retinal vessels, prevent the thickening of capillary membranes, and inhibit retinal dysfunction.

16. Treating anemia and sickle cell disease

Moringa might help a person's body absorb more iron, therefore increasing their red blood cell count. It is thought the plant extract is very helpful in treating and preventing anemia and sickle cell disease.

Click here to purchase moringa products. Please note that this will open an external page.

## Side effects

Anyone considering using moringa is advised to discuss it with a doctor first.

Moringa may possess anti-fertility qualities and is therefore not recommended for pregnant women. There have been very few side effects reported. People should always read the label on the extract and follow dosage instructions.

## Risks

Some of the medications to be particularly aware of are: • Levothyroxine: Used to combat thyroid problems. Compounds in the moringa leaf may aid the thyroid function, but people should not take it in combination with other thyroid medication. • Any medications that might be broken down by the liver: Moringa extract may decrease how quickly this happens, which could lead to various side effects or complications.

Diabetes medications: Diabetes medications are used to lower blood sugar, which moringa also does effectively. It is vital to ensure blood sugar levels do not get too low.
High blood pressure medication: Moringa has shown to be effective at lowering blood pressure. Taking moringa alongside other drugs that lower blood pressure may result in it becoming too low.

Can it aid weight loss? Evidence has shown that moringa extract can be effective in reducing and controlling weight gain in mice. Its high vitamin B content helps with smooth and efficient digestion and can assist the body when converting food into energy, as opposed to storing it as fat.

Moringa is thought to:

• reduce weight gain

• help to lower cholesterol and blood pressure

• prevent inflammation

• help the body convert fats into energy

• reduce fatigue and improve energy levels

## Research

Like all supplements, the United States Food & Drug Administration (FDA) do not monitor moringa, so there might be concerns about purity or quality. It is essential to understand the validity of the claims made by the manufacturers. whether it is safe to use, and what potential side effects there may be. There is plenty of recent research to back up the benefits as stated above, though many of the studies are still in the preliminary stages or the tests have only taken place on animals as opposed to humans, so there is plenty more to be done.

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