

# **PFNDAI Bulletin(September 2012)**

**Protein Foods and Nutrition Development  
Association of India**

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# Editorial

Consumers are looking for healthy alternatives. There are many new products that come in the market. Some try to beat the competition and put their products in market without losing much time and efforts. People are attracted by advertisements which talk about all the health benefits and immediately find that the products do not taste really good. They just don't buy them again.

We must realize that people do not buy most food products because they only think of nutrition. Our consumers are just learning about the nutrition and they are still looking for taste and flavour. They are prepared to go some way to meet the nutrition and health but not at a great sacrifice of taste of food products.

Some of the products like snacks and soft drinks are consumed for almost purely the taste and these are fun foods. There is hardly any thought given to nutrition and health. Here the taste modification is even less appreciated. By including some amount of nutrition in these or reducing those perceived as undesirable such as salt, sugar, fat and calories without noticeably affecting the taste the consumers may try them grudgingly.

We still need to create awareness about health among consumers but they still will consider some products purely for enjoyment and they will not sacrifice any taste sensation in these. They may reduce the intake of these but not compromise on the taste factor.

Food companies have been trying to get some of the new products in the market with the hope of getting the market share by introducing the nutrition and health benefit into their products. When the benefit does not affect the taste at all and

may marginally affect the cost, the consumers are willing to accept.

This requires not only good technology but some ingredients and additives. Although food laws have allowed many new additives there still a large number that is approved in Codex and regulations of other countries but we still have not included them.

Thus those products that market their products without considering the taste especially for certain category of products find that consumers are not at all forgiving and compromising. It is also a bit difficult to gauge the consumer reaction without marketing. Test marketing is sometimes avoided by bigger companies as they feel that their competition would learn about their efforts and a benefit of new product will be lost.

In spite of some difficulties, we are happy to learn that many companies are introducing the health and wellness category of products in their product portfolio. They also serve through their promotion to educate the consumers. These advertisements go a long way, much longer than any efforts by government to educate, to create awareness among the masses. We hope that these efforts continue with all sincerity for the health and wellness of all the consumers so they not only enjoy the food for its taste but get all the nutritional and health benefit they would derive.

With season's greetings!

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



**6-7 March 2013**

## **Nutracon**

Anaheim, CA, USA  
New Hope Natural Media  
Tel: +1-866-458-4935  
E: conferences@newhope.com  
W: www.nutraconference.com

**March 6-8, 2013**

## **Global Food Safety Conference 2013**

Barcelona Spain  
T: +33 1 43186182  
E: tcgffoodsafety@theconsumer  
goodforum.com  
W: www.tcgffoodsafety.com

**March 8 - 10, 2013**

## **Natural Products Expo West**

Location: Anaheim, CA  
Contact: New Hope Natural Media  
Phone: 866-458-4935  
Email: tradeshow@newhope.com  
Website: www.expowest.com

**March 13-16, 2013**

## **8th Nutra India Summit**

Bombay Exhibition Centre, Mumbai  
T: 022-2438 5007  
E: enquiry@nutraindiasummit.in

**March 14-16, 2013**

## **41st Dairy Industry Conference**

Bombay Exhibition Centre, Mumbai  
M: 0922330454  
E: shyjuida@gmail.com  
W: www.idawz.org

**March 24 - 27, 2013**

## **Anuga Food Tech**

Location: Cologne, Germany  
Contact: Matthias Schlüter, Project Manager  
Phone: +49 (0)221 821 2901  
Website: www.anugafoodtec.com  
Email: m.schluter@koelnmesse.de

**March 29-30, 2013**

## **Flora India 2013**

Exhibition on Horticulture & Agriculture  
Bombay Exhibition Convention Centre,

# Coming Events

Goregaon, Mumbai  
Tel: 99307 11797; 022-6459 0047  
E: pr@floraindia.co.in  
W: www.floraindia.co.in

**May 14 - 16, 2013**

## **Vitafoods Europe**

Location: Geneva, Switzerland  
Contact: IIR Exhibitions/ Daria Smith  
Phone: 44-20-701-76482  
Email: daria.smith@informa.com  
Website: www.vitafoods.eu.com

**July 13 - 16, 2013**

## **IFT Annual Show & Conference**

Location: Chicago, IL  
Contact: Institute of Food Technologists (IFT)  
Phone: 312-782-8424  
Email: info@ift.org  
Website: www.ift.org



# Probiotics: The Wonder Bugs

[Prof. Jagadish Pai](#)

**United Nation's Food & Agriculture Organisation (FAO)** gives definition of probiotics as live microorganisms which when consumed in adequate amounts confer health benefits including prevention and cure of disorders like lactose intolerance and inflammatory bowel disease. Global market was over 16 billion dollars in 2008. There are more than 500 food and beverages introduced in the last decade to which probiotics have been added. The market is one of the fastest growing and is expected to be worth 30 billion dollars by 2015. The market is at present mostly in US, Europe (especially Germany & UK) and Japan but Asia-Pacific is one of the fastest growth areas. According to Frost & Sullivan market analysis, Probiotic Cultures market in Asia-Pacific earned 310 million dollars in 2011 and is expected to reach over 522 million dollars by 2018.

Although Indian market is still small, according to one report it is grow at 11% for next few years as awareness is increasing about its benefits. The present market is about 20 million dollars and the future looks bright for probiotics foods. Probiotics are being added to various products like yoghurt, beverages, ice-creams and other foods. Promotion is mostly directed to children and young families. With changing lifestyles bring in readymade processed foods, so presence of probiotics in these foods may be acceptable as they would make these foods healthier.

## What are Probiotics?

There are many lactic acid bacteria. These are “friendly” bacteria that live in our digestive and other systems without causing disease. These are also present in some fermented foods like yoghurt. There are many other bacteria live in our bodies and friendly bacteria like lactic acid bacteria help us break down food, absorb nutrients and fight off “unfriendly” organisms that might cause diseases like diarrhea. They are also useful in some other problems including irritable bowel syndrome (IBS), colic in babies, high cholesterol, lactose intolerance etc. Not all lactic acid bacteria would have all these benefits and some of the strains have been shown to have these benefits. Friendly bacteria with health benefits are called Probiotics. There is also another property the probiotics have that distinguishes them from others and that is ability to lodge in intestine. Others may not be able to thrive there. It is necessary for probiotics to be able to reside in our intestine in order to be useful to us.

Positive role of these bacteria was first recognised by Russian scientist Eli Metchnikoff who was trying to replace harmful gut microbes with useful ones. It was at that time known that milk fermented with lactic acid bacteria inhibits growth of proteolytic bacteria that produced toxic substances. Lactic acid bacteria inhibit the growth of proteolytic bacteria because of the low pH produced during fermentation of lactose.

Metchnikoff also noted that certain rural populations in Europe e.g. Bulgaria who lived largely on milk fermented by lactic acid bacteria were exceptionally long lived. He proposed that consumption of fermented milk would populate intestine with harmless lactic acid bacteria, lowering intestinal pH and suppressing the growth of proteolytic bacteria. The microorganism isolated from this

fermented milk and called Bulgarian Bacillus and later called *Lactobacillus delbruckii* subsp. *bulgaricus* could not lodge in intestine.

Bifidobacterium was first isolated from a breast-fed infant and was found to provide clinical benefit of treatment of diarrhea, which was claimed to be due to displacement of pathogens by these bacteria. It was realised that bacteria originating from the gut were more likely to be beneficial.

The term “probiotics” was first introduced in 1965 by Lilly and Stillwell to describe bacteria that provided health benefits. Probiotics were defined as microbially derived factors stimulating growth of microorganisms. Probiotics are now defined by FAO/WHO as “live microorganisms which when administered in adequate amounts confer a health benefit on the host”.

Many factors disrupt the balance of intestinal flora including use of antibiotics, continual stress, improper diets, exposure to radiation, parasitic infestation etc. Probiotics are intended to restore the balance by growing in intestine and providing healthful benefits.

### Probiotic Organisms

For use in foods, probiotic microorganisms should be capable of surviving passage through digestive tract and also be capable to proliferate in the gut. Hence they must be resistant to gastric juices and be able to grow under conditions of intestines. They are Gram positive bacteria and are included primarily in two genera, *Lactobacillus* and *Bifidobacterium*.

Table1. Names of Microorganisms Used as Probiotics

<b>Lactobacillus sps.</b>	<b>Bifidobacterium sps.</b>	<b>Streptococcus sps.</b>	<b>Others</b>
Lactobacillus sps. L. acidophilus L. casei (rhamnosus) L. fermentum L. lactis L. paracasei L. plantarum L. salivarius L. bulgaricus	B. bifidum B. breve B. lactis B. longum B. infantis B. adolescentis	S. thermophilus S. salivarius subsp. thermophilus	Saccharomyces boulardii Bacillus cereus Escherichia coli Enterococcus Propionibacterium freudenreichii

The probiotic chosen for adding to foods should have following properties. It should be in very large amount in the dose or serving (typically 5 billion colony forming units) to ensure that sufficient number reach the intestine. The microorganisms used should be non-pathogenic and safe. They should also be resistant to bile, hydrochloric acid and pancreatic juice. Some of them are protected from these environments in stomach and intestine so their viability would be ensured. They should also be resistant to processing carried out during their production or in food processing if added to foods.

Food itself can affect the viability. Frozen foods may not only have effect of temperature but also ice structure that can affect microbes. Contents of food including nutrients can interact. Presence of



oxygen and pH may be factors. Sometimes food components can provide protective effect also. Presence of prebiotics or food for probiotics would be useful for viability.

Probiotic organism should also have ability to lodge in the intestine so ability to adhere to intestine surface will resist being passed out of the gut and remain viable in presence of prebiotic.

ICMR guidelines for Evaluation of Probiotics in Foods states that any new strain used as a probiotic should be evaluated for safety and efficacy. The absence of pathogenicity and infectivity thus is an essential pre-requisite of probiotic safety. The guidelines give following requirements:

Since effects of probiotics are strain specific, strain identification is important using validated standard methodology. The strain in use in India should be deposited in an internationally recognised culture collection.

The strain should be resistant to gastric acidity, bile resistant, having antimicrobial activity against potential pathogens, having ability to reduce pathogen adhesion to surfaces and having bile salt hydrolase activity.

Safety and efficacy of probiotics must first be established in animals prior to human trials. Human trials should prove probiotics providing well-being, reduced or delayed risk of disease or faster recovery from illness. If a probiotic food has a record of documented long and safe use outside the country, it may be marketed in India, however, for health claims to be made on labels, efficacy studies should be conducted on Indian subjects.

### **Benefits of Probiotics**

**Necrotising Enterocolitis (NE):** This is a devastating intestinal disorder affecting preterm infants in neonatal ICU with very high mortality rate. Most preterm babies delivered by Caesarean need intensive care and are breast-fed only after several weeks. Hence they are deprived of beneficial bacteria ingested through mother's milk. These infants are exposed to many pathogens such as E. coli, Salmonella, Shigella, Staphylococcus and others which colonise in intestine and increase the risk of NE. Human trials with high levels of live L. acidophilus and B. infantis resulted in 60% reduction of NE and overall mortality. Another study showed colonisation with probiotic bacteria and subsequent protection against NE.

**Diarrhoea:** Probiotics have preventive and curative effects on several types of diarrhoeas. Several studies have shown beneficial effects of L. rhamnosus and B. lactis for prevention and L. reuteri for treatment of acute diarrhea caused by rota virus in children.

Although many new antibiotics with fewer side effects have been developed, the incidence of antibiotic associated diarrhoea (AAD) still affects a lot of patients. A meta-analysis of evaluation of efficacy of probiotics in prevention and treatment of AAD was quite favourable.

Other types of diarrhoeas like radiation induced one in cancer patients and traveller's diarrhoea also showed benefits. Probiotics were found to be easy, safe and feasible approach to protect cancer patients against the risk of radiation induced diarrhoea. Probiotics like S. boulardii and L. acidophilus and B. bifidum showed significant efficacy in preventing traveller's diarrhoea.

*H. pylori* is a major cause of chronic gastritis and peptic ulcer and a risk factor for gastric malignancies. Eradication with antibiotics is extremely effective but expensive and causes side effects and antibiotics resistance. Meta-analysis of studies revealed that probiotics had inhibitory effect and reduced gastric inflammation and gastritis due to *H. pylori* and also side effects of other treatments.

### **Inflammatory Bowel Disease (IBD)**

This includes ulcerative colitis and Crohn's disease with different patterns of chronic inflammation of GI tract. Studies implicate an imbalance with predominance of aggressive bacteria and paucity of predominance of protective ones. Various studies suggest positive response to probiotics in patients with IBD increasing the immune response and improving the gut bacteria functions. Thus probiotics have potential for beneficial role to induce and maintain remission in IBD but needs further studies.

### **Cancers**

Lactobacilli bind to mutagenic substances in intestine and suppress the growth of bacteria that form carcinogens from their precursors in intestinal tumours. Ability to reduce risks of cancers by lactobacilli is also based on their ability to modify gut microflora and to decrease carcinogen levels like  $\beta$ -glucuronidase. Probiotics like *L. casei* appears to decrease recurrence of urinary bladder cancers but this needs confirmation. Lower rates of colon cancer among consumers of fermented dairy products have been also been observed in one study but confirmation does not exist.

### **Surgical Infections**

Fermented milk was used for healing wounds and to fight infection before antiseptics and antibiotics appeared. Some success has been shown by recent studies for use of probiotics in treating and preventing surgical infections. Infection by *S. aureus* and its adherence to surgical implants is inhibited by *L. fermentum*, while reduced infection and pancreatic abscesses are seen when *L. plantarum* is consumed with oat fibres.

### **Uro-genital Infections**

Vaginal or bladder infection is caused by abnormal microbiota. Two strains of *Lactobacillus* appear to be effective at colonising and protecting urogenital tract. The by-products of their metabolism, such as biosurfactants having antagonistic effect due to their inhibition to adhesion, acids, bacteriocins and hydrogen peroxide inhibiting growth and coaggregation molecules blocking spread of pathogens, are responsible for antagonistic effects.

Reduction of risk of bacterial vaginosis by probiotics may also be able to reduce infant mortality and pre-term labour in pregnant women. As probiotics play a critical role in regulation of vaginal microflora due to formation of hydrogen peroxide. This substance is thought to also protect against transmission of certain diseases such as AIDs.

## Lactose Intolerance

Ingestion of certain active strains may help lactose intolerant individuals tolerate more lactose than they would otherwise have tolerated. These individuals lack lactase that hydrolyses lactose but since probiotics can digest lactose easily reducing the problem substantially.

## Cholesterol

Animal studies have shown that some strains of lactobacilli are able to lower serum cholesterol levels, presumably by breaking down bile in the gut. This inhibits its reabsorption which enters blood as cholesterol. Several short term studies have shown effects of yogurt containing probiotic strains on slight but significant reduction of serum LDL concentrations. However, longer study did not find significant difference, but found increase in serum HDL.

## Blood Pressure

Some studies have indicated that consumption of various strains of lactobacilli may result in modest reduction in blood pressure. This may be due to certain peptides similar to ACE inhibitor during fermentation. This also needs confirmation.

## Factors Affecting Viability

When probiotics are added to foods, they may interact with substances in foods and its environment. These may act as protective or inhibitory or destructive to probiotic microorganisms. Bacteria being living organisms react favourably or unfavourably to foods with respect to pH, temperature, moisture, oxygen and various ingredients that may be toxic or harmful to organisms.

Lactobacillus species tolerate lower pH values better than most Bifidobacter. Probiotics need to be active in intestines where pH is slightly alkaline in small intestine. However the foods may have slightly acidic pH and stomach is highly acidic. Thus pH tolerance is quite important. Some of the preparations may use enteric coating or microencapsulation to tolerate extreme pH.

Temperature is also another important factor while selecting probiotics. Frozen foods are stored at  $-18^{\circ}\text{C}$  whereas many foods are processed at very high temperatures. Some of the milk and juice products are processed at ultra-high temperature. Probiotics must survive these temperatures without loss of viability or alteration of beneficial properties.

Moisture is essential for viability and growth but if probiotics showed growth in foods, they may alter the food characteristics resulting sometimes in food being called spoiled. Thus lower moisture levels may be better to keep them without any adverse changes but then normal foods that contain high moisture contents cannot be used for adding probiotics. Here also microencapsulation may be useful.

There are many substances in foods such as salt, organic acids and nitrates can inhibit probiotics. Foods also may have some ingredients which might be protective to microbes. Certain minerals and vitamins are needed by these microbes and ingredients like fat may protect them from environmental factors.

Prebiotics are found to be quite useful in maintaining the viability of probiotics especially after consumption in the intestines. These are soluble fibres which are not digested by humans so they will remain in large intestine when all other ingredients are digested and absorbed in small intestine. Prebiotics provide food for probiotics in large intestine.

### **Safety of Probiotics**

Although in most cases probiotics have been found to be beneficial, some exceptions are also known. Probiotics were found to be harmful in one study with patients with predicted severe acute pancreatitis. Another study with children found that probiotics developed sensitivity to allergens. Consumption of probiotics by people with lowered immune systems developed lactobacillus septicaemia. Therefore it is necessary to ensure that probiotics are adequately tested for safety.

### **Probiotic Superstrain?**

One strain of *Lactobacillus acidophilus* DDS1 has been referred to as superstrain by some as it is claimed to have multiple benefits. It is supposed to be stable to stomach acid and bile resistant. Among the probiotic benefits are listed: production of B-vitamins including folic acid, prevention of carcinogenesis, prevention of adhesion of pathogenic coliforms to cell wall, alleviation of traveller's diarrhoea and constipation, inhibition of *H. pylori*, relief from dermatitis and other skin disorders, reduction of serum cholesterol, inhibition of toxic microbes, reduction of lactose intolerance and stimulation of immune system.





# Report –Nutrition Week Activity:

by Ms. Ummeayman R.

*PFNDAI celebrates the NutritionWeek Activity and encourages students towards a Healthy Lifestyle. The Association has been celebrating the Nutrition Week Activity in various colleges of Food Science and Nutrition, this year it was celebrated on 8<sup>th</sup> September 2012 at SNDT Women's University, Juhu campus.*

An overwhelming response was seen from students and it was equally supported by industry representation. Morning session had various competitions for students from Undergraduate and Post Graduate in Food Science and Nutrition. Ministry of Family Welfare had declared 'Malnutrition and Awareness to eradicate malnutrition' as the theme for this year's nutrition week activities nationwide. Following this theme students presented table -top calendars showing the nutrition for women during various stages of life, especially during pregnancy and adolescent period. There was also Nutritional Quiz and Recipe competition on making 'Micronutrient rich snack for preschoolers' by undergraduate students and post graduate students made recipe which were 'Low in sodium and potassium food adjuncts for renal patients'. There was also Poster making and exhibition by PG students of Dept of Food Science and Nutrition and Dr. BM Nanavati College of Home Science on 'Food Security'. All the events were judged by Dr. Archana Bhatnagar, Ms. Salomi Benjamin , Dr. Lewi J.I. and Dr. Subbulaxmi, each of the distinguished judges are well known experts in the field of Food Science , Dietetics and Food regulatory. The competitions session was followed by Seminar session post lunch, a brief of the presentations is as follows.

Dr. Lewis J.I., Chairman of Regulatory Affairs Committee-PFNDAI, made the student community familiarize with the concept of Risk Analysis and what Acts are considered by FSSAI while framing the regulations. It is very interesting to know the interrelation of Risk Assessment, Risk Management and Risk Communications and its influence on the stake holders. A hazard can be viewed differently under different situations and so while making any regulations we should consider what situation we are in and what are we considering, as the hazard causing agent might be present in negligible quantity for us and so for our situation it might not be a potential hazard at all.

Mrs. Shweta Tawde- Shirke, Project Manager, clinical operations at C.L.A.I.M.S. presented the 'Functional Food-Safety and Efficacy Trials'. She gave an insight into the functional foods and what are the concepts that triggered its origin. Today this is finding more and more consumer interest as there is more demand for a healthy lifestyle. Consumers concept of health has more focus on overall wellness for a longer durations. In her presentation , she also focused on the current claims that are allowed on functional foods and the requirement of scientific basis to support the claims for functional components or the foods containing them .Also the claims about the potential health benefits from functional foods or food ingredients must be communicated effectively to consumers

and the difference between health claims and structure-function claims must also be more widely addressed to allow consumers to understand the differences in the scientific bases of such claims.

In Gandhiji's words, India does not live in cities, she lives in villages. Dr. Subbulakshmi, Nutrition Consultant, through her presentation of 'TRADITIONAL FOODS - HEALTH BENEFITS' explained the health benefits of the various Indian traditional cuisine and the ingredients that have been used for years long. Indian food is largely influenced by religious and cultural choice. Largely the cuisines are shaped by Hindu and Jain influence but it also has a Mughal touch to it. Also each festival and season is marked with its special foods for the occasion, this not only made the occasion more special but a detailed study shows that it has its own health benefits.

How this concept of healthy foods and products are actually given shape and brought to the consumers was explained by Dr. Anand Dhodapkar from Marico in his presentation 'Development of Healthy Foods'. Healthy food industry has grown due to consumers demand for healthy products and it thrives on the demands of the consumers. In 1990's the demand was more for 'fortified foods', in 2000's consumers wanted more of 'less evil foods', in 2010's people are looking for 'functional foods' like probiotics etc. He gave an insight into the synergy between various stakeholders to develop the product and how an idea is finally given the form of a product and brought to market, what all different gates are that the products need to clear to enter the market shelves. With increased global awareness, there has been an increase in consumers demands and they are aware of their own needs for a healthy living. Today's consumer wants to manage weight, take care of his heart, wants his child to be taller, wants his looks to be younger, feel more energetic. Further to help the consumers there are various colour coded labeling and signals available on packages so that the consumers can find more of healthy choices.

Dr. Frank Daniel, Coca-Cola India, with his presentation on 'Beverages for Wellness and Nutrition' showed that beverages can be a good medium in the eradication of malnutrition. Health and wellness market has seen a tremendous growth and now we have many products in market such as enhanced waters, flavored water, value added dairy products and drinks. Coca-Cola offers two major brands Minute Maid, non-mango drink with orange sacs and Maaza, tapping into the love of Indians for the king of mangoes. Micronutrient malnutrition which is widely prevailing in India and globally it is a challenge to reduce iron deficiency anemia, one intervention method that has been of some success is providing iron in a powdered soft drink mix.

Such informative blend of knowledge supply was very much appreciated by all and this was possible by the support of companies such as Kellogg's, Marico, CLAIMS and Coca-Cola.



## Research in Health & Nutrition

### Elderly With Low Vitamin D Increase Mortality Risk by 30%

July 27, 2012 Food Product Design

CORVALLIS, Ore.—Older adults with low vitamin D levels have a 30% greater risk of death compared to people with higher levels, according to a new study published in the European Journal of Clinical Nutrition. The findings also suggest frail adults with low levels of vitamin D tripled their risk of death compared to people who were not frail and who had higher levels of vitamin D.

Researchers at Oregon State University examined the combined effect of low vitamin D, frailty and mortality risk. They examined more than 4,300 adults older than 60 using data from the Third National Health and Nutrition Examination Survey. Because of the cross-sectional nature of the survey, researchers could not determine if low vitamin D contributed to frailty or whether frail people became vitamin D deficient because of health problems. However, the longitudinal analysis on death showed it may not matter which came first.

“Our study suggests that there is an opportunity for intervention with those who are in the pre-frail group, but could live longer, more independent lives if they get proper nutrition and exercise,” said lead author Ellen Smit.

The study divided people into four groups. The low group had levels less than 50 nanograms per milliliter; the highest group had vitamin D of 84 or higher. In general, those who had lower vitamin D levels were more likely to be frail.

“If you have both, it may not really matter which came first because you are worse off and at greater risk of dying than other older people who are frail and who don’t have low vitamin D,” she said. “This is an important finding because we already know there is a biological basis for this. Vitamin D impacts muscle function and bones, so it makes sense that it plays a big role in frailty.”

Smit concluded a balanced diet, including good sources of vitamin D like milk and fish, and being physically active outdoors, will go a long way in helping older adults to stay independent and healthy for longer.

One way to maintain strong bones and flexible joints is through proper nutrition. Check out the Bone and Joint Nutrients slide show on Food Product Design to learn more about the nutrients that support strong bones and joints.



## **Portion Control Key To Maintaining Weight**

July 27, 2012 Food Product Design

CHICAGO—People trying to lose or maintain their weight by eating a diet rich in fruits and vegetables may be sabotaging their efforts by eating too much of the healthy foods, according to Brooke Schantz, registered dietitian at Loyola University Health System.

"While fruits are nutritious, too much of even a healthy food can lead to weight gain," she said. "The key is to remember to control the portion sizes of the foods you consume."

Schantz reported that overeating healthy foods is easy to do, but the same rules apply to healthy food as snack food. Weight fluctuates based on a basic concept of energy in versus energy out. If your total caloric intake is higher than the energy you burn off in a day, you will gain weight. If it is lower, you will lose weight.

Schantz noted one exception to the rule: Non-starchy vegetables, which are difficult to overeat unless they are accompanied by unnecessary calories from sauces, cheeses and butter. This is due to the high water and fiber content of these vegetables coupled with the stretching capacity of the stomach. She advised to limit vegetables that are high in starch, such as peas, corn and potatoes. Foods that are labeled as fat-free or low-fat are another area of concern because people give themselves the freedom to overeat "healthy" foods without thinking about the quantity.



## **Antioxidant-Rich Diet Cuts Pancreatic Cancer Risk**

July 25, 2012 Food Product Design

LONDON—Individuals who consume a healthy diet rich in antioxidants, including selenium and vitamins C and E, may reduce their risk of developing pancreatic cancer by up to 67%, according to a new study published online in the journal *Gut*.

Researchers leading the Norfolk arm of the European Prospective Investigation of Cancer (EPIC) study tracked the health of more than 23,500 40- to 74-year-olds, who had entered the Norfolk arm of the EPIC study between 1993 and 1997. Participants completed a comprehensive food diary, detailing the types and amount of every food they ate for seven days, as well as the methods they used to prepare it. Each entry in the food diary was matched to one of 11,000 food items, and the nutrient values calculated using a specially designed computer program (DINER).

They found 49 participants developed pancreatic cancer within 10 years of entering the study. The number increased to 86 by 2010.

Nutrient intakes of those diagnosed with the disease within 10 years of entering EPIC were compared with those of almost 4,000 healthy people to see if there were any differences. Analysis showed that a weekly intake of selenium in the top 25% of consumption reduced their risk of developing pancreatic cancer by about 50% compared with those whose intake was in the bottom

25%. Those whose vitamins C, E, and selenium intake in the top 25% of consumption were 67% less likely to develop pancreatic cancer than those in the bottom 25%.

The findings support a similar study published last month in the same journal that found individuals who consume 4 servings of vegetables a day reduce their risk of developing acute pancreatitis by 44% compared to those who eat less than 1 serving of veggies a day. They also found overweight people and those who consumed more than one alcoholic drink per day appeared to get the most positive benefit from eating a lot of vegetables.

Check out the "5 Springtime Cancer-Fighting Fruits, Vegetables" Image Gallery to find out which fruits and vegetables help ward off the free radical avengers that cause cancer.



### [Diacetyl Linked to Alzheimer's](#)

[August 3, 2012 Food Product Design](#)

MINNEAPOLIS—Past studies have shown that inhalation of diacetyl by workers in factories processing microwave popcorn can potentially lead to respiratory problems, with some developing bronchiolitis obliterans, resulting in recommendations for such workers to wear respiratory protection. Now new research from the University of Minnesota has found possible links between exposure to diacetyl and Alzheimer's disease ("The Butter Flavorant, Diacetyl, Exacerbates  $\beta$ -Amyloid Cytotoxicity," Aug. 2012, Chemical Research in Toxicology).

Diacetyl, a natural byproduct of fermentation, is sometimes used to lend a characteristically buttery flavor to a variety of food products, including margarine, snack foods, candy, baked goods and alcoholic beverages like wine. It was also formerly a regular ingredient in microwave popcorn. However, manufacturers of microwave popcorn generally removed diacetyl from their formulas back in 2007 in the wake of safety concerns (see "Microwave Popcorn to Omit a Risky Chemical," The New York Times, Sept. 5, 2007).

As reported by Science Daily, the Minnesota researchers found that diacetyl intensifies the damaging effects of an abnormal brain protein linked to Alzheimer's disease (see "Artificial Butter Flavoring Ingredient Linked to Key Alzheimer's Disease Process"). They also found that diacetyl enhanced toxic effects on nerve cells in a laboratory setting, and that it crosses the blood-brain barrier.

In summary, the researchers noted, "In light of the chronic exposure of industry workers to DA (diacetyl), this study raises the troubling possibility of long-term neurological toxicity mediated by DA."

For more on diacetyl and safety measures surrounding the flavoring, see "OSHA Releases Diacetyl Flavoring Bulletin" on the Food Product Design website.





## **Kids Who Eat Healthy Foods Have Higher IQs**

August 7, 2012 Food Product Design

ADELAIDE, Australia—Young children who are fed a healthy diet rich in foods, such as legumes, cheese, fruit and vegetables, have slightly higher IQs compared to toddlers who consume a diet high in snack foods, according to a new study published in the *European Journal of Epidemiology*.

Researchers at the University of Adelaide investigated the link between the eating habits of children at six months, 15 months and 2 years, and their IQ at 8 years. The study of more than 7,000 children compared a range of dietary patterns, including traditional and contemporary home-prepared food, ready-prepared baby foods, breastfeeding, and 'discretionary' or snack foods.

"Diet supplies the nutrients needed for the development of brain tissues in the first two years of life, and the aim of this study was to look at what impact diet would have on children's IQs," the researchers said.

They found children who were breastfed at six months and had a healthy diet regularly, including legumes, cheese, fruit and vegetables at 15 months and 24 months had an IQ up to 2 points higher by age 8. Children who had a diet regularly involving cookies, chocolate, candy, soft drinks and chips in the first two years of life had IQs up to 2 points lower by age 8.

"While the differences in IQ are not huge, this study provides some of the strongest evidence to date that dietary patterns from six to 24 months have a small but significant effect on IQ at eight years of age," the researchers added. "It is important that we consider the longer-term impact of the foods we feed our children."



## **Childhood Obesity Linked to Fertility Problems**

August 6, 2012 Food Product Design

CORVALLIS, Ore.—Childhood obesity may accelerate puberty in girls and eventually lead to fertility problems, according to a new report published in the journal *Frontiers in Endocrinology*.

"The issue of so many humans being obese is very recent in evolutionary terms, and since nutritional status is important to reproduction, metabolic syndromes caused by obesity may profoundly affect reproductive capacity," said lead author Patrick Chappell, an assistant professor of veterinary medicine at Oregon State University.

Chappell said while humans show natural variations in pubertal progression, the signals that control the timing are unclear. However, puberty appears to be starting earlier in girls, and it is being accelerated.

The researchers theorize obesity may have an impact on kisspeptin, a recently characterized neurohormone necessary for reproduction. Normal secretions of this hormone may be disrupted by

endocrine signals from fat that serve to communicate to the brain. Another possible affect on pubertal timing, and reproduction in general, is disruption of circadian clocks, which can affect the secretion of cortisol, testosterone and insulin.

"Any disruption of circadian clocks throughout the body can cause a number of problems, and major changes in diet and metabolism can affect these cellular clocks," Chappell said. Disruption of the clock through diet can even feed into a further disruption of normal metabolism, making the damage worse, as well as affecting sleep and reproduction."



### **[New Research Shows Cocoa Flavanols Improve Cognitive Impairment](#)**

[August 13, 2012 Nutraceuticals World](#)

According to new research in *Hypertension*, eating cocoa flavanols daily may improve mild cognitive impairment. Each year, more than 6% of people aged 70 years or older develop mild cognitive impairment, a condition involving memory loss that can progress to dementia and Alzheimer's disease.

Flavanols can be found in tea, grapes, red wine, apples and cocoa products and have been associated with a decreased risk of dementia. They may act on the brain structure and function directly by protecting neurons from injury, improving metabolism and their interaction with the molecular structure responsible for memory researchers said. Indirectly, flavanols may help by improving brain blood flow.

In this study, 90 elderly participants with mild cognitive impairment were randomized to drink daily either 990 milligrams (high), 520 mg(intermediate) or 45 mg (low) of a dairy-based cocoa flavanol drink for 8 weeks. The diet was restricted to eliminate other sources of flavanols from foods and beverages other than the dairy-based cocoa drink. Cognitive function was examined by neuro-psychological tests of executive function, working memory, short-term memory, long-term episodic memory, processing speed and global cognition. Researchers found:

- Scores significantly improved in the ability to relate visual stimuli to motor responses, working memory, task-switching and verbal memory for those drinking the high and intermediate flavanol drinks.
- Participants drinking daily higher levels of flavanol drinks had significantly higher overall cognitive scores than those participants drinking lower-levels.
- Insulin resistance, blood pressure and oxidative stress also decreased in those drinking high and intermediate levels of flavanols daily. Changes in insulin resistance explained about 40% of the composite scores for improvements in cognitive functioning.

"This study provides encouraging evidence that consuming cocoa flavanols, as a part of a calorie-

controlled and nutritionally-balanced diet, could improve cognitive function," said Giovambattista Desideri, M.D., study lead author and director of Geriatric Division, Department of Life, Health and Environmental Sciences, University of L'Aquila in Italy. "The positive effect on cognitive function may be mainly mediated by an improvement in insulin sensitivity. It is yet unclear whether these benefits in cognition are a direct consequence of cocoa flavanols or a secondary effect of general improvements in cardiovascular function.

"The study population was generally in good health without known cardiovascular disease. Thus, it would not be completely representative of all mild cognitive impairment patients. In addition, only some clinical features of mild cognitive impairment were explored in the study. "Given the global rise in cognitive disorders, which have a true impact on an individual's quality of life, the role of cocoa flavanols in preventing or slowing the progression of mild cognitive impairment to dementia warrants further research," Desideri said. "Larger studies are needed to validate the findings, figure out how long the positive effects will last and determine the levels of cocoa flavanols required for benefit."



### **Grapes Boost Heart Health in Men With Metabolic Syndrome**

August 10, 2012Food Product Design

STORRS, Conn.—Consuming polyphenol-rich grapes may help protect heart health in people with metabolic syndrome by reducing blood pressure, improving blood flow and reducing inflammation, according to a new study published in the *Journal of Nutrition*.

Researchers at the Department of Nutritional Sciences of the University of Connecticut, recruited men between ages 30 and 70 years with metabolic syndrome to investigate the impact of grapes on metabolic syndrome. Participants were randomly assigned to consume grapes, in the form of a freeze-dried whole grape powder, or a placebo powder, for four weeks. Following a 3-week "washout" period where neither grapes nor placebo were consumed, individuals were allocated to the alternate treatment.

Results showed that for each of the study's subjects, grape consumption resulted in significant decreases in blood pressure, improved blood flow (greater vasodilation), and decreases in a compound associated with inflammation.

"These results suggest that consuming grapes can improve important risk factors associated with heart disease, in a population that is already at higher risk," the researchers said. "This further supports the accumulating evidence that grapes can positively influence heart health, and extends it to men with metabolic syndrome."



## [Iron, Vitamins Linked to Teens' Fitness Levels](#)

August 9, 2012 Food Product Design

BETHESDA, MD—European researchers discovered a possible link between vitamins and adolescent physical fitness. In a newly released study in the *Journal of Applied Physiology* online edition, scientists found adolescents' blood levels of various micronutrients are correlated with how well they performed in physical fitness tests (*J Appl Physiol.* 2012 Jun 21.).

The researchers studied European children ages 12 to 17. The adolescents performed a standing long jump test, which assesses lower-body muscular strength, and a 20-meter shuttle run test, which assesses cardiovascular fitness through maximal oxygen consumption ( $VO_{2max}$ ). The scientists took blood samples from more than 1,000 of the participants, and looked for various micronutrients, including hemoglobin, indicative of iron intake, soluble transferrin receptor, serum ferritin, retinol, vitamin C, beta-carotene, alpha-tocopherol, vitamin B<sub>6</sub> and vitamin D.

The study found connections between physical fitness and micronutrients, particularly iron. In the shuttle run, concentrations of hemoglobin, retinol, and vitamin C in males and beta-carotene and vitamin D in females were associated with  $VO_{2max}$ . Similarly, better performance in the muscular fitness test pointed toward concentrations of hemoglobin, beta-carotene, retinol, and alpha-tocopherol in males and beta-carotene and vitamin D in females.

Iron's importance has long been touted. In July, a study published in the *Canadian Medical Association* found iron supplementation decreased fatigue in women who had ferritin levels below 50 µg/L. However, the Centers for Disease Control and Prevention released its Nutrition Report in April, indicating that the U.S. population has good levels of vitamins A and D, and folate in the body, but some groups still need to increase their levels of vitamin D and iron.



## [Vitamin C May Decrease the Effects of Air Pollution](#)

August 20, 2012 Nutraceuticals World

A new study published in the journal *Epidemiology* found an vitamin C-rich diet could be helpful for those with chronic obstructive pulmonary disease (COPD) and asthma who have difficulty breathing when exposed to air pollution, as particulate matter in the air is a pollutant that can cause oxidative stress in the body.

Researchers at the Imperial College London said vitamin C's antioxidant properties were the chief alleviant of the effects of air pollutants. For every 10 mcg/m<sup>3</sup>, researchers found the risk of hospitalization for breathing-related issues increased 35% for people with COPD or asthma. For those who had low levels of vitamin C, that number was increased by 1.2 times.

To further test their hypothesis, researchers excluded the elderly and former smokers in their analysis and found the correlation held true, though they found former smokers tended to have

lower levels of vitamin C than non-smokers.



## The Flax Of Life

August 15, 2012 Food Product Design

By Marilyn Stieve, Contributing Editor

Initially introduced into the U.S. by colonists to provide fiber for clothing, flax use has since expanded into a broad range of food production applications, including breadings, baked goods, sauces and beverages. From its humble origins as one of the first domesticated plants, flax is now big news. According to the Agricultural Marketing Resource Center (AgMRC), Iowa State University, Ames, IA, last year alone, the United States produced nearly 2.8 million bushels of flax, valued at \$38.6 million. The United States is one of the big-four producers, with 80% of the world's flaxseed grown by Canada, China, the United States and India. Flaxseed offers a pleasant, nutty flavor and considerable health benefits for consumers, while manufacturers turn to it for its numerous functional benefits for food and beverage formulations.

### **What makes flax so appealing?**

From a nutritional perspective, flaxseed contains oil (predominantly "healthy" polyunsaturated fatty acids), as well as 20 grams protein and 28 grams dietary fiber per 100 grams (Flax Council of Canada). And, it's an important emerging food ingredient due to its rich content of omega-3 alpha-linolenic acid (ALA) fatty acids, lignans and fiber (*Critical Reviews in Food Science and Nutrition*, 2011; 51(3):210-222).

Flax contains two essential fatty acids (EFAs): ALA and linoleic acid (LA), which provide omega-3 and omega-6 fatty acids, respectively. EFAs, including ALA omega-3s, provide a number of health benefits, including those associated with cardiovascular health. As such, flax ingredients that contain high levels of omega-3s are increasingly being used in a variety of food applications to deliver significant levels of EFAs and their associated health benefits.

Flaxseed provides one of the richest vegetarian sources of ALA available, containing more than five times the ALA content of most other common plant oils.

ALA is the only 'true' essential omega-3 fatty acid required in the diet, since it cannot be synthesized by the body (*Nutrition Reviews*, 2008; 66(6):326-332). It's critical to human health, particularly for normal growth, development, reproduction and vision. ALA can be converted into eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) omega-3 forms through inherent metabolic pathways (*American Journal of Clinical Nutrition*, 2010; 92( 5): 1,040-1,051), creating comparable levels of EPA and DHA to those obtained from fish oils. The conversion of ALA into its longer-chain metabolites is important as it allows consumers to reap the added health benefits of EPA and DHA. However, while ALA's conversion to EPA and DHA is important to ensure delivery of the health benefits of those fatty acids, ALA itself has been shown to have significant health advantages. For example, ALA protects against cardiovascular disease by altering the omega-3 fat content of cell membranes, making them more flexible and improving functionality (*Journal of the American College of Nutrition*, 2002; 21:495-505).



Plus, ALA has been proven to dampen inflammation, which is a feature of many chronic conditions, such as coronary heart disease, stroke and cancer (*American Journal of Clinical Nutrition*, 2007; 85:385-391), as well as help to reduce arrhythmia (*American Journal of Clinical Nutrition*, 2003; 78(Suppl):640S-660S).



### **Study Pits Coconut Water vs. Sports Drinks**

August 24, 2012 Food Product Design

PHILADELPHIA—Recent research from Indiana University Southeast, New Albany, Ind., as noted in a recent release, investigated the benefits of drinking coconut water vs. popular sports beverages Gatorade and Powerade for athletes. The findings were presented during the recent National Meeting & Exposition of the American Chemical Society.

“Coconut water is a natural drink that has everything your average sports drink has and more,” said Chhandashri Bhattacharya, Ph.D., lecturer in chemistry, Natural Sciences, Indiana University Southeast, and lead researcher on this project. “It has five times more potassium than Gatorade or Powerade. Whenever you get cramps in your muscles, potassium will help you to get rid of the cramps. It’s a healthy drink that replenishes the nutrients that your body has lost during a moderate workout.”

Bhattacharya also notes that coconut water is a healthful choice for non-athletes due to its high potassium content—a mineral generally deficient in the typical American diet, which skews toward higher levels of sodium, creating an unhealthy imbalance. Analysis has shown that a 12-oz. serving of coconut water has more potassium than a banana. Coconut water is also high in antioxidants.

The researchers found that the coconut water contained up to 1,500 mg per liter of potassium, compared to up to 300 mg per liter for Powerade and Gatorade. Coconut water, however, had 400 mg per liter of sodium compared to 600 for the other two drinks. Magnesium and carbohydrate levels were comparable for all three beverages.

Although this lower level of sodium might initially appear attractive—considering the high levels of sodium present in most American diets—this is not the case for athletes engaging in strenuous exercise. Sodium is depleted through sweating during exercise and must be replaced. Formulators designing sports beverages based on coconut water, therefore, often add sodium to compensate for this deficiency.

However, plain coconut water, sourced from young, green coconuts, is recommended for light to moderate exercise.



## [What Babies Eat After Birth Likely Determines Lifetime Risk of Metabolic Mischief and Obesity. Rat Studies Suggest](#)

Aug. 30, 2012 Science Daily

Rats born to mothers fed high-fat diets but who get normal levels of fat in their diets right after birth avoid obesity and its related disorders as adults, according to new Johns Hopkins research. Meanwhile, rat babies exposed to a normal-fat diet in the womb but nursed by rat mothers on high-fat diets become obese by the time they are weaned.

The experiments suggest that what mammalian babies -- including humans -- get to eat as newborns and young children may be more important to their metabolic future than exposure to unhealthy nutrition in the womb, the Hopkins scientists say.

"Our research confirms that exposure to a high-fat diet right after birth has significant consequences for obesity," says Kellie L.K. Tamashiro, Ph.D., an assistant professor of psychiatry and behavioral sciences at the Johns Hopkins University School of Medicine and leader of the study published online in the journal *Diabetes*. "But it also suggests that by putting children on a healthy diet in infancy and early childhood, we can intervene and potentially prevent a future of obesity, diabetes and heart disease."

Obesity has become a worldwide public health problem that often leads to many other disorders, such as cardiovascular disease, hypertension, type 2 diabetes, some cancers and arthritis. A significant concern in Western society is the consumption of modern diets high in fat: Rates of obesity are skyrocketing, costing the health care system billions and reducing longevity.

In the Johns Hopkins experiments, newborn baby rats exposed to a high-fat diet through the breast milk of rat mothers fed high amounts of fat were more likely to gain excessive weight, have impaired tolerance to glucose (a sign of prediabetes) and become insensitive to the hormone leptin, which regulates appetite and body weight in humans and rodents and can be disrupted in obese mammals. Leptin, secreted by fat cells, signals how much fat is around and controls food intake; obese people often are insensitive to the signals, for reasons so far unclear.

To compare the impact on offspring obesity of prenatal versus postnatal exposure to a maternal high-fat diet, Tamashiro and her team began by feeding half of the pregnant rats a high-fat diet and half a normal diet. After birth, half of the offspring of the high-fat moms were given to the normal-diet moms to nurse and vice versa. Those exposed to a high-fat diet both before and after birth (through breast milk) gained more weight and were obese by the time they were weaned, as were those who were only nursed by rats on a high-fat diet. Those born to mothers on a high-fat diet but nursed by rats on a normal diet did not suffer the same fate.

Tamashiro and her colleagues currently are trying to determine whether exercise in early rat development, the equivalent of elementary school age in humans, can reverse the effects of exposure to a high-fat diet.

"These animals -- like children -- are still developing and responding to their environment, and, as much as possible, we want to make sure they develop properly so bad health consequences don't occur," she says.

While the findings are important steps in understanding how prenatal and postnatal environments affect development, Tamashiro cautions that data from rats don't directly translate into human application.

Still, Tamashiro says, obstetricians may be on the right track as they rethink guidelines for pregnant women. Many suggest that obese women limit weight gain during pregnancy by reducing fat and calories. Obese mothers who switch to healthier diets during pregnancy and then maintain them while nursing may be able to help their children avoid the road to obesity, Tamashiro says.

"Obesity rates have increased threefold over the last 20 years," she says. "We know it's not because of genetics because our genes don't change that quickly. So we are focusing on the developmental environment. Obese children are developing metabolic disorders earlier, affecting their quality of life and health over the long term. Prevention is probably the best strategy we have."



### [Working Moms Spend Less Time Daily On Kids' Diet, Exercise](#)

[Aug. 27, 2012 Science Daily:](#)

When it comes to cooking, grocery shopping and playing with children, American moms with full-time jobs spend roughly three-and-half fewer hours per day on these and other chores related to their children's diet and exercise compared to stay-at-home and unemployed mothers, reports a new paper by a Cornell University health economist.

Male partners do little to make up the deficit: Employed fathers devote just 13 minutes daily to such activities and non-working fathers contribute 41 minutes, finds the study, which will be printed in the December issue of *Economics and Human Biology*.

The findings are consistent across socio-economic lines measured by the mothers' education, family income, race and ethnicity.

To make up for this time deficit, working mothers are significantly more likely to spend time purchasing prepared foods -- takeout from restaurants or prepackaged, ready-to-eat meals from grocery stores -- which are generally less nutritious than home-cooked meals.

"It's inaccurate to pin rising childhood obesity rates on women, given that husbands pick up so little of the slack," cautioned lead author John Cawley, professor of policy analysis and management and of economics at Cornell's College of Human Ecology.

The study does not prove that employment alone drives the way mothers spends their time. "For example, mothers who choose to work might be those who enjoy cooking less and who would cook less whether working or not," Cawley said.

He added that working mothers produce additional benefits for children such as more money to provide for family needs.

"It's important to remember that we can take steps to enhance childhood nutrition and physical activity without advocating that women exit the workforce," Cawley said. For instance, the authors

argue, parents should be better educated about the nutritional content of restaurant and prepackaged foods. "In order to make more informed decisions, consumers need to have nutrition and calorie information available where they buy their food," said Cawley, who noted that federal health care reform rules will soon require chain and fast-food restaurants nationwide to post calorie counts of the foods they sell.

Cawley noted that schools shoulder a greater burden for supporting healthy lifestyles.

"Our findings underscore the importance of schools offering high-quality foods and physical education classes," he said. "In general, the Institute of Medicine and the Centers for Disease Control and Prevention are urging comprehensive changes in school environments to promote healthy eating and active living."



### **Vitamin B3 May Offer New Tool in Fight Against Staph Infections. 'Superbugs'**

[Aug. 27, 2012 Science Daily](#)

A new study suggests that nicotinamide, more commonly known as vitamin B3, may be able to combat some of the antibiotic-resistance staph infections that are increasingly common around the world, have killed thousands and can pose a significant threat to public health.

The research found that high doses of this vitamin increased by 1,000 times the ability of immune cells to kill staph bacteria. The work was done both in laboratory animals and with human blood.

The findings were published August 27 in the *Journal of Clinical Investigation* by researchers from Cedars-Sinai Medical Center, the Linus Pauling Institute at Oregon State University, UCLA, and other institutions. The research was supported by several grants from the National Institutes of Health.

The work may offer a new avenue of attack against the growing number of "superbugs."

"This is potentially very significant, although we still need to do human studies," said Adrian Gombart, an associate professor in OSU's Linus Pauling Institute. "Antibiotics are wonder drugs, but they face increasing problems with resistance by various types of bacteria, especially *Staphylococcus aureus*.

"This could give us a new way to treat staph infections that can be deadly, and might be used in combination with current antibiotics," Gombart said. "It's a way to tap into the power of the innate immune system and stimulate it to provide a more powerful and natural immune response."

The scientists found that clinical doses of nicotinamide increased the numbers and efficacy of "neutrophils," a specialized type of white blood cell that can kill and eat harmful bacteria.

The nicotinamide was given at megadose, or therapeutic levels, far beyond what any normal diet would provide -- but nonetheless in amounts that have already been used safely in humans, as a drug, for other medical purposes.

However, there is no evidence yet that normal diets or conventional-strength supplements of vitamin B3 would have any beneficial effect in preventing or treating bacterial infection, Gombart said, and people should not start taking high doses of the vitamin.

Gombart has been studying some of these issues for more than a decade, and discovered 10 years ago a human genetic mutation that makes people more vulnerable to bacterial infections. In continued work on the genetic underpinnings of this problem, researchers found that nicotinamide had the ability to "turn on" certain antimicrobial genes that greatly increase the ability of immune cells to kill bacteria.

One of the most common and serious of the staph infections, called methicillin-resistant *S. aureus*, or MRSA, was part of this study. It can cause serious and life-threatening illness, and researchers say the widespread use of antibiotics has helped increase the emergence and spread of this bacterial pathogen.

Dr. George Liu, an infectious disease expert at Cedars-Sinai and co-senior author on the study, said that "this vitamin is surprisingly effective in fighting off and protecting against one of today's most concerning public health threats." Such approaches could help reduce dependence on antibiotics, he said.

Co-first authors Pierre Kyme and Nils Thoennissen found that when used in human blood, clinical doses of vitamin B3 appeared to wipe out the staph infection in only a few hours.

Serious staph infections, such as those caused by MRSA, are increasingly prevalent in hospitals and nursing homes, but are also on the rise in prisons, the military, among athletes, and in other settings where many people come into close contact.



### **Breast Milk Promotes a Different Gut Flora Growth Than Infant Formulas**

Aug. 27, 2012 Science Daily

The benefits of breast milk have long been appreciated, but now scientists at Duke University Medical Center have described a unique property that makes mother's milk better than infant formula in protecting infants from infections and illnesses.

The finding, published in the August issue of the journal *Current Nutrition & Food Science*, explains how breast milk, but not infant formula, fosters colonies of microbiotic flora in a newborn's intestinal tract that aid nutrient absorption and immune system development.

"This study is the first we know of that examines the effects of infant nutrition on the way that bacteria grow, providing insight to the mechanisms underlying the benefits of breast feeding over formula feeding for newborns," said William Parker, PhD, associate professor of surgery at Duke and senior author of the study. "Only breast milk appears to promote a healthy colonization of beneficial biofilms, and these insights suggest there may be potential approaches for developing substitutes that more closely mimic those benefits in cases where breast milk cannot be provided."



Earlier studies have shown that breast milk lowers the incidence of diarrhea, influenza and respiratory infections during infancy, while protecting against the later development of allergies, type 1 diabetes, multiple sclerosis and other illnesses. As scientists have learned more about the role intestinal flora plays in health, they have gained appreciation for how an infant's early diet can affect this beneficial microbial universe.

In their study, the Duke researchers grew bacteria in samples of infant formulas, cow's milk and breast milk. For the infant formula, the researchers used three brands each of popular milk- and soy-based products, and they purchased whole milk from the grocery store. Breast milk was donated and processed to separate different components, including proteins, fats and carbohydrates. They also tested a purified form of an antibody called secretory immunoglobulin A (SIgA), which is abundant in breast milk and helps establish an infant's immune system.

The infant formulas, the milk products and the SIgA were incubated with two strains of *E. coli* bacteria -- necessary early inhabitants of the gut that are helpful cousins to the dangerous organisms associated with food poisoning.

Within minutes, the bacteria began multiplying in all of the specimens, but there was an immediate difference in the way the bacteria grew. In the breast milk, bacteria stuck together to form biofilms - thin, adherent layers of bacteria that serve as a shield against pathogens and infections. Bacteria in the infant formula and cow's milk proliferated wildly, but it grew as individual organisms that did not aggregate to form a protective barrier. The bacteria in SIgA had mixed results, suggesting that this antibody by itself isn't enough to trigger the beneficial biofilm formation.

"Knowing how breast milk conveys its benefits could help in the development of infant formulas that better mimic nature," Parker said. "This could have a long-lasting effect on the health of infants who, for many reasons, may not get mother's milk."

Parker said additional studies should explore why human whey has the clumping effect on the bacteria, and whether it has a similar effect on strains of bacteria other than *E. coli*.

"This study adds even more weight to an already large body of evidence that breast milk is the most nutritious way to feed a baby whenever possible," said Gabriela M. Maradiaga Panayotti, M.D., co-director of the newborn nursery for Duke Children's and Duke Primary Care. "We know that babies who receive breast milk have better outcomes in many ways, and mother who breast feed also have improved health outcomes, including decreased risks of cancer. Whenever possible, promoting breast feeding is the absolute best option for mom and baby."



### **[Feeling Full Sooner: Self-Control, Willpower Improved By Paying More Attention To Quantity Eaten](#)**

**[Medical News Today: 24 Aug 2012](#)**

New research from the University of Minnesota's Carlson School of Management suggests learning how to stop enjoying unhealthy food sooner may play a pivotal role in combating America's [obesity](#) problem. The research, published in the *Journal of Consumer Research*, explores how satiation,

defined as the drop in liking during repeated consumption, can be a positive mechanism when it lowers the desire for unhealthy foods.

"When people talk about self-control, they really imply that self-control is willpower and that some people have it and others don't when facing a tempting treat," says Joseph Redden, an assistant professor of marketing at the Carlson School and lead author of the 'Healthy Satiation: The Role of Decreasing Desire in Effective Self-Control.' "In reality, nearly everyone likes these treats. Some people just stop enjoying them faster and for them it's easier to say no."

Through a series of experiments, Redden and Texas A&M University assistant professor of marketing Kelly Haws discovered that when people with high self-control eat unhealthy foods they become satisfied with the experience faster than when they are eating healthy foods and thus eat less. In one study, the researchers asked participants to monitor themselves as they ate by counting how many times they swallowed. With this subtle clue to the amount eaten, those with low self-control became satisfied at a faster rate. Redden said they were surprised at how easy it was to recreate self-control - just using a baseball pitch counter made low self-control people act like they had high self-control.

"People can essentially use attention for how much they are consuming instead of relying on self-control," Redden says. "Really paying a lot more attention to the quantity will lead people to feel satiated faster and eat less."



### **Seniors Could Be More Steady On Their Feet After Consuming Red Wine Compound**

[Medical News Today: 20 Aug 2012](#)

In a stride toward better health in later life, scientists reported that resveratrol, the so-called "miracle molecule" found in red wine, might help improve mobility and prevent life-threatening falls among older people. The finding, believed to be the first of its kind, was presented to some 14,000 scientists and others gathered at the 244th National Meeting & Exposition of the American Chemical Society, the world's largest scientific society.

The researchers say this report - based on studies of laboratory mice - could lead to the development of natural products designed to help older Americans live safer and more productive lives.

"Our study suggests that a natural compound like resveratrol, which can be obtained either through dietary supplementation or diet itself, could actually decrease some of the motor deficiencies that are seen in our aging population," said Jane E. Cavanaugh, Ph.D., leader of the research team. "And that would, therefore, increase an aging person's quality of life and decrease their risk of hospitalization due to slips and falls."

Cavanaugh notes that falls become more common with advancing age and are the leading cause of injury-related death among people older than 65. In addition, about one in three older Americans have difficulty with balance or walking, according to the American Geriatrics Society.

These mobility problems are particularly common among older people who have Parkinson's disease and other age-related neurological disorders, Cavanaugh said. She is with Duquesne University in Pittsburgh. However, while drugs can help alleviate some of the motor-related problems in Parkinson's disease, Cavanaugh points out that there are no comparable treatments for balance and walking problems in otherwise healthy older adults. She and her colleagues set out to rectify that, focusing on natural chemical compounds such as resveratrol.

Previous studies have shown that resveratrol - an antioxidant found in red wine and dark-skinned fruits - might help reduce inflammation, lower cholesterol, slash the risk of heart disease and certain cancers and, perhaps, have some anti-aging effects in the body. Resveratrol is available as a dietary supplement and is abundant in foods such as red grapes, blueberries and nuts.

To determine its effects on balance and mobility, Cavanaugh, Erika N. Allen and colleagues fed young and old laboratory mice a diet containing resveratrol for eight weeks. They periodically tested the rodents' ability to navigate a steel mesh balance beam, counting the number of times that each mouse took a misstep. Initially, the older mice had more difficulty maneuvering on the obstacle. But by week four, the older mice made far fewer missteps and were on par with the young mice.

While it is unclear how resveratrol works in the body, Cavanaugh's team found some clues. In laboratory experiments, they exposed neural cells to a neurotransmitter called dopamine, which in large amounts can induce cell death. However, neurons treated with resveratrol before being exposed to dopamine survived. On closer examination, the researchers found that resveratrol mitigated the damage done by oxygen free radicals, generated by the breakdown of the dopamine, and activated protein signaling pathways that appeared to promote cell survival.

Although she is encouraged by the results, Cavanaugh notes that resveratrol does have some drawbacks. For instance, it is poorly absorbed by the body. In fact, she calculates that a 150-pound person would have to drink almost 700 4-ounce glasses of red wine a day to absorb enough resveratrol to get any beneficial effects. That's why she and her colleagues are investigating similar man-made compounds that mimic the effects of resveratrol and might be more bioavailable to the body. They're also trying to determine how much resveratrol actually enters the brain.

Nevertheless, the researchers suspect that even if the effects of resveratrol in the brain are minute, this small margin could potentially be enough to help older people remain steady on their feet and avoid taking serious tumbles.



## Cocoa Linked to Blood Flow Benefits, Reduction of Diabetic Risk Factors

Nutraceuticals World August 31, 2012

Two recent Harvard systematic reviews, including a meta-analysis with 2,575 participants published in the Journal of Nutrition, found that cocoa consumption is associated with decreased blood pressure, improved blood vessel health, and improved cholesterol levels, among other benefits.

According to lead researcher, Harvard epidemiologist and nutritionist Eric Ding, Ph.D., consumption of flavonoid-rich cocoa was also linked to reductions in risk factors for diabetes, a major contributor to cardiovascular disease. Resistance to the hormone insulin, which helps regulate blood sugar, favorably dropped among people who consumed cocoa compared to controls.

"Diabetics are insulin resistant, which means their body's cells grow deaf and unresponsive to this vitally important hormone. Our research found that high-flavanol cocoa both lowers insulin and insulin resistance – thereby improving sensitivity. The body gets better at pulling dangerous sugar out of the blood stream quicker, which is good for fighting against diabetes," Dr. Ding explained. His research and another Harvard study published in the spring of 2012 together showed that cocoa counters the effects of obesity connected to insulin resistance.

"High flavanol cocoa improves blood flow via endothelial function (as measured by improved flow-mediated dilation)—which benefits the entire body. Good circulation is the key to heart and brain health, and diabetes risk is increased by poor endothelial blood flow. Diabetes prevention is also key to preventing kidney problems, blindness, and related nerve damage—all major side effects of diabetes," he said. "Interestingly, erectile dysfunction is also fundamentally a circulation problem—Viagra® is also shown to improve flow-mediated dilation, similar to cocoa."



## Low/No/Reduced Sodium Claims Decline Despite Salt Concerns

Nutraceuticals World August 31, 2012

Despite increased awareness about the risks of too much sodium in consumers' diets and pledges from governments around the world to reduce salt levels in food, products with low/no/reduced sodium claims have seen some decline over the past years according to new findings from Mintel. Globally, launches of foods with low/no/reduced sodium claims declined 5% over the 2010-2011 period, appearing on just 2% of total food launches in 2011.

"A large percentage of the global food industry remains wary of the commercial impacts of reducing salt in their products," said Chris Brockman, global food and drink analyst at Mintel. "This anxiety is well-founded, with many products positioned as low sodium forced off the shelves prematurely in recent years due to poor sales. Manufacturers struggled to find workable salt substitutes, forcing many to rapidly pull them from the market. Efforts are being made to offer consumers alternatives to sodium. However, existing salt replacements have not caught the imagination of consumers. Consumers are concerned about salt intake, but are not willing to compromise on taste."

Indeed, according to Mintel's Global New Products Database (GNPD) Europe remains the most active

region in terms of product innovation, covering the same percentage in 2011 (35%) as the year before of new product launches carrying low/no/reduced sodium claims compared to 39% back in 2007. North America follows with 26% share of the global market in 2011 as opposed to 32% in 2010 and 28% in 2007. While APAC comes third covering 19% of new launches in 2011, vs. 18% in 2010 and 19% in 2007.

In Europe, 3% of all new food products introduced in 2011 in the UK carried a low/no reduced sodium claim, a higher percentage than other key European markets with the exception of Netherlands, where 9% of all new products had the same claim. For France the figure stood at 2% in 2011; for Spain 1.4%. Italy and Germany were somewhat lower, at just 1% each.

"The Netherlands was higher mainly because of the food industry's Ik Kies Bewust ('I choose consciously') campaign featuring on-pack logos to indicate new or reformulated products that are low in sugar, sodium and saturated fat," Chris Brockman explains.

Over in Asia Pacific, New Zealand took the lead, with 3% of all new food products in 2011 labeled as low/no/reduced sodium followed by Australia with 2%. Other market activity in the region included Thailand with 1.2%, South Korea (0.8%) and Singapore (0.8%). In Japan, 0.7% of new product launches carried the claims, in Taiwan 0.7%, in China 0.5% and in Vietnam 0.4%.

And when it comes to consumer attitudes, according to Mintel's research some 54% of US consumers say they limit their use of packaged snacks and other packaged foods because they think they have too much salt or sodium, and 53% are concerned about the amount of salt or sodium in their diets. However, it seems consumers will not give up salt easily. In general, 49% of British consumers agree that "taste is more important to me than calories in food," while in the US, 60% of restaurant diners typically order what they want instead of what is healthy. Moreover, when it comes to products flavored with a non-sodium or salt alternative, almost half (46%) of consumers in the US think that they don't taste as good as their traditional counterparts. Similarly in the UK, only a relatively small proportion (22%) of consumers have purchased low salt products, and just 4% of consumers have cut back on table sauces because of health concerns.

"Brands will need to dispel widely held perception about low sodium or salt alternatives to be successful. Fortunately, this is possible. Many food brands are already introducing step-by-step salt reduction programs that gradually reduce the salt content of their products, a strategy often called 'stealth health,' as the incremental removal of sodium can be carried out over a period of time to help the consumer to become accustomed to the changed flavor profile, without the need to flag that up prominently on-pack and thus deter consumers who may perceive 'less taste.' Other brands are also steering clear of the health issue by experimenting with different flavor profiles, such as strong spices and vinegars, to enhance taste while eliminating sodium," Mr. Brockman said.

Globally in 2011, snacks (16%) and sauces & seasonings (14%) have emerged as the most active categories in low/no/reduced sodium claims. While in response to concerns from parents toward their young children, the baby food category accounted for 12% of new products carrying the claim globally. While breakfast cereals and bakery accounted for 10% and 11% respectively, with 8% in dairy.

In the overall "minus" claim category, products positioned with low/no/reduced formulations such as reduced calories, fat, sugar or cholesterol, Mintel's GNPD shows a global decline of 10% over the year 2010-2011, with low/no/reduced calorie (-19%) and low/no/reduced carb products (-41%) seeing the biggest drop, followed by low/no/reduced sugar (-9%), low/no/reduced cholesterol (-9%) and low/no/reduced fat (-8%).



The findings also tie in to the Mintel Inspire trend "Fauxthenticity," which explores how food alternatives can become preferable to real versions, because they are variously healthier, greener or more affordable.

"Sometimes a fake alternative carries less risk than its authentic cousin, especially when it comes to something like alcohol," explained Richard Cope, principal trend analyst at Mintel. "An option might be for manufacturers to explore tricking consumer taste buds and marketing foods that smell, as opposed to taste, salty. This is something we've seen food researchers investigate in our trend 'Fauxthenticity.' This has been the success story behind everything from B&Q's sales of fake grass, to sunless tanners and meat substitutes."



### **Dietary Vitamin D Found to Delay the Onset of Alzheimer's Disease**

[Nutraceuticals World September 10, 2012](#)

High dietary intake of vitamin D has been associated with a lower risk of developing Alzheimer's disease among older women, according to a new study published in the Journal of Gerontology: Medical Science. Operating on the hypothesis that low vitamin D levels have been linked to cognitive decline among older adults, the study authors said their intention was to examine whether dietary intake of vitamin D could be a predictor of the onset of dementia like Alzheimer's disease.

Researchers, led by Cédric Annweiler of Université Nantes-Angers-Le Mans, France, studied 498 women aged 75 and older who did not take vitamin D supplements. The women were divided into three groups - no dementia, Alzheimer's disease and other dementia within seven years according to the onset of dementia. The participants' baseline dietary intake of vitamin D was estimated based on dietary information from a self-administered food frequency questionnaire.

The researchers found that the women who had highest dietary intake levels of vitamin D were 77% less likely to be diagnosed with Alzheimer's disease in seven years, compared to those who had the had lower dietary vitamin D intakes.



### **Algal DHA Contributes to Better Reading and Behavior in School Children**

[Nutraceuticals World September 7, 2012](#)

Increased dietary intake of algal DHA (docosahexaenoic acid) in school-aged children with low reading levels demonstrated "significant improvements" in reading performance and behavior, according to a new clinical study conducted at the University of Oxford in the United Kingdom. Lead researchers of the study indicated that DHA supplementation appears to be an effective way to improve reading in healthy but underperforming children from mainstream schools.

"Poor reading skills as a child impact all learning and can lead to a host of problems in adulthood," said lead investigator Alex Richardson, Ph.D., senior research fellow at the University of Oxford and director of Food and Behavior (FAB) Research. "The DHA Oxford Learning and Behavior (DOLAB) trial showed

that taking daily algal DHA supplements improved reading performance for the worst readers, and helped these children catch up with their peer group."

The study results were published in the peer-reviewed PLoS ONE journal on September 6. The DOLAB trial, an independent study initiated at the University of Oxford, was funded by a grant from DSM Nutritional Products, and DSM's algal DHA omega-3 oil was used as the active treatment for the intervention.

The DOLAB Trial was a parallel group, fixed-dose, randomized, double-blind, placebo-controlled clinical trial designed to assess whether an increased dietary intake of DHA omega-3 had benefits on reading performance, working memory and behavior in healthy school-aged children. The study population included 362 healthy children aged 7–9 years recruited from mainstream state schools in Oxfordshire, U.K. underperforming in literacy skills (<33<sup>rd</sup> percentile on standardized reading test) but with other abilities within the normal range. The study population was not taking medications for ADHD.

The active treatment intervention was a fixed dose of 600 mg DHA (from algal oil), delivered in 3 x 500 mg capsules/day, each providing 200 mg DHA. The placebo treatment was 3 x 500 mg capsules/day containing corn/soybean oil placebo, matched with active treatment for taste and color. Duration of treatment was 16 weeks with delivery of capsules via schools and parents at other times.

Although no significant treatment effect was observed in the overall population of the lower 33<sup>th</sup> percentile, the study did find significant improvement in reading performance among the subgroups of children who were underperforming in literacy skills, based on the British Ability Scales ( $p=.04$  among students in the lowest 20<sup>th</sup> percentile of reading and  $p<.01$  in the lowest 10<sup>th</sup> percentile of readers). Improvement in reading in these poorer readers was 20 percent and nearly 50 percent greater, respectively, than would normally be expected, helping these children to catch up with their peer group.

In the subgroup of 224 children with initial reading in the lowest 20<sup>th</sup> percentile, algal DHA led to an additional 0.8 months reading age gain compared with the placebo. In the subgroup of 105 children initially reading in the lowest 10<sup>th</sup> percentile, the additional reading age gain from algal DHA treatment versus placebo was 1.9 months. In general, children's reading ages typically increase by four months over a 16-week period.

In addition to the promising results found in the subgroups, an overall effect was found versus placebo in improved parent-reported behavior (ADHD-type symptoms). Analysis showed significant effects of algal DHA over placebo on eight of the 14 scales assessing a range of ADHD-type symptoms. For example, children in the control group had fewer oppositional symptoms ( $p=0.01$ ) and less hyperactivity ( $p=0.02$ ), as reported by their parents.

Following the positive results found in the subgroup populations, a follow-on study is currently underway at the University of Oxford to explore a larger sample size of children who are underperforming (<20<sup>th</sup> percentile) in reading performance.

The study results come at a time when many school-aged children lack sufficient reading skills. According to the most recent report card by the National Assessment of Educational Progress (NAEP), students in the United States continue to struggle with reading, the most fundamental educational skill. More than a third of all fourth-grade public school students cannot read at even the most basic level and another third only reach the level of proficient.



## Vitamin C, Beta-Carotene May Protect Against Alzheimer's

Nutraceuticals World September 13, 2012

About 700,000 Germans are afflicted with the forgetfulness, disorientation and reduced mental capacity of Alzheimer's disease. Recent research out of the University of Ulm and led by epidemiologist Professor Gabriele Nagel and neurologist Professor Christine von Arnim, found that the concentration of the antioxidants vitamin C and beta-carotene in the blood serum of Alzheimer's patients at an early stage is lower than in healthy individuals. The study was published in the *Journal of Alzheimer's Disease* (JAD).

Alzheimer's disease is a neurodegenerative disease. Changes in the brain caused by beta-amyloid plaques, fibrillae degeneration, and the loss of nerve-contact points (synapses) lead to the characteristic symptoms. Oxidative stress is also suspected to expedite the development of disease. Researchers set out to determine if blood serum levels of the antioxidant vitamins C and E, beta-carotene and lycopene and coenzyme Q10 in Alzheimer's patients influenced the onset and development of AD. "In order to affect Alzheimer's disease, we need to know possible risk factors," said Gabriele Nagel.

Study participants (approximately 1,500 seniors) were recruited from the cross-sectional study "IMCA ActiFE" (Activity and Function in the Elderly in Ulm). The 65 - to 90-year-old from Ulm and environment have undergone various neuropsychological tests, and answered questions about their lifestyle. Their blood tested and the body mass index (BMI), the ratio of weight and height was calculated. In total, the group included 74 people (mean age 78.6 years), in which "mild dementia" was found, among a control group of 158 healthy peers.

Researchers found that the concentration of vitamin C and beta-carotene in the blood of AD patients was significantly lower than in the control group. For all other examined antioxidants (vitamin E, lycopene, coenzyme Q10) no corresponding difference was detected. Potential confounding factors such as education, civil status, BMI, consumption of alcohol and tobacco were considered in the statistical analysis. Nevertheless, the researchers felt additional parameters such as the storage and preparation of food as well as stressors in the life of participants might have influenced the findings. Therefore, results need to be confirmed in prospective surveys. "Longitudinal studies with more participants are necessary to confirm the result that vitamin C and beta-carotene might prevent the onset and development of Alzheimer's disease," said Professor Nagel.



## **Food Science & Industry News**

### **'Cool Food for Kids' Encourages Healthy Lifestyles**

July 26, 2012 Food Products Design

HARRISBURG, Pa.—The National Frozen & Refrigerated Foods Association (NFRA) is gearing up for its annual Cool Foods For Kids promotion to educate millions of children and families about the many nutritious and convenient frozen and refrigerated food options. The educational outreach program takes place in October and encourages healthy lifestyles through responsible, balanced food choices, appropriate portion control, increased daily physical activity and more quality, family mealtime.

Educational curriculum specialists, Young Minds Inspired (YMI), have designed the Cool Food for Kids program and will distribute specialized curriculum materials emphasizing good nutrition and physical exercise to more than 20,000 schools nationwide. Teachers are given a lesson plan with several activities and an educational poster to get kids excited about planning healthy meals and active hobbies for their entire family.

The program will extend into the retail sector, attracting consumers with point-of-sale materials provided by NFRA and merchandising that showcases the complimentary elements of the campaign. Promotional highlights include a Ski or Sea Family Vacation Sweepstakes, the online Cool Food for Kids Café featuring kid-friendly recipes and games, Easy Home Meals on Facebook and Twitter and more. NFRA spokesperson, Mr. Food, will also be supporting the Cool Food for Kids healthy lifestyle messaging and will devote an entire show to the promotion in October.

The October Cool Food for Kids educational initiative is enhanced through NFRA's partnership with the Healthy Weight Commitment Foundation (HWCF), a coalition of organizations fighting the growing obesity problem in America.



### **Specialty Fiber Improves Crunch in Breakfast Cereal**

August 7, 2012 Food Product Design

ST. LOUIS—Stratum Nutrition's ARTINIA® specialty fiber was shown to improve crunch in breakfast cereals in recent studies conducted independently and in collaboration with the Wenger Technical Research Facility in Sabetha, Kan., and the Food Processing Center at the University of Nebraska, Lincoln.

The primary outcome benefit of ARTINIA-fortified breakfast cereal was the enhanced functional performance of the cereal by lowering its solubility, therefore creating "less sogginess". The higher the inclusion rate of ARTINIA in the extruded cereal, the higher the porosity or "crunchiness."

ARTINIA was incorporated into extruded breakfast cereal, tested against positive (beta-glucan fiber) and negative controls (no added fiber). ARTINIA showed to be an easy "drop-in" ingredient, as it did not cause any handling or processing issues during blending, pre-conditioning, extrusion or

drying. Sensory evaluations included appearance, flavor, texture, crunch versus sogginess over time in milk, along with a physical characteristic analysis. Score sheet results for sensory and physical characteristic showed better or equal performance compared to the positive and negative controls in all areas. The quality of the ARTINIA final product had greater acceptability and resembled commercially available products.



### **Study Reveals Consumer Perceptions about Specific “Health Foods”**

August 10, 2012 Nutraceuticals World

A new study from iModerate Research Technologies has investigated consumers’ perceptions about two specific food groups: functional foods that contain natural health benefits such as the antioxidants found in blueberries, and fortified foods such as pastas that are enriched with calcium and vitamins.

The research, conducted in the U.S., found that while both men and women have a strong desire to eat healthy, most aren’t exactly sure what healthy eating entails, and how they can make it practical for them. Currently, there is a lack of information as it relates to what types of foods are healthy and what specific health benefits these foods provide – creating a challenge for consumers. Aside from a lack of information and prominent marketing by functional food producers and purveyors, the study found definitive barriers that prevent consumers from purchasing fortified and functional foods. Concerns about taste, cost, spoilage, convenience and preparation are the major hurdles when it comes to purchasing and consuming functional foods. When it comes to fortified foods, consumers’ apprehension stems from the fortification process itself, believability as to the product’s health claim, the possible overconsumption of nutrients, and long-term health implications.

“People generally want to eat healthy and do what’s best for them and their family” said Adam Rossow, VP of marketing at iModerate. “However, while consumers know some of the basics and what to stay away from, there is a tremendous lack of practical information and education that would help break down the barriers for them, inspire purchases and create a loyal following.” From the research, iModerate found there to be significant areas of opportunity for manufacturers, growers and retailers. These opportunities revolve around taking the guesswork out of healthy eating, messaging health benefits more effectively, and improving labels and signage.



### **Electrifying Success in Raising Antioxidant Levels in Sweet Potatoes**

Aug. 20, 2012 Science Daily

Already ranked by some as number one in nutrition among all vegetables, the traditional sweet potato can be nutritionally supercharged – literally – with a simple, inexpensive electric current

treatment that increases its content of healthful polyphenols or antioxidants by 60 percent, scientists said at a conference in Philadelphia August 20.

Their report on the first electrical enhancement of sweet potatoes, a dietary staple since prehistoric times, was part of the 244<sup>th</sup> National Meeting & Exposition of the American Chemical Society. "Many people don't realize it, but sweet potatoes are one of the world's most important food crops," said Kazunori Hironaka, Ph.D., who led the research team.

More than 95 percent of the global sweet potato crop grows in developing countries, where it is the fifth-most important food, and malnutrition is a serious problem," he said. "Our discovery offers a way to further increase the sweet potato role in relieving hunger and improving nutrition and health."

Hironaka and colleagues at the University of the Ryukyus, Nishihara, Okinawa, Japan, previously discovered that passing an electric current through white potatoes increased the polyphenol levels by 60 percent. Polyphenols are a family of chemical compounds found naturally in fruits and vegetables that may help protect people from diseases and the effects of aging.

The electric current apparently stresses the potatoes, and they produce more polyphenols as a protective measure. The team suspected that the same effect would occur with sweet potatoes, but until now, nobody had tried.

In the new study, Hironaka and colleagues used the same approach, putting sweet potatoes into a salt solution that conducts electricity, and then passing various amounts of electric current through the water and the potatoes for 5 minutes. The best results came with 0.2 amps of current, which increased antioxidant activity in the potatoes by 1.4 times and total polyphenol content by 1.6 times compared to untreated potatoes. He noted that untreated sweet potatoes already are high in antioxidants, with 7 times more polyphenols than other potatoes.

The Center for Science in the Public Interest once ranked the baked sweet potato number one in nutrition of all vegetables. With a score of 184, the sweet potato outscored the next-highest vegetable (a baked white potato) by more than 100 points. Points were given for content of dietary fiber, naturally occurring sugars and complex carbohydrates, protein, vitamins A and C, iron and calcium. Points were deducted for fat content (especially saturated fat), sodium, cholesterol, added refined sugars and caffeine.

Hironaka also noted that the electrical zapping seems to have no effect on the flavor, and that steaming is the best method of cooking to retain the most antioxidants. The electrical treatment method is inexpensive and simple enough to be used on small farms or in food distribution centers, he noted.



### **[Fruity Science Halves Fat in Chocolate](#)**

[Aug. 13, 2012 Science Daily](#)

It may not make chocolate one of your five a day -- but scientists have found a way to replace up to 50 per cent of its fat content with fruit juice.



University of Warwick chemists have taken out much of the cocoa butter and milk fats that go into chocolate bars, substituting them with tiny droplets of juice measuring under 30 microns in diameter.

They infused orange and cranberry juice into milk, dark and white chocolate using what is known as a Pickering emulsion.

Crucially, the clever chemistry does not take away the chocolatey 'mouth-feel' given by the fatty ingredients.

This is because the new technique maintains the prized Polymorph V content, the substance in the crystal structure of the fat which gives chocolate its glossy appearance, firm and snappy texture but which also allows it to melt smoothly in the mouth.

The final product will taste fruity -- but there is the option to use water and a small amount of ascorbic acid (vitamin C) instead of juice to maintain a chocolatey taste.

Dr Stefan Bon from the Department of Chemistry at the University of Warwick was lead author on the study published in the *Journal of Materials Chemistry*.

He said the research looked at the chemistry behind reducing fat in chocolate, but now it was up to the food industry to use this new technique to develop tasty ways to use it in chocolate.

Dr Bon said: "Everyone loves chocolate -- but unfortunately we all know that many chocolate bars are high in fat.

"However it's the fat that gives chocolate all the indulgent sensations that people crave -- the silky smooth texture and the way it melts in the mouth but still has a 'snap' to it when you break it with your hand.

"We've found a way to maintain all of those things that make chocolate 'chocolatey' but with fruit juice instead of fat.

"Our study is just the starting point to healthier chocolate -- we've established the chemistry behind this new technique but now we're hoping the food industry will take our method to make tasty, lower-fat chocolate bars."

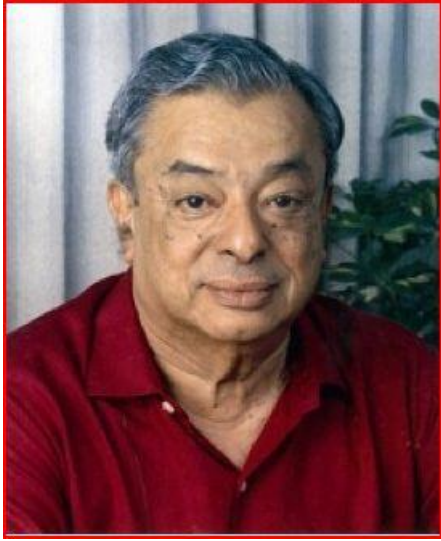
The scientists used food-approved ingredients to create a Pickering emulsion, which prevents the small droplets from merging with each other.

Moreover, their chocolate formulations in the molten state showed a yield stress which meant that they could prevent the droplets from sinking to the bottom.

The new process also prevents the unsightly 'sugar bloom' which can appear on chocolate which has been stored for too long.



## **DR. V. KURIEN, FATHER OF WHITE REVOLUTION PASSES AWAY**



Dr. Verghese Kurien, the Father of the White Revolution, passed away in the early hours of today, after a brief illness. He was 91 years old. He is survived by his wife, Molly Kurien, daughter Nirmala and grandson, Siddharth.

Dr. Kurien, was the architect of India's White Revolution, which helped India emerge as the largest milk producer in the world. Founder Chairman of the National Dairy Development Board (NDDB) from 1965 to 1998, the Gujarat Co-operative Milk Marketing Federation Ltd. (GCMMF), from 1973 to 2006 and the Institute of Rural Management (IRMA) from 1979 to 2006, his professional life has been dedicated to empowering the Indian farmers through co-operatives. Dr. Kurien has helped to lay the foundation of democratic enterprises at the grass roots. He believed that by placing technology and professional management in the hands of the farmers, the

standard of living of millions of our poor people can be improved.

The cooperative movement, he helped to create became a model not only for India, but for developing countries throughout the world. The Operation Flood Programme, of which Milk Producers' Cooperatives were the central plank, emerged as India's largest rural employment programme and unleashed the larger dimension of dairy development. Dr. Kurien was the undisputed 'Milkman' of India. Born on November 26, 1921 at Kozhikode, Kerala, he graduated in Science from the Loyola College in 1940 and obtained his degree in Engineering from the Guindy College of Engineering in Chennai. After a stint at TISCO, Jamshedpur, he obtained the Govt. of India's scholarship to study Dairy Engineering. After some specialized training at the Imperial Institute of Animal Husbandry & Dairying, Bangalore, he left for the United States where he completed his Masters degree in Mechanical Engineering with Dairy Engineering as a minor subject from the Michigan State University in 1948.

Upon his return to India, Dr. Kurien was assigned to a Government Creamery located at Anand in Gujarat to serve his bond period. He arrived in Anand on Friday, the 13th May 1949. His only intention at that time was to obtain a release from his bond and get out of Anand as quickly as possible. At the end of 1949, when he got release orders from his job from the Government Creamery, he was all set and eager to pack off to Mumbai. Shri Tribhuvandas Patel, the then Chairman of Kaira District Co-operative Milk Producers Union (popularly known as Amul), with whom Kurien had developed a friendship requested him to stay on in Anand for some more time and help him put his co-operative society's dairy equipment together. Kurien decided to stay back for a few more days and stayed there forever.

His forced tenure at Anand changed the destiny of Indian Dairy industry. He started helping the fledgling dairy co-operative. The rest is history.

The first Dairy Co-operative Union in Gujarat was formed in 1946 with 2 Village Dairy Co-operative societies as its members. The number of member societies has now increased to 16,100, with 3.2 million members pouring milk every day- twice a day. Today, the Billion Dollar GCMMF has emerged as the India's largest integrated dairy products manufacturing and marketing

organization. NDDB, formed by the efforts of Dr. Kurien ensured replication of Amul Model across India. Thereby, it played an instrumental role in increasing the milk production of India significantly. India's milk procurement has increased from 20 million metric tonnes per year in the 60s to 122 million metric tonnes in 2011.

His work has received tremendous national and international recognition. The Govt. of India conferred on him the "Padma Vibhushan", the second highest honour in the land next only to Bharat Ratna. He is also the recipient of the World Food Prize, the Ramon Magsaysay award for Community Leadership, the Carnegie - Wateler World Peace Prize and the International Person of the Year award from the U.S.

Dr. Kurien's main contribution has been in designing of systems and institutions, which enable people to develop themselves, as he believed the development of man can best be achieved by putting in his hands the instruments of development. He believed that the greatest assets of this country, were its people and he dedicated his life to the task of harnessing the power of the people in a manner which promoted their larger interests.

**Tribute by GCMMF Chairman:**

Paying respectful homage to Dr V Kurien, Shri Vipul Chaudhary, Chairman, GCMMF said " Dr. Kurien was the Father of the White Revolution. Dr Kurien guided the dairy co operative movement in India and brought social and economic development in the lives of milk producers of the country. Dr Kurien was always an advisor and mentor of milk producers. Due to the efforts of the farmers of Kaira district and Gujarat, Amul brand has emerged as the undisputed force to reckon with. Dr Kurien always dreamt that "Amul" brand should be associated with all milk producers'; across India. He also wanted that Amul brand in real sense should become the "Taste of India" when it is associated with all India milk producers. We are committed to fulfilling his dream. This will be the real tribute to Dr Kurien."

(From: Amul website, Anand, September 09, 2012)



## Regulatory & Safety News

### Monster Energy Drinks Under Regulatory Probe

August 13, 2012 Food Product Design

CORONA, Calif.—Monster Beverage Corp.'s Monster Energy® brand of energy drinks is the target of an unnamed state attorney general inquiry, according to an affidavit the company filed with the Securities and Exchange Commission on Aug. 9.

According to the document, in July 2012, the company received a subpoena from a state attorney general in connection with an investigation concerning the company's advertising, marketing, promotion, ingredients, usage and sale of its Monster Energy® brand of energy drinks.

In April, Sen. Dick Durbin (D.-Ill.) asked the U.S. Food and Drug Administration (FDA) to investigate energy drinks and clarify the definition of conventional food and beverages versus supplements. He also asked FDA to enforce its regulatory authority over the caffeine levels in energy drinks marketed as supplements.

His request was made in response to the death of a 14-year-old Maryland girl who had a heart attack as a result of caffeine toxicity after consuming two energy drinks. In his letter to FDA Commissioner Margaret Hamburg, Durbin specifically named Monster Energy, Red Bull, Rockstar, Full Throttle and AMP in his call for investigation.

He urged FDA to address the safety concerns posed by additives in energy drinks by requiring manufacturers to provide scientific evidence that ingredients, such as guarana, taurine, yerba mate, kola nut and ginseng, are safe for their intended use and when used in combination with other ingredients and caffeine.



### **Nice Cup of Tea to Beat Bioterrorists? Tea Ingredients Can Kill Micro-Organisms and Inactivate Toxins, Expert Says**

Aug. 8, 2012 Science Daily

New research has revealed that a nice cup of tea could hold the solution to a range of deadly weapons in the bioterrorist's arsenal.

As well as being the UK's favorite drink, research has shown that the morning brew has the ability to kill micro-organisms and inactivate toxins.

Dr Simon Richardson, Senior Lecturer in Biopharmaceutical Sciences at the University of Greenwich's School of Science, is part of a team of researchers who have discovered that a principal component of black tea can neutralize ricin, a highly toxic substance which has been at the center of a number of attempted terrorist attacks.

Dr Richardson says: "One cup of char won't cure you if you have been poisoned, but compounds extracted from tea could, with further research, provide an antidote to poisoning following a terrorist attack. I've been working on neutralizing ricin poisoning for about six years as a by-product of my work in drug delivery. Professor Les Baillie from Cardiff University is leading this project, which is in its preliminary stages but there is real progress! The next stage, as well as securing more funding, is seeing if other components of tea have a greater effect."

Ricin was the poison used to kill the Bulgarian dissident Georgie Markov on Westminster bridge in 1978 after a small pellet containing the poison was fired out of what was thought to be a modified umbrella.



### **Technical Workshop on Risk Based Approaches for Food Safety Management**

The current approaches used in the safety assessment of food products in India are largely hazard based and there is a need to adopt and use risk based approaches which considers exposure scenarios to assess food safety. The Food Safety and Standards Authority of India (FSSAI) has been making new regulations in this respect. These are at an early stage of implementation. Application of science-based approaches to assess and manage food safety risks, is hampered by lack of adequate trained resources/ scientists as well as lack of data/ knowledge.

The International Life Sciences Institute- India (ILSI-India) took the initiative to make up the lacunae. A two day Workshop was organized to raise awareness of Risk Based Approaches for Food Safety Management, covering Microbiological and Chemical Hazards, and Food Allergens and hands on training program on case studies in New Delhi. The Workshop was organized in collaboration with Ministry of Food Processing Industries GOI and Export Inspection Council, Ministry of Commerce, GOI. Corporate co-sponsors were: Coca Cola India, Hindustan Unilever Ltd. and Kejriwal Enterprises.



The program was inaugurated by Mr. S.N. Mohanty, CEO, Food Safety and Standards Authority of India (FSSAI). The valedictory address was delivered by Mr. Rakesh Kacker Secretary, Ministry of Food Processing Industries. Mr. D H Pai Panandiker, Chairman, ILSI-India delivered the welcome address and Mr. N.M Kejriwal President, ILSI-India delivered Vote of Thanks. The workshop was addressed by a number of senior officers from FSSAI including Dr. Ghankrokta, Director, FSSAI, Mr. S Dave, Advisor, FSSAI (Chairman Codex)

and Dr. Chakraborty, Director, FSSAI. National speakers included: Dr Nimish Shah, Dr.

Kiran Bhilegaonkar, Dr. Debabrata Kanungo, Dr. K S Rao; and Mr Sunil Adsule. The international speakers were: Dr. Benoit Schilter, Dr. George Pugh, Dr. Leon Gorris, Dr. Paul Hepburn; Dr. Richard Goodman and Mr. Bobby Krishna Thulasi.

Mr Mohanty explained that risk assessment is integral to functioning of the FSSAI. FSSAI is concentrating on moving from inspection at the market place to monitoring by implementing a surveillance system. Mr. Mohanty informed that FSSAI will build National Food Science and Risk Assessment Center. This Center will be the apex agency under FSSAI that will focus on food safety, risk analysis, educational, behavioral and social research. It will become the national depository of all food data surveillance and risk analysis. It will also help FSSAI to develop risk mitigation services and help developing new products. It will help professionals to participate in risk analysis activities. Professionals will also carry out research and developmental activities. They will also assist FSSAI in identifying intervention required at policy level.

**(Photo: Mr. Pai Panadiker felicitating Mr. Mohanty)**

**Note:** The Workshop presentations can be found on ILSI-India website: [www.ils-india.org](http://www.ils-india.org). The video recording of the presentations can be seen at: <http://www.youtube.com/user/ILSIGlobal>.

