

PFNDAI Bulletin (August 2013)

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

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Editorial

There was a time when Indian research journals in food science were not considered for publication by Indian researchers as they wanted to publish in fancy international journals. These would have better impact factor and citation possibility than the Indian publications. However, when someone tried to publish research about food material with mostly Indian context the foreign journals were not very keen to publish them as their readership they felt would be interested in more relevant subjects to them which was western food materials.

This created some problems for Indian researchers who then had to choose the topics more relevant to western audience rather than would be relevant to Indian context. So many of our foods and raw materials were not studied and we do not have adequate data bank on their properties including nutritive values.

Things are changing slowly and not only Indian publications are getting adequate recognition globally but also Indian materials are becoming interesting enough for international journals. Still there are many subjects that need to be studied. One such topic is soluble fibre. When one tries to find the literature for prebiotic one gets many studies with materials which are not found here. Although we do have soluble fibres from fruits, vegetables and pulses there have not been

adequate studies to show that probiotics grow and thrive well on these substances.

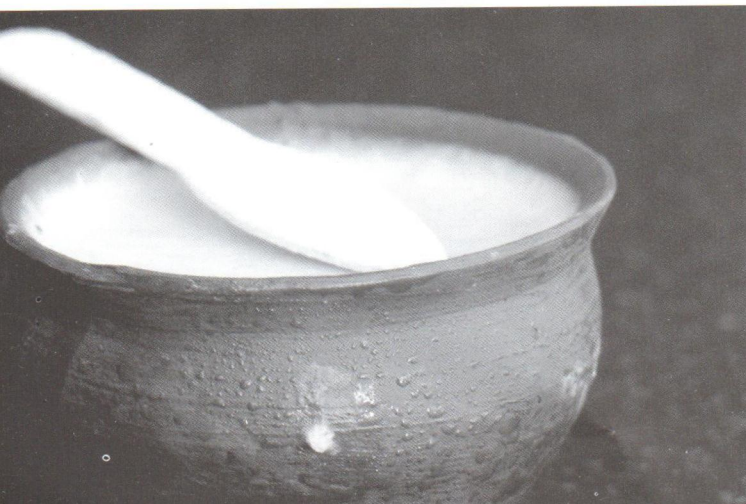
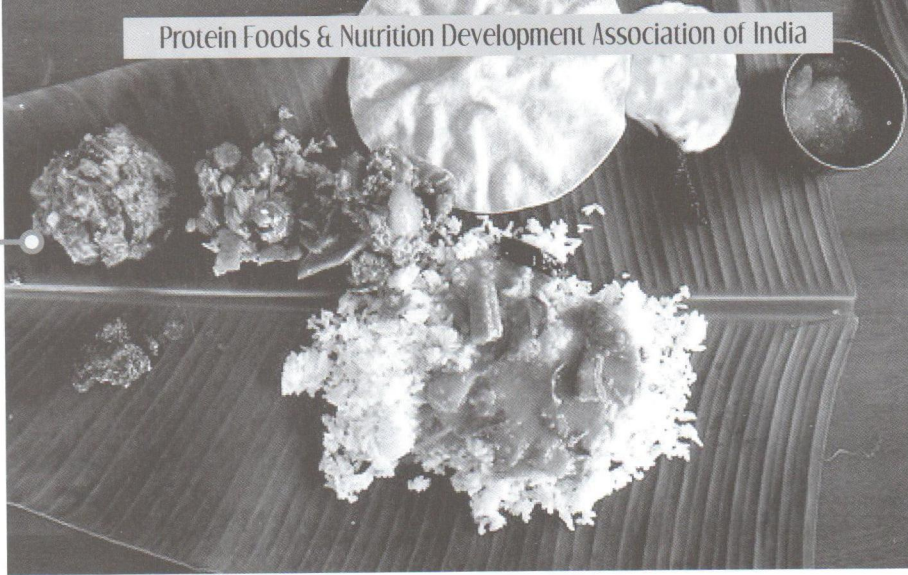
Even for that matter, very little work has been done on lactic acid bacteria present in curds that are prepared traditionally. Most cultures that are used in our foods enriched with probiotics are foreign cultures. There is nothing wrong with it but can we not study some of our cultures are find out if they provide probiotic benefits. The curds and fermented dairy products have been used in India for many centuries for their health benefits so there must be many cultures that could be studied for their beneficial effects. There may also be instances of benefits being synergistic due to presence of two or more cultures.

The probiotics also need to lodge in the guts or else they would simply be washed off along with the food. These studies also need to be carried out while studying the health benefits along with whether they pass through to GI tract in viable conditions in order for their beneficial effects. Many lactic acid bacteria get destroyed in stomach itself.

There are many such topics that need to be studied and published so the industry can utilise the fruits of the research done in Indian conditions.

With season's greetings,

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Healthy and Nutritious Beverages: Demystification

Dr. Prabhakar Kanade & Mahesh Satpute

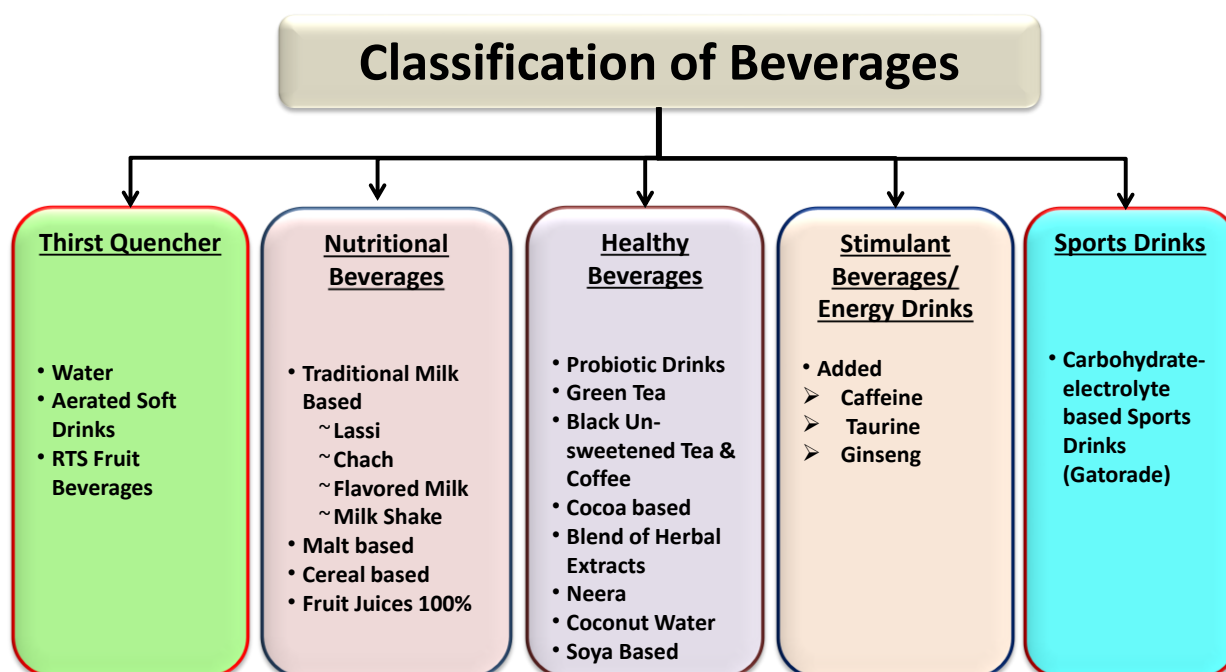
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Recent study published in the medical journal Lancet, says Food, Beverage and Alcohol companies shape public-health legislation and avoid regulation. The study is of relevance to India as it has a huge incidence of lifestyle ailments. Lifestyle ailments also called NCDs (non-communicable diseases)-including heart disease, stroke, cancer, diabetes, and chronic obstructive pulmonary disease-have long been major causes of death and disability in developed countries, but are now reaching epidemic levels in the developing world. According to recent estimates, a staggering 34.5 million people died from NCDs in 2010, 65% of the 52.8 million deaths worldwide. By 2030, NCDs are expected to claim more than 50 million lives every year. Now the scenario is changing and consumers are demanding more Healthy and Nutritious Food and Beverage.

Nutritional Beverage (Foods having “*Nutritional Claim*”) is enriched with nutrients, such as minerals proteins or vitamins. It suggests that a food has particular nutritional properties which is not limited to the energy value but include the protein, fat and carbohydrates, vitamins and minerals.

Healthy Beverages (Foods having “*Health Claim*”) suggests that a relationship exists between a food or a constituent of that food and health. It mainly covers two aspects; one of them is nutrition claims which describe the physiological role of the nutrient in growth, development and normal functions of the body. Second aspect is a functional claim concerning specific beneficial effect of the consumption of food or its constituents such as positive contribution and reduced risk of developing a disease.

These Beverages can be classified into various groups depending upon their functions as follows:



1. Thirst Quencher

This group includes Water, Ready to Serve (RTS) Beverages and Aerated Soft Drinks. The humble thirst quencher, water, is also now fortified with vitamins, and minerals with health benefit claims of weight management, improved digestion and mental alertness.

Ready to Serve Beverages or 'fruit juice drinks' include products with added ingredients such as sugar, acidity regulators and additives. The sugar content of these juices makes them appealing to children as well as adults but highlights important potential health issues regarding the promotion of fruit juices.

2. Nutritional Beverages:

Doctors and nutritionists encourage drinking low fat and fat-free milk. Low fat Milk has same amount of calcium, protein, minerals and vitamins, and less fat with fewer calories. Use of Low Fat Milk in instant pudding mix, yogurt with fruit blend, soups and casseroles and in many other healthier meals is encouraging.

This category includes milk based, Fruit Pulp Based, Malt Based, Cereal Based & Soya Based beverages. Milk based beverages contains two major streams, Major contributor is Indian Traditional Milk based beverages like Chach (Spices or plain), Lassi (Sweetened/Salty/added with Fruit pulp), Milk Shakes.

Malt is one of the most diuretic beverages. These are widely consumed as taste enhancers to encourage drinking of milk among growing children. Its carbohydrates are largely broken down and are thus easy to digest for humans. Malt is perfectly suited as a dietary supplement in a low-protein diet. It contains more than 30 essential minerals and elements. It is a good source of vitamins A, D and E as well as folic acid, which is particularly essential for pregnant women as its deficiency can cause spinal defects in the unborn child.

There are several types of cereal-based fermented drinks (Sake, Bouza, Bushera, Mahewu, Chicha, Pozol, Togwa, Bushera, Mahewu, Boza)^[5] produced around the world based on different cereal substrates (sometimes mixed with other pulses) fermented by lactic acid bacteria. This Lactic acid bacterium exhibits antimicrobial effect against Diarrhoeagenic Bacteria. Although these beverages are traditionally consumed in rural parts of India, commercialization of these beverages is still in infant stage.

'Fruit juice' refers to products made from 100% fresh fruit with no added ingredients. Fruit juices represent an appropriate medium for the dissolution of functional components, but also a convenient and widely accepted method of consumption. Within the emerging functional food paradigm, healthy beverages contribute toward increasing the consumption of fruit to re-equate the balance between recommendations and actual intake, although juice intake does not equate to intake of whole fruits or vegetables. Fruit juices and vegetable juices have been shown to be a rich source of bio-accessible antioxidants.

Orange, Grape and Apple juices contain hydroxycinnamic acids and vitamins primarily. Flavonoids in particular have recently been linked with beneficial effects on the central nervous system. Flavonoids suppress neuroinflammation and improve cognitive functioning through their effects on the phosphatidylinositol-3 kinase (PI3K)/Akt, protein kinase-C and mitogen-activated protein kinases signaling pathways. Orange and grapefruit juices are good sources of vitamin C and polyphenolic compounds including hydroxycinnamic acids and flavanoids such as (in particular Flavones, Flavanone Naringenin). Naringenin (found in both orange and grapefruit juice) induced anti-proliferative effects in human hepatoma HepG2 cells and human colon adenocarcinoma and anti-estrogenic effects. The major phenolic component of apple juice is chlorogenic acid, together with flavanols (quercetin and its glycosides) and flavonols catechin and epicatechin. Apple phytochemicals have beneficial effects in a number of human diseases.

3. Health Drinks

3.1 Probiotics & Prebiotics

The new upcoming prebiotic and probiotic yoghurt drinks are among the popular functional beverage products in the markets. Functional Milk is also gaining popularity with many new nutritional fortified milks being marketed, including those fortified with extra calcium, omega-3 fatty acids (FA), vitamins and even lactose-free milk for specific target audience.

Non-Dairy products such as Sauerkraut, Kombucha, Miso, Water Kefir, Moroccan Preserved Lemons, Coconut Kefir, Ginger Beer, Sour Pickles can also be a good carrier for probiotic organisms.

3.2 Black Tea, Coffee & Cocoa

Tea is characterized by the presence of the polyphenolic catechins including: epigallocatechin-3-gallate (EGCG), epigallocatechin (EGC), epicatechin-3-gallate (ECG), and epicatechin. These catechins are found in green tea. These constituents are oxidized during fermentation to yield a complex mixture of secondary polyphenols including theaflavins, theasinensins and oolongtheanins. The health benefits of polyphenols include antioxidant, anticancer, and anti-inflammatory effects. Extracts obtained from different teas affect Dental Caries development, as their polyphenol components reduce the production of acidic compounds and the ability of microbes responsible for Plaque formation (streptococci) to synthesize adherent water-insoluble glucan from sucrose with the cooperative action of glucosyltransferase.

Phenolic acid content of green coffee are Caffeic, Ferulic Acids and Diester of Quinic acid (chlorogenic acid). Roasted coffee possesses antibacterial activity against Gram positive and Gram negative bacteria. Caffeine reinforces the development of immune resistance to bacteria and stimulates the activity of lysozyme, which has shown bactericidal activity, directly affect the growth of Gram-negative bacteria.

The main polyphenols of cocoa seeds based beverages are Catechin, Epigallocatechin and Cyanidins. Studies have showed that phenolic substances are responsible of the Anticaries Effect of Extract of Cocoa Powder.

3.3 Super fruit Beverages

Pomegranate, Cranberry, and Blueberry as well as other dark fruits such as cherry and blackcurrant which contain high levels of polyphenolic compounds (e.g. flavanoids, flavonoids and tannins). Pomegranate juice is rich in polyphenolic compounds: anthocyanins, ellagic acid and phytoestrogenic flavanoids. The peel of pomegranate contains punicalagin.

Cranberry juice contains a complex mixture of compounds including a number of flavonoids, and organic acids, and has been adopted into the common diet as a means of treating urinary tract infections.

The blueberry skin, which is incorporated into some juices, is a particularly rich source of pterostilbene. Strawberry, Cherry and Blackcurrant are increasing in popularity due to the potential of polyphenol rich produce to protect against oxidative-stress mediated disease and influence signaling pathways.

3.4 Vegetable Juices & Blends of Herbal Extracts

Herbal Drinks and Vegetable Juices have been used habitually to deliver high concentrations of functional ingredients. The number of commercially available vegetable juices and vegetable/ fruit blends appears to be increasing. Tomato juice is blended with other vegetable rather to improve its acceptability. Commonly available vegetable juices in markets include tomato, carrot, beetroot, mixed vegetable and a number of fruit and vegetable blends. Phenolic content and antioxidant capacity of vegetables and vegetable juices have numerous health benefits.

Cabbage juice is a particularly efficient radical scavenger together with sweet pepper and broccoli. Carotenoids mainly α -carotene and lutein have been shown to be more bioavailable from vegetable juice than from either cooked or raw vegetables. Studies showed that 1–2 cups of vegetable juice a day could significantly increase vegetable intake, which was in turn associated with a reduction in blood pressure in hypertensive subjects.

Beetroot is found to contain a particularly high amount of antioxidants. Beetroot juice contains betalains; pigments which are classified as betacyanins and lend beetroot its deep red coloration. Its juice is a particularly efficient radical scavenger than both blueberry and cherry juices. Beetroot juice is a favorable

product amongst the general public because it has a relatively sweet taste due to its high sugar content whilst maintaining a low glycemic load.

Stringent Specifications and Regulations for these types of products are yet to be developed in India. These will prevent manufacturers from stating the contents of their products provided they are not adulterated or misleading, for example beverage manufacturers could include "A rich source of antioxidants" as a message on the labeling of their products, as they frequently do. The difficulty here is defining what a 'rich source' actually is. Manufacturers and distributors are increasingly committed to process the Vegetable Juices through more Healthy and Transparent practices. As a result of increased consumer education there is now a broad market for intrinsically healthy beverages with health benefits beyond their basic nutrition.

3.5 Neera (Fresh Toddy)

Coconut sap (Neera) is obtained by tapping the unopened spadix of the coconut palm. Neera is traditionally tapped from the coconut tree in an organized manner, and consumed largely by the rural population. It is reported to be highly nutritive and a good digestive agent. It is reported to be highly nutritive and a good digestive agent.

3.6 Bioactive Peptide based Beverage

Soya-based beverages are also available in market with unique health effects. Angiotensin I-Converting Enzyme (ACE) is an important enzyme of the renin-angiotensin system, a major regulator of blood pressure in mammals. Inhibition of ACE activity has been shown to effectively reduce blood pressure, and various ACE inhibitory peptides have been derived from many plant foods and animal muscle protein by enzymatic hydrolysis. Synthetic ACE inhibitors are suffering from strong side effects such as cough, skin rashes, and angioedema. The Novel peptides derived from Soya protein showed higher ability to reduce systolic blood pressure than Synthetic once without any side-effects. These peptides are naturally present in Soya Based Beverages and easily consumed as part of diet.

One of the major sources of ACE inhibitors are whey proteins based beverages. Whey Protein is a popular dietary supplement purported to provide immune modulation, improved muscle strength and body composition and to prevent cardiovascular disease and osteoporosis. The biological components of Whey Protein demonstrate a wide range of immune-enhancing properties. The primary beneficial components such as Lactoferrin, Beta-lactoglobulin, Alpha-lactalbumin, Glycomacropeptides and Immunoglobulins. Whey Protein has been shown to have the ability to act as an Antioxidant, Antihypertensive, Antitumor, Hypolipidemic, Antiviral, Antibacterial and Chelating agent. Whey protein hydrolysates contain several biologically active peptides, including antihypertensive peptides.

3.7 Coconut Water

Scientific Studies have shown that coconut water contains novel antibiotics i.e. defense peptides with bactericidal properties. These Anti-microbial peptides activates a non-specific innate immune system which is considered the first main defense system for the majority of living organisms, acting against pathogenic organisms invasion. Tender Coconut Water also inhibits lipid peroxidation, regulation of antioxidant status and improved insulin sensitivity prevents thereby reducing high blood pressure.

4. Stimulent Beverages / Energy Drinks

Energy drinks are promoted as enhancing behavioral outcomes by reversing fatigue effects and consequently increasing alertness and endurance. Ingredients used in Energy Drinks include Caffeine, Glucuronolactone, Sugars, Vitamin-B, Herbal extracts and Taurine. Scientific name of Taurine is 2-aminoethane sulphonic acid, an abundant free amino acid widely-distributed throughout the body and readily found in

animal-derived dietary sources. Amy and France (2013) has suggested a combined use of caffeine & taurine showed improved performance during Visual Oddball Task and Stimulus Degradation Tasks. Energy drink consumption improves performance on 'secondary memory' and 'attentional speed' factors.

5. Sport Drinks

Sport Drinks are commonly used by a wide age-range of athletes and active individuals during and after physical activities, being very popular among school-aged children. Body fluid become disturbed under exercising conditions in which sweat losses are not matched by Normal Water intake. Hypohydration (Water Loss) in excess of 2% impairs endurance performance, as it "overloads" the cardiovascular and thermoregulatory systems, increases perceived exertion and decreases motivation. To avoid hypohydration, "isotonic" solution should be ingested during exercise. Such isotonic characteristics should facilitate gastric emptying and intestinal absorption, thus avoiding gastrointestinal discomfort and optimizing rehydration. These are carbohydrate-electrolyte beverages available in various fruit-related flavors. The carbohydrate content will provide the energy required for prolonged or intermittent high intensity exercises. The electrolytes (sodium, chloride and potassium) help replace the losses from sweat, with sodium being the major one. The carbohydrate portion of these beverages is generally composed of monosaccharides and disaccharides ranging from 6% to 9% weight/ volume.

5.1 Fat-Free Milk as Sport Drink

Due to the presence of electrolytes, Fat free milk (< 0.1%) has been shown to be effective for body fluid restoration in adults and in children after hypohydration induced by exercise. Skim milk has a similar amount of sodium compared with sports drinks and carbohydrate to replenish muscle glycogen; it also provides protein, which could enhance muscle recovery. Thus, as mentioned, skim milk could be a viable rehydration beverage for those individuals who are lactose tolerant.

6. Future Opportunities and Challenges

According to BCC Research, functional Beverage market is expected to experience the highest growth, at Compounded Annual Growth Rate (CAGR) of 8.8 percent during the five year period from 2011 to 2016. This sector is expected to be worth nearly of \$ 87 billion in 2016. According to Frost & Sullivan Report, 2011 the Indian Nutraceutical market is valued at \$ 1,480 million in 2011 and expected to touch \$ 2,731 million in 2016.

The Beverage Guidance Panel published guidelines in American Society for Nutrition (2006) on the relative health and nutritional benefits and risks of various beverage categories. In assessing each beverage category five major factors were considered such as Energy and nutrient density, Contribution to total energy intake and body weight, Contribution to the daily intake of essential nutrients, Evidence for beneficial health effects and Evidence for adverse health effects. The panel ranked beverages at different levels based on caloric and nutrient contents and related health benefits and risks. Drinking water was ranked as the most preferred beverage to fulfill daily water needs and was followed by tea and coffee, low-fat (1.5% or 1%) and skim (nonfat) milk and soy beverages, non-calorically sweetened beverages, beverages with some nutritional benefits (fruit and vegetable juices, whole milk and sports drinks), and calorically sweetened, nutrient-poor beverages. The Panel recommends that the consumption of beverages with no or few calories should take precedence over the consumption of beverages with more calories. A set of each level for all the key concepts used in classification of beverages are summarized as follows:

Table: Classification of Beverage based on health and nutritional benefits and risks

	Category Name	Examples	Range of Daily Intake (ml per Day)
Level 1	Water	Packaged Drinking Water	592 to 1478
Level 2	Tea and Coffee (unsweetened)	Unsweetened and Brewed and/or Decaffeinated Black Tea, Green Tea, Herbal Tea, Coffee	Up to 1182
Level 3	Low-fat and Skim Milk & Soy Beverages	Reduced fat (1.5% - 1%) and skim milk, Vitamin A-fortified, Soy milk (Vanilla, Mango and Chocolate)	Up to 473
Level 4	Non-calorically Sweetened Beverages	Decaffeinated and/or Green Tea, Zero Calorie Artificial Cola Beverages	Up to 946
Level 5	Caloric Beverages with some nutrients	Fruit and Vegetable Juices (100% juice such as Orange, Grape, Apple, Cranberry, Tomato, Carrot), Whole Milk (3.25% fat, 2% fat), Sports drinks, Alcoholic beverages	Up to 236
Level 6	Calorically Sweetened Beverages	Carbonated and Non-carbonated drinks, Fruit Juice Blends with added sugar such as Cola Beverages, Mix-fruit, Cold Coffee, Iced Tea	Up to 236

With increasing health awareness and pressure to remain fit at all the time, health-conscious Indians are opening up to experimenting with functional beverages. The changing lifestyle with poor dietary habits, the hurried life with lesser time to cook at home have spurred the demand for complete and convenient nutrition that help prevent ailments and keep oneself physically and mentally fit. Needless to state, the growing affluence in the country has also enabled the purchase and usage of these new products. Some of the leading players in the Food Sector are tempting Indian Consumers with a variety of product choices.

Some of the obstacle faced by Market of functional beverages in India includes:

- Price factor
- Public concerns over the safety and quality of these beverage
- Fear of high pesticides level in water based products
- Lack of endorsement from the medical community for such a products
- Ambiguity over regulations governing label claims of the same
- Resistance to change beverage consumption habits
- Low awareness among non-metro consumers

To overcome these obstacles, beverage marketers must adapt their marketing strategies to appease Indian consumers and their requirements. What strategies works in other countries may not necessarily work in similar manner in India. Right from the consumption brand name, packaging, pricing, distribution channels, brand communication and other brand-related decision, there is enough scope to blend creativity with strong marketing research of quintessential Indian Consumer. Only those who do so will be able to quench their thirst for success in the functional beverage market early.

What is food intolerance? What causes food intolerance?

Food intolerance, also known as non-IgE mediated food hypersensitivity or non-allergic food hypersensitivity, refers to difficulty in digesting certain foods. It is important to note that food intolerance is different from food allergy.

Food allergy triggers the immune system, while food intolerance does not. Some people suffer digestive problems after eating certain foods even though their immune system has not reacted - there is no histamine response. Foods most commonly associated with food intolerance include dairy products, grains that contain gluten, and foods that cause intestinal gas build up, such as beans and cabbage.

This in-depth Medical News Today information article provides details on the **signs and symptoms** of food intolerance, the different possible **causes** of food intolerance, **how it is diagnosed** or confirmed, and the **difference** between food allergy and food intolerance.

What are the signs and symptoms of food intolerance?

It can be difficult to determine whether the patient has food intolerance or allergy, because often signs and symptoms overlap. **When it is an allergy even small amounts result in symptoms**, as may be the case with peanuts, according to James Li, M.D., Ph.D., Mayo Clinic allergy specialist.

With food intolerance tiny amounts will usually have no effect. Doctors can also test for Immunoglobulin E (IgE) antibodies. A symptom is something the sufferer feels and describes, such as pain or discomfort, while a sign is something others can detect, such as a rash.

The symptoms of food intolerance generally take longer to emerge, compared to food allergies. Onset typically occurs several hours after ingesting the offending food or compound and may persist for several hours or days. In some cases symptoms may take 48 hours to emerge.

Some people are intolerant to several groups of foods, making it harder for doctors to determine whether it might be a chronic illness or food intolerance. Identifying which foods are culprits can take a long time.

According to the Australian NSW Food Authority, the following are the most common symptoms of food intolerance:

- Bloating
- Migraines
- Headaches
- Cough
- Runny nose
- Feeling under the weather
- Stomach ache
- Irritable bowel
- Hives

What are the causes of food intolerance?

Absence of an enzyme

Enzymes are needed to fully digest foods. If some of these enzymes are missing or insufficient, proper digestion may be undermined. People who are **lactose intolerant** do not have enough lactase, an enzyme that breaks

down milk sugar (lactose) into smaller molecules that the body can break down further and absorb through the intestine. Lactose cannot be absorbed through the gut wall into the bloodstream. If it remains in the digestive tract it can cause spasm, stomachache, bloating, diarrhea and gas.

People with an allergy to milk protein have similar symptoms to those with lactose intolerance; that is why lactose intolerant individuals are commonly misdiagnosed as allergic. Researchers from Mary Bridge Children's Hospital and Health Center in Tacoma, WA, USA, found that fructose intolerance is common in children with recurrent or functional abdominal pain.

Nearly all foods require an enzyme for proper digestion. According to the British Allergy Foundation, enzyme deficiencies are common causes of food intolerance.

Chemical causes of food intolerance

Certain chemicals in foods and drinks can cause intolerance, including amines in some cheeses, and caffeine in coffee, tea and chocolates. Some people are more susceptible to these chemicals than others.

Food poisoning - toxins can cause food intolerance

Some foods have naturally-occurring chemicals that can have a toxic effect on humans, causing diarrhea, nausea and vomiting. Undercooked beans have aflatoxins that can cause extremely unpleasant digestive problems. Fully cooked beans do not have the toxin. Hence, people may wonder why they react to beans after one meal, and not after another.

Natural occurrence of histamine in some foods

Some foods, such as fish that has not been stored properly, can have an accumulation of histamine as they "rot". A number of people are particularly sensitive this naturally-occurring histamine and develop skin rashes, abdominal cramps, diarrhea, vomiting and nausea. Often, the symptoms are similar to **anaphylaxis** (a strong allergic reaction).

Salicylates are present in many foods

Salicylate intolerance, also known as salicylate sensitivity occurs when somebody reacts to normal amounts of ingested salicylate. Salicylates are derivatives of salicylic acid, which occurs naturally in plants as a defense mechanism against harmful bacteria, fungi, insects and diseases.



Salicylates are found in many foods. Most of us can consume salicylate-containing foods without any adverse effects, but a number of people suffer symptoms after eating large amounts. Salicylate intolerant individuals should avoid foods that are high in salicylates.

Salicylates are present in most plant-sourced foods, including the majority of fruits and vegetables, spices, herbs, tea and flavor additives. Mint-flavoring, tomato sauce, berries, and citrus fruits have particularly high levels of salicylates. Processed foods with flavor additives are usually high in salicylates as well.

Food additives are common causes of food intolerance

Food additive intolerance has been a steadily-growing problem over the last thirty years, because more and more foods contain additives. Even so, food additive intolerance is not estimated to affect more than 1% of people.

Food additives are used to enhance flavors, make foods look more appealing, and to increase their shelf life.

Examples of food additives include:

- Antioxidants
- Artificial colorings
- Artificial flavorings
- Emulsifiers
- Flavor enhancers
- Preservatives
- Sweeteners

Of the thousands of additives used in the food industry, a relatively small number are thought to cause problems.

The following food additives are known to cause adverse reactions in people:

- Nitrates - known to cause itching and skin rashes. Processed meats are generally high in nitrates and nitrites.
- MSG (monosodium glutamate) - used as a flavor enhancer. Known to cause headaches.
- Sulfites - used as a food preserver or enhancer. Commonly used in wines. In the USA and European Union wines bottled after 1987 and 2005 respectively must state on their labels if they contain sulfites at more than 10 parts per million. A German study found that about **7% of people have an intolerance to wine**.
- Some colorings - especially carmine (red) and annatto (yellow).

How is food intolerance diagnosed or confirmed?

It is not easy to initially determine whether somebody has a food intolerance or allergy, because the signs and symptoms often overlap. Certain patterns in the symptoms can help a health care professional distinguish between the two. In the vast majority of cases, food intolerance symptoms take much longer to appear than food allergies.

Patients are advised to keep a diary and write down which foods are eaten, what the symptoms were like, and when they appeared. The data in the diary can help a dietician or doctor identify which foods are causing adverse reactions and what steps to take.



Apart from lactose intolerance and **celiac disease**, there is no accurate, reliable and validated test to identify food intolerance. The best diagnostic tool is an exclusion diet, also known as an elimination or diagnostic diet.

Intolerance to regularly-eaten foods may result in adverse reactions running into each other. When this occurs, it is difficult to identify which foods are the culprits. There is a higher risk that a chronic condition or disease is erroneously diagnosed. Exclusion diets are extremely useful in isolating the culprit foods.

In a typical exclusion diet the suspected food is removed from the diet for a set period, usually between two weeks to a couple of months. If during this period the adverse reactions resolve, it becomes more likely the culprit has been found. This can be further confirmed if it is then reintroduced and symptoms return.

The doctor may recommend a skin test and/or a blood test to rule out a food allergy:

- **Skin prick test** - this determines the patient's reaction to a specific food. A small quantity of the suspected food is placed on the patient's back or forearm. The skin is pricked with a needle, allowing some of its substance to penetrate below the skin surface. Allergic people will react with a raised bump. Skin prick tests are not 100% reliable.

- **Blood test** - this measures levels of IgE (immunoglobulin E) antibodies. These tests are not 100% reliable either. **The presence of IgE antibodies may be a part of the normal human response and indicate tolerance**, rather than an adverse reaction, according to a study published in *CMAJ*.

In food intolerance, unlike food allergies, there are several signs and symptoms which occur simultaneously, they may be general and non-specific, making diagnosis challenging. Dieticians and doctors emphasize that a detailed food and symptom diary is important.

The best current treatment for food intolerance is to either avoid certain foods or eat them less often and in smaller amounts, as well as taking some supplements that may help digestion.

Tolerance can improve

Some people find that if they stay off the culprit food for a while, they have no reaction when eating it again - this is known as tolerance. Maintaining tolerance is often a question of knowing how long to abstain, and how much of it to eat when it is being reintroduced. As each person reacts differently, the only way to determine this is by trial-and-error.

Article by Christian Nordqvist in Medical News Today 25 July 2013



Older Adults: 9 Nutrients You May Be Missing

Getting adequate nutrition can be a challenge as you get older. With age, the number of calories you need begins to decline. Every calorie you consume must be packed with nutrition in order to hit the mark.

Even then, you may fall short. "As we get older, the body becomes less efficient at absorbing some key nutrients," says Katherine Tucker, RD, PhD, chair of the department of health sciences at Northeastern University in Boston. In addition, the ability to taste food declines, blunting appetite. Some foods become difficult to chew or digest. Several key nutrients in particular may be in short supply as you get older. Here are the top vitamins and nutrients to look out for -- and how to get enough.

Vitamin B12

B12 is important for creating red blood cells and DNA, and for maintaining healthy nerve function. "Getting enough B12 is a challenge for older people because they can't absorb it from food as well as younger people," says Tucker. "Even if your diet contains enough, you may be falling short."

How to hit the mark: Eat more foods rich in B12. The richest sources include fish, meat, poultry, eggs, milk, and milk products. Talk to your doctor about whether you should take a B12 supplement.

Folate/Folic Acid

You may have heard of folate. Too little of this essential B vitamin is known for contributing to anemia and increasing the risk of a pregnant woman having a baby with a neural tube defect. Older people whose diets don't include a lot of fruits and vegetables or fortified breakfast cereals may be falling short.

How to hit the mark: Now that breakfast cereals are fortified with folate, deficiencies are less common. "Still, if you don't eat breakfast cereals or plenty of fruits and vegetables, it's wise to ask your doctor if you should take a supplement that contains folate," says Kathleen Zelman, RD, director of nutrition for WebMD.

Calcium

Calcium plays many roles in the body. But it is most important for building and maintaining strong bones. Unfortunately, surveys show that as we age, we consume less calcium in our diets. "Calcium is so essential that if you don't get enough, your body will leach it out of your bones," says Zelman. Coming up short on calcium has been shown to increase the risk of brittle bones and fractures.

How to hit the mark: Help yourself to three servings a day of low-fat milk and other dairy products. Other good dietary sources of calcium include kale and broccoli, as well as juices fortified with calcium. Calcium-rich foods are by far that best choice, says Robert Heaney, MD, a Creighton University professor of medicine and an expert on calcium and vitamin D. "The body needs both calcium and protein for bone health," says Heaney. "So the ideal source of calcium is dairy products, not supplements." If you tend to steer clear of dairy products, talk to your doctor about whether you should take a supplement.

Joanne Koenig Coste, a former caregiver who works with older people, says that smoothies made with yogurt, fruit, and even vegetables can be an attractive option for people who have lost their appetite, have trouble chewing, or have a dry mouth. "I used to make one for my mother with spinach, yogurt, a little orange juice, and a little pistachio ice cream," she says. "My mother loved it. I'd divide it into small portions and freeze them for her. She'd take it out in the morning and have it for lunch." Another favorite: a smoothie of vanilla yogurt, a little molasses and maple syrup, and a small scoop of vanilla ice cream.

Vitamin D

"Vitamin D helps the body absorb calcium, maintain bone density, and prevent osteoporosis," says Zelman. Recent findings suggest that D may also protect against some chronic diseases, including cancer, type 1 diabetes, rheumatoid arthritis, multiple sclerosis, and autoimmune diseases. In older people, vitamin D deficiency has also been linked to increased risk of falling. Many Americans fall short on vitamin D, which is mainly produced by the skin when exposed to sunlight.

How to hit the mark: Many foods are fortified with vitamin D, including cereals, milk, some yogurts, and juices. Few foods naturally contain vitamin D. However, vitamin D is found in salmon, tuna, and eggs. Researchers are currently debating what the recommended level of vitamin D for optimal health should be. Many experts think older people need to take vitamin D supplements, since the skin becomes less efficient at producing the vitamin from sunlight as we age. For now, the best advice is to talk to your healthcare provider.

Potassium

Getting enough potassium in your diet may also help keep bones strong. This essential mineral is vital for cell function and has also been shown to help reduce high blood pressure and the risk of kidney stones. Unfortunately, surveys show that many older Americans don't get the recommended 4,700 mg of potassium a day.

How to hit the mark: Fruits and vegetables are by far the richest dietary sources of potassium. Banana, prunes, plums, and potatoes with their skin are particularly rich in potassium. By helping yourself to fruits and vegetables at every meal, you can get enough potassium. If you're considering potassium supplements, talk to your doctor first. Just as too little potassium can be a problem, too much potassium can be very dangerous for your health.

Magnesium

Magnesium plays a crucial role in some 300 different physiological processes. Getting enough can help keep your immune system in top shape, your heart healthy, and your bones strong. "Many whole foods, including vegetables, contain magnesium. But it is often lost in processing," says Tucker. Absorption of magnesium decreases with age. Some medications older people take, including diuretics, may also reduce magnesium absorption.

How to hit the mark: Fill your plate with as many unprocessed foods as possible, including fresh fruits, vegetables, nuts, whole grains, beans and seeds, all of which are great sources of magnesium.

Fiber

Fiber helps promote healthy digestion by moving foods through the digestive tract. Foods rich in fiber, including whole grains, beans, fruits, and vegetables, have many other health benefits, including protecting against heart disease. "If you don't eat a lot of these whole foods, chances are you're not getting enough fiber," says Zelman. You're not alone. Most Americans only get about half the recommended levels.

How to hit the mark: Eat more whole grains, nuts, beans, fruits, and vegetables. Be creative. "Try adding cranberry sauce to your turkey and whole wheat bread sandwich," Coste suggests. "Family can help out with this too. When you visit your parents, divide up pumpkin seeds, nuts, blueberries, or already-chopped vegetables into snack size bags and leave them in the refrigerator so they're ready to eat." And talk to your doctor about taking a fiber supplement.

Omega-3 Fats

These unsaturated fats, found primarily in fish, have a wide range of benefits, including possibly reducing symptoms in rheumatoid arthritis and slowing the progression of age-related macular degeneration (AMD), a disease of reduced vision in the elderly. "New evidence suggests that omega-3s may also reduce the risk of Alzheimer's disease and perhaps even keep the brain sharper as we age," says Zelman. Seafood should be part of a heart-healthy diet but omega-3 supplements have not been shown to protect against the heart.

How to hit the mark: Nutrition experts recommend helping yourself to at least two servings of fish a week. Salmon, tuna, sardines, and mackerel are especially high in omega-3 fats. Some vegetable sources of omega 3 include soybeans, walnuts, flaxseed, and canola oil. Omega 3 supplements are available but be sure to talk to your doctor before you begin taking any supplements.

If you're an adult child trying to help your parents get more omega-3s, Coste says to make it as easy as possible for them. She suggests buying canned salmon to put on salad. "You can get little cans or open bigger cans and put them in a plastic container," she says. "Put mixed greens in another container. Then all they have to do is open the containers up and toss them together with salad dressing."

Water

Water might not seem like an essential vitamin or mineral, but it is crucial for good health. With age, sense of thirst may decline. Certain medicines increase the risk for becoming dehydrated. Water is especially important if you are increasing the fiber in your diet, since it absorbs water. In the Modified MyPyramid for Older Adults, created by Tufts University researchers, 8 glasses of fluids a day are next to physical activity in importance for health.

How to hit the mark: Nutritionists recommend you drink 3 to 5 large glasses of water each day, says Zelman. One sign that you're drinking enough is the color of your urine. It should be pale yellow. If it is bright or dark yellow, you may need to drink more liquids.

Coste says that adult children can help remind their parents to drink enough water by buying them 4-ounce water bottles. "As we get older, we get overwhelmed really easily," she says. "You open the refrigerator and you see big bottles of water and you close the refrigerator. You see a small bottle of water and you think, 'I can drink that.'"

Some people may need to have their amount of fluids restricted due to medical reasons such as kidney or liver disease. Make sure to check with your healthcare provider about a suitable fluid intake level for you. Taking in too much fluid can be unsafe, too.

Article Link: <http://www.webmd.com/healthy-aging/nutrition-world-2/missing-nutrients>



A Glass of Milk After Eating Sugary Cereals May Prevent Cavities

July 31, 2013 Science Daily

Washing down sugary breakfast cereal with milk after eating reduces plaque acid levels and may prevent damage to tooth enamel that leads to cavities, according to new research at the University of Illinois at Chicago College of Dentistry.



Dry ready-to-eat, sugar-added cereals combine refined sugar and starch. When those carbohydrates are consumed, bacteria in the dental plaque on tooth surfaces produce acids, says Christine Wu, professor of pediatric dentistry and director of cariology, who served as principal investigator of the study.

The research is published in the July issue of the *Journal of the American Dental Association*.

Reports have shown that eating carbohydrates four times daily, or in quantities greater than 60 grams per person per day, increases the risk of cavities.

The new study, performed by Wu's former graduate student Shilpa Naval, involved 20 adults eating 20 grams of dry Froot Loops cereal, then drinking different beverages -- whole milk, 100 percent apple juice, or tap water.

Plaque pH, or acidity, was measured with a touch microelectrode between the premolar teeth before eating; at two and five minutes after eating; and then two to 30 minutes after drinking a liquid.

The pH in plaque dropped rapidly after consuming cereal alone, and remained acidic at pH 5.83 at 30 minutes. A pH below 7 is acidic; a pH greater than 7 is basic. Pure water has a pH close to 7.

Participants who drank milk after eating sugary cereal showed the highest pH rise, from 5.75 to 6.48 at 30 minutes. Those who drank apple juice remained at pH 5.84 at 30 minutes, while water raised the pH to 6.02.

Fruit juices are considered healthy food choices, but the added sugar can be a risk to dental health, Wu said.

"Our study results show that only milk was able to reduce acidity of dental plaque resulting from consuming sugary Froot Loops," said Naval, who is currently a fellow at the Centers for Disease Control and Prevention in Atlanta. "We believe that milk helped mitigate the damaging effect of fermentable carbohydrate and overcome the previously lowered plaque pH."

Milk, with a pH ranging from 6.4 to 6.7, is considered to be a functional food that fights cavities because it promotes tooth remineralization and inhibits the growth of plaque, Wu said.

Wu says most consumers think that since milk is considered to be cavity-fighting, acid production by plaque bacteria can be minimized by mixing it with cereal. However, in an unpublished study in her lab, it was discovered that the combination of Froot Loops and milk became syrupy. Eating cereal combined with milk lowered plaque pH to levels similar to that obtained after rinsing with a 10 percent sugar solution.

Eating sugar-added cereal with milk, followed by drinking fruit juice is thus a highly cavity-causing combination, Wu said.

Diet plays an important role in oral health, Wu said. Studies of food intake and cavities have focused mainly on the sugar, or carbohydrate, content. Fewer studies have looked at how combinations of food, and the order in which they are eaten, may help fight cavities.

"Results from a previous study suggested that the last food item consumed exerts the greatest influence on subsequent plaque pH," she said. For example, eating cheese after a sugary meal reduces acid production, and consumers can modify their diet in such a way as to prevent the cavity-causing effects of sugary foods."

"If understood and implemented properly, food sequencing can be used as a public health educational tool to maintain and preserve good oral health," said Naval.



Diets Lacking Omega-3s Lead to Anxiety, Hyperactivity in Teens: Generational Omega-3 Deficiencies Have Worsening Effects Over Time

July 29, 2013 Science Daily

Diets lacking omega-3 fatty acids -- found in foods like wild fish, some eggs, and grass-fed livestock -- can have worsened effects over consecutive generations, especially affecting teens, according to a University of Pittsburgh study.

Published in *Biological Psychiatry*, the Pitt team found that in a rodent model second-generation deficiencies of omega-3s caused elevated states of anxiety and hyperactivity in adolescents and affected the teens' memory and cognition.

"We have always assumed that stress at this age is the main environmental insult that contributes to developing these conditions in at-risk individuals but this study indicates that nutrition is a big factor, too," said Bitamoghaddam, lead author of the paper and professor of neuroscience in the Kenneth P. Dietrich School of Arts and Sciences. "We found that this dietary deficiency can compromise the behavioral health of adolescents, not only because their diet is deficient but because their parents' diet was deficient as well. This is of particular concern because adolescence is a very vulnerable time for developing psychiatric disorders including schizophrenia and addiction." Diets lacking omega-3 fatty acids -- found in foods like wild fish, eggs, and grass-fed livestock -- can have worsened effects over consecutive generations, especially affecting teens, according to a University of Pittsburgh study.

Performing experiments in rats in Moghaddam's laboratory, the research team examined a "second generation" of omega-3-deficient diets, mimicking present-day adolescents. Parents of many of today's teens were born in the 1960s and 1970s, a time period in which omega-3-deficient oils like corn and soy oil became prevalent, and farm animals moved from eating grass to grain. Since omega-3s are present in grass and algae, much of today's grain-fed cattle contain less of these essential fatty acids.

The Pitt team administered a set of behavioral tasks to study the learning and memory, decision making, anxiety, and hyperactivity of both adults and adolescents. Although subjects appeared to be in general good physical health, there were behavioral deficiencies in adolescents that were more pronounced in second-generation subjects with omega-3 deficiencies. Overall, these adolescents were more anxious and hyperactive, learned at a slower rate, and had impaired problem-solving abilities.

"Our study shows that, while the omega-3 deficiency influences the behavior of both adults and adolescents, the nature of this influence is different between the age groups," said Moghaddam. "We observed changes in areas of the brain responsible for decision making and habit formation."

The team is now exploring epigenetics as a potential cause. This is a process in which environmental events influence genetic information. Likewise, the team is exploring markers of inflammation in the brain since

omega-3 deficiencies causes an increase of omega-6 fats, which are proinflammatory molecules in the brain and other tissues.

"It's remarkable that a relatively common dietary change can have generational effects," said Moghaddam. "It indicates that our diet does not merely affect us in the short-term but also can affect our offspring."



The importance of maintaining muscle mass during weight loss

Friday 26 July 2013 Medical News Today

Athletes seeking a healthy performance weight should eat high fiber, low-fat food balanced with their training regimen in order to maintain muscle while still burning fat, according to a report by an Oregon State University researcher.

The United States now has a record number of overweight athletes, a population many think of as untouched by the obesity crisis. Nationally, more than 45 percent of high school linebackers are obese, and the number of overweight students entering college level-sports is increasing.

In a peer-reviewed literature review published this summer in the Nestle Nutritional Institution Workshop Series, OSU researcher Melinda Manore looked at the benefits of teaching athletes how to consume what she calls a low-energy-dense diet, or high-fiber, high-water, but lower-fat foods. She said too many athletes are pushed into fad diets or try to restrict calorie intake too much in a way that is unhealthy and unsustainable.

"Depending on the sport, athletes sometime want to either lose weight without losing lean tissue, or gain weight, mostly lean tissue," she said. "This is very difficult to do if you restrict caloric intake too dramatically or try to lose the weight too fast. Doing that also means they don't have the energy to exercise, or they feel tired and put themselves at risk of injury."

Manore is professor of nutrition in the College of Public Health and Human Sciences at OSU. She said the overwhelming body of research shows that just counting calories does not work. What does work is a healthy lifestyle that can be maintained, even during breaks or when not in training. She said an athlete's optimum body weight should include the following criteria:

- Weight that minimizes health risks and promotes good eating
- Weight that takes into consideration genetic makeup and family history
- Weight that is appropriate for age and level of physical development, including normal reproductive function in women
- Weight that can be maintained without constant dieting and restraining food intake

In the paper, Manore outlined some strategies that athletes can use to maintain a healthy weight and remain performance-ready. It's important, she said, to adopt a low-energy-dense diet, which includes a large amount of fruits, vegetables, whole grains, lean meat, fish, and low-fat dairy. Avoid beverages high in sugar, especially soda and alcohol. Manore said half of a plate of food should be filled with fruits and veggies, and processed food should be avoided.

"Always opt for the food over the drink, don't drink your calories," Manore said. "Instead of drinking orange juice, eat an orange. It has more fiber, and fills you up more."

Other key points:

- Eat breakfast. Data from the National Weight Control Registry shows that 80 percent of people who lost at least 30 pounds in a year and kept it off were breakfast eaters. Eat a breakfast rich with high-fiber whole grains, fruit, high-quality protein such as egg whites, and low-fat dairy. Skip the processed cereals.
- Get plenty of protein. Most athletes get plenty of protein, but they may not be strategic about making sure to refuel after exercise, and spreading their protein intake throughout the day. Depending on the goals, some athletes may need to get as much as 30 percent of their calories from protein, but many get that in one large meal. Spreading that protein out throughout the day is a better strategy; and nuts, beans and legumes are a great source of protein, not just meat.
- Exercise regularly. This may seem obvious for an athlete, but many seasonal athletes can pack on pounds during off-seasons, making it that much harder to get performance-ready.
- Avoid fad diets. Combining severe calorie restriction with intense training can result in metabolic adaptations that actually can make it more difficult to lose weight. Severe weight loss also makes an athlete stressed out and tired, and that is never good for sport.

While her paper is aimed at competitive and recreational athletes, Manore said all of these tips can apply to anyone who wants to change their diet and head in a healthier direction.



Skipping Breakfast May Increase Coronary Heart Disease Risk

July 22, 2013 Science Daily

A large 16-year study finds men who reported that they skipped breakfast had higher risk of heart attack or death from coronary heart disease. The timing of meals, whether it's missing a meal in the morning or eating a meal very late at night, may cause adverse metabolic effects that lead to coronary heart disease. Even after accounting for modest differences in diet, physical activity, smoking and other lifestyle factors, the association between skipping breakfast (or eating very late at night) and coronary heart disease persisted.

Here's more evidence why breakfast may be the most important meal of the day: Men who reported that they regularly skipped breakfast had a higher risk of a heart attack or fatal coronary heart disease in a study reported in the American Heart Association journal *Circulation*.

Researchers analyzed food frequency questionnaire data and tracked health outcomes for 16 years (1992-2008) on 26,902 male health professionals ages 45-82. They found:

- Men who reported they skipped breakfast had a 27 percent higher risk of heart attack or death from coronary heart disease than those who reported they didn't.
- The men who reported not eating breakfast were younger than those who did, and were more likely to be smokers, employed full time, unmarried, less physically active and drank more alcohol.
- Men who reported eating late at night (eating after going to bed) had a 55 percent higher coronary heart disease risk than those who didn't. But researchers were less convinced this was a major public health concern because few men in the study reported this behavior.
- During the study, 1,572 of the men had first-time cardiac events.

"Skipping breakfast may lead to one or more risk factors, including obesity, high blood pressure, high cholesterol and diabetes, which may in turn lead to a heart attack over time," said Leah E. Cahill, Ph.D., study lead author and Postdoctoral Research Fellow in the Department of Nutrition at Harvard School of Public Health in Boston, Mass.

"Our study group has spent decades studying the health effects of diet quality and composition, and now this new data also suggests overall dietary habits can be important to lower risk of coronary heart disease," said Eric Rimm, Sc.D., senior author and Associate Professor of Epidemiology and Nutrition, Harvard School of Public Health and Associate Professor of Medicine at the Harvard Medical School.

Men who reported eating breakfast ate on average one more time per day than those who skipped breakfast, implying that those who abstained from breakfast were not eating additional make-up meals later in the day. Although there was some overlap between those who skipped breakfast and those who ate late at night, 76 percent of late-night eaters also ate breakfast, researchers said.

The study collected comprehensive questionnaire data from the participants and accounted for many important factors such as TV watching, physical activity, sleep, diet quality, alcohol intake, medical history, BMI, and social factors like whether or not the men worked full-time, were married, saw their doctor regularly for physical exams, or smoked currently or in the past.

While the current study group was composed of men who were of 97 percent white European descent, the results should also apply to women and other ethnic groups, but this should be tested in additional studies, researchers said.

"Don't skip breakfast," Cahill said. "Eating breakfast is associated with a decreased risk of heart attacks. Incorporating many types of healthy foods into your breakfast is an easy way to ensure your meal provides adequate energy and a healthy balance of nutrients, such as protein, carbohydrates, vitamins and minerals. For example, adding nuts and chopped fruit to a bowl of whole grain cereal or steel-cut oatmeal in the morning is a great way to start the day."



Calcium Linked to Increased Risk of Heart Disease and Death in Patients With Kidney Disease

July 19, 2013 Science Daily

Kidney patients who take calcium supplements to lower their phosphorus levels may be at a 22 per cent higher risk of death than those who take other non-calcium based treatments, according to a new study by Women's College Hospital's Dr. Sophie Jamal.

The study, published today in the *Lancet*, calls into question the long-time practice of prescribing calcium to lower phosphate levels in patients with chronic kidney disease. The researchers suggest some of the calcium is absorbed into the blood stream and may expedite hardening of the arteries, leading to a higher risk of heart disease and even death. Cardiovascular disease is a leading cause of death for people with chronic kidney disease.

"Doctors commonly prescribe calcium supplements to prevent elevated phosphate levels, which can damage the body, but a growing number of studies have shown calcium supplements may actually increase the risk of heart disease," explains Dr. Sophie Jamal, a physician at Women's College Hospital and an associate professor of medicine at the University of Toronto. "Our study validates these claims and, for the first time, shows the long-term consequences of taking calcium supplements can be dangerous for patients with kidney disease."

As part of their analysis, researchers reviewed 11 randomized, controlled studies that included more than 4,600 patients. The researchers assessed the risk of heart disease, including heart attack, stroke, and hardening of the arteries, along with death among individuals prescribed the medication containing calcium and those prescribed the medication without calcium. They found:

- A 22% reduction in death among patients who took non-calcium based treatments sevelamer and lanthanum.
- Less artery calcification (hardening) in patients who did not take calcium supplements.

"Some researchers and physicians have been saying for years that kidney disease patients need to get off calcium, now we think our review shows there is much more solid evidence to argue for that change to clinical practice," the study's senior author Ross Tsuyuki from the University of Alberta's faculty of medicine and dentistry.

In the meantime, given the study's findings, the researchers suggest non-calcium containing treatments be used as a first line of treatment to lower phosphate for patients with chronic kidney disease.

"The findings of our study provides the best evidence as to what doctors should be prescribing their patients, but further research is necessary to help us understand how exactly calcium increases the risk of death, if non calcium-based treatments reduce the risk of death, and whether certain types of treatments may be more effective and beneficial than others," says Dr. Jamal.



Eating Eggs Is Not Linked to High Cholesterol in Adolescents, Study Suggests

July 19, 2013 Science Daily



Although in the late 20th century it was maintained that eating more than two eggs a week could increase cholesterol, in recent years experts have begun to refute this myth. Now, a new study has found that eating more eggs is not associated with higher serum cholesterol in adolescents, regardless of how much physical activity they do.

A new study led by researchers at the University of Granada has analysed the link between egg intake in adolescents and the main risk factors for developing cardiovascular diseases, such as lipid profile, excess body fat, insulin resistance and high blood pressure.

As Alberto Soriano Maldonado, primary author of the study, explains: "Health professionals traditionally insisted that eating eggs increased cholesterol levels, so in recent decades there has been a tendency to restrict intake championed by various public health organisations."

However, the most recent research suggests that increased serum cholesterol is more affected by intake of saturated fats and trans fats -- present in red meat, industrial baked goods, etc. -- than by the amount of cholesterol in the diet.

The results of this article, part of the European study HELENA involving nine countries, demonstrated that eating larger amounts of egg is neither linked to higher serum cholesterol nor to worse cardiovascular health in adolescents, regardless of their levels of physical activity.

"The conclusions, published in the journal *Nutrición Hospitalaria*, confirm recent studies in healthy adults that suggest that an intake of up to seven eggs a week is not associated with an increased risk of developing cardiovascular diseases," notes Soriano.

As a result, the authors suggest reviewing dietary recommendations for adolescents, although they add that it would be useful to conduct similar research on a sample group with higher egg intake.

"Egg is a cheap food that is rich in very high-quality proteins, minerals, folates and B vitamins. Thus it can provide a large quantity of nutrients necessary for optimum development in adolescents," according to the researcher.

Banishing the egg myth

In 1973, the American Heart Association recommended limiting egg intake to a maximum of three per week, an idea that was accepted by health experts for years.

However, although the majority of foods rich in cholesterol are usually also rich in saturated fats, a medium-size egg contains 200 milligrams of cholesterol but has more unsaturated fats than saturated fats and only has 70 calories.



Gene Mutation Linked to Obesity: Mice Gain Weight Even When Fed Normal Amounts of Food

July 18, 2013 Science Daily

Researchers at Boston Children's Hospital have identified a genetic cause of severe obesity that, though rare, raises new questions about weight gain and energy use in the general obese population. The research, published in the journal *Science* on July 19, involved genetic surveys of several groups of obese humans and experiments in mice.



Mice with the genetic mutation gained weight even while eating the same amount of food as their normal counterparts; the affected gene, *Mrap2*, has a human counterpart (*MRAP2*) and appears to be involved in regulating metabolism and food consumption.

"These mice aren't burning the fat, they're somehow holding onto it," says the study's lead investigator Joseph Majzoub, MD, chief of endocrinology at Boston Children's. "Mice with the genetic mutation gained more weight, and we found similar mutations in a cohort of obese humans."

The protein created by the *Mrap2* gene appears to facilitate signaling to a receptor in the brain called *Mc4r*, which helps increase metabolism and decrease appetite as part of a larger signaling chain involved in energy regulation. Fat cells produce the hormone leptin, prompting receptors in the brain to instigate production of a second hormone, α MSH. *Mc4r* detects this hormone with the aid of *Mrap2*, leading to a decrease in appetite and weight. Mutations in this signaling chain, including mutations in *Mc4r*, are known to increase the likelihood of obesity.

Majzoub, first author Masato Asai, MD, PhD, now at Nagoya University in Japan, and colleagues studied mice with the *Mrap2* gene knocked out both overall and just in the brain. In both cases, the mice grew to about twice their normal size. Weight gain was greatest when both copies of *Mrap2* were knocked out, but the mice still showed weight gain and appetite increase with one working copy of the gene. The weight gain was more pronounced in males than females. In addition, the mice without *Mrap2* had more exaggerated weight gain when fed a high-fat diet than normal mice.

Surprisingly, while the mice without *Mrap2* didn't eat more at first, they still gained weight faster than the controls. Later, their appetites increased and they continued to gain more weight than the controls, even when held to the same diet and quantity of food. In the end, the mutant mice had to be underfed by 10 to 15 percent to show the same weight gain as their normal peers. As soon as they were let off the restricted diet, their weight gain increased.

To investigate the gene in humans, Majzoub collaborated with Sadaf Farooqi, MD, PhD, of the University of Cambridge, and others to investigate groups of obese patients from around the world. The team found four mutations in the human equivalent of *Mrap2* among the 500 people, all in patients with severe, early-onset obesity; each of the four affected patients had only one copy of the mutation.

While the finding suggests that these rare mutations directly cause obesity in less than 1 percent of the obese population, the researchers suspect that other mutations in the gene might occur more commonly and might interact with other mutations and environmental factors to cause more common forms of obesity. "We found other mutations that weren't as clearly damaging to the gene," notes Majzoub. "It's possible that some of these

more common mutations actually are pathogenic, especially in combination with other genes in the same pathway."

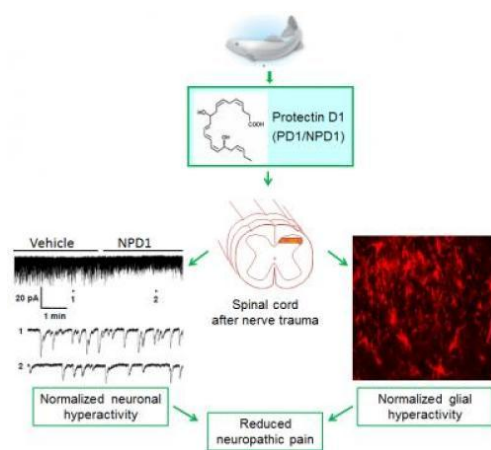
One intriguing theory, called the thrifty-gene hypothesis, holds that rare mutations in genes like *Mrap2* exist because they gave humans an evolutionary advantage in times of severe famine. Further investigation into how these mutations work may lend insight into the body's mechanisms for energy storage and use. In the present study, the lab did not observe anything to explain why the mutant mice were storing more food energy, such as a difference in activity level or heat output.

Majzoub and his colleagues look forward to expanding the scope of the research, studying additional populations of obese people, including measures of their activity and diet, as well as further exploring how the gene alters energy balance.



Uncovering a Healthier Remedy for Chronic Pain

July 17, 2013 Science Daily



Physicians and patients who are wary of addiction to pain medication and opioids may soon have a healthier and more natural alternative.

A Duke University study revealed that a derivative of DHA (docosahexaenoic acid), a main ingredient of over-the-counter fish oil supplements, can soothe and prevent neuropathic pain caused by injuries to the sensory system. The results appear online in the *Annals of Neurology*.

The research focused on a compound called neuroprotectin D1=protectin D1 (NPD1=PD1), a bioactive lipid produced by cells in response to external stimuli. NPD1=PD1 is present in human white blood cells, and was first identified based on its ability to resolve abdominal and brain inflammation.

"These compounds are derived from omega-3 fatty acids found in fish oil, but are 1,000 times more potent than their precursors in reducing inflammation," said Ru-Rong Ji, professor of anesthesiology and neurobiology at Duke University Medical Center and principal investigator of the study.

The team used laboratory mouse models of nerve injuries to simulate pain symptoms commonly associated with post-surgical nerve trauma. They treated these animals with chemically-synthesized NPD1=PD1, either through local administration or injection, to investigate whether the lipid compound could relieve these symptoms.

Their findings revealed that NPD1=PD1 not only alleviated the pain, but also reduced nerve swelling following the injuries. Its analgesic effect stems from the compound's ability to inhibit the production of cytokines and chemokines, which are small signaling molecules that attract inflammatory macrophages to the nerve cells. By preventing cytokine and chemokine production, the compound protected nerve cells from further damage. NPD1=PD1 also reduced neuron firing so the injured animals felt less pain.

Ji believes that the new discovery has clinical potential. "Chronic pain resulting from major medical procedures such as amputation, chest and breast surgery is a serious problem," he said. Current treatment options for neuropathic pain include gabapentin and various opioids, which may lead to addiction and destruction of the sensory nerves.

On the other hand, NPD1=PD1 can relieve neuropathic pain at very low doses and, more importantly, mice receiving the treatment did not show signs of physical dependence or enhanced tolerance toward the lipid compound.

"We hope to test this compound in clinical trials," Ji said. The initial stages of the trial could involve DHA administration through diet and injection. "DHA is very inexpensive, and can be converted to NPD1 by an aspirin-triggered pathway," he said. The ultimate goal is to develop a safer approach to managing chronic pain.



Monitoring Nutrient Intake Can Help Vegetarian Athletes Stay Competitive

July 17, 2013 Science Daily

A balanced plant-based diet provides the same quality of fuel for athletes as a meat-based diet, provided vegetarians seek out other sources of certain nutrients that are more commonly found in animal products.

The research was compiled by Dilip Ghosh, Ph.D., director of Nutriconnect in Sydney, Australia. He was unable to attend the meeting, so his presentation was given by Debasis Bagchi, Ph.D., director of innovation and clinical affairs at Iovate Health Sciences International Inc. in Oakville, Ontario, Canada.

Ghosh's research noted that vegetarian athletes have been present throughout history. Perhaps most notably, analysis of the bones of Roman Gladiators indicate they may have been vegetarians. There are several notable vegetarian athletes today, such as marathon runners Bart Yasso and Scott Jurek, and pro Ironman triathlete Brendan Brazier.

The key to success, Ghosh found, is that vegetarian athletes must find ways within their diet to reach the acceptable macronutrient distribution for all athletes, which he breaks down as carbohydrates (45-65 percent), fat (20-35 percent) and protein (10-35 percent).

"Vegetarian athletes can meet their dietary needs from predominantly or exclusively plant-based sources when a variety of these foods are consumed daily and energy intake is adequate," Ghosh wrote in his presentation.

Vegetarians should find non-meat sources of iron, creatine, zinc, vitamin B12, vitamin D and calcium because the main sources of these typically are animal products and could be lacking in their diets. Vegetarian women, in particular, are at increased risk for non-anemic iron deficiency, which may limit endurance performance. In addition, vegetarians as a group have lower mean muscle creatine concentrations, which may affect high-level exercise performance.

These deficiencies can be avoided or remedied through several food sources acceptable to the vegetarian diet, such as orange/yellow and green leafy vegetables, fruits, fortified breakfast cereals, soy drinks, nuts and milk products (for vegetarians who consume dairy).

Ghosh noted that his conclusions are based on observational and short-term interventional studies, but there needs to be a well-controlled long-term study to further assess the impact of a vegetarian diet on athletic performance.

The presentation also included a discussion of nutrition for bodybuilders, defined as athletes whose primary goals are to maximize muscle size, optimize fat and minimize body fat.

Phil Apong, senior formulation specialist/researcher at Iovate Health Sciences, said dietary recommendations for bodybuilders depend on many factors, such as genetics, age, gender and body size. But in general the current recommendation is 1.4 to 2.0 grams of protein per kilogram (g/kg) of body weight -- about 1 gram per

pound. Ideally a bodybuilder should seek to eat that amount in increments of 20 to 25 grams of high-quality protein throughout the day to maximize protein synthesis in muscle in response to training.

However, Apong noted those benefits did not exist past the limit of 2.4 g/kg.

"This is important because it seems to indicate there is an upper cap of protein intake that seems to promote protein synthesis to the maximum level and if you exceed this upper cap of protein level intake, you will not be pushing protein synthesis any further," Apong said. "In fact, you're going to be oxidizing protein for energy production."



What Are Fructooligosaccharides and How Do They Provide Digestive, Immunity and Bone Health Benefits?

July 16, 2013 Science Daily

Health benefits of short-chain fructooligosaccharides (scFOS), which are low-calorie, non-digestible carbohydrates that can improve food taste and texture while aiding immunity, bone health and the growth and balance of important bacteria in the digestive track.

Fructooligosaccharides are naturally found in chicory, onions, asparagus, wheat, tomatoes and other fruits, vegetables and grains. They also can be derived from cane sugar and seaweed for use as a low-calorie (1.5 -- 2 Kcal/g) food sweetener and supplement. As scFOS provides approximately 30-to-50 percent of the sweetness of regular sugar, it can be used to enhance flavor and lower the amount of sugar in a food product.

In addition, scFOS are considered prebiotics. After they are consumed, fructooligosaccharides move to the large intestine to stimulate the production of microbiota in the colon and gastrointestinal track.

Microbiotas are "friendly, beneficial" bacteria, said Kelly A. Tappenden, Ph.D., Kraft Foods human nutrition endowed professor at the University of Illinois at Urbana-Champaign and editor-in-chief of the *Journal of Parenteral and Enteral Nutrition*. Microbiotas produce essential nutrients such as short-chain fatty acids; control epithelial cell growth (the cells that line body cavities); prevent overgrowth of infectious organisms; boost intestinal immunity; and prevent inflammation, diarrhea and other intestinal conditions. This "essential ecosystem" provides an important "balance between health and disease" in the body.

Fructooligosaccharides also increase calcium absorption in the body, an important consideration for pre- and post-menopausal women, ages 45 and older, who are losing critical bone mass that increases their risk for osteoporosis and bone fractures.

The regular addition of scFOS to the diet is "ideal for maintaining mineral density and (bone) strength," said Phillip Allsopp, Ph.D., research associate at the University of Ulster in Coleraine, Ireland. Most Americans, including many formula-fed infants and children, do not get enough scFOS, said Cristina Munteanu, senior technical service technologist at Ingredion, Inc.

As an additive, scFOS is a clear, stable powder suitable for pasteurization, baking and beverages, said Munteanu. It can be found in milk, yogurts and other dairy products, as well as snacks, cereal, bars and candy.



People Who Eat Nuts More Than Three Times a Week Have Reduced Risk of Dying from Cancer or Cardiovascular Disease

July 16, 2013 Science Daily

People who eat nuts, particularly walnuts, are more likely to live longer, finds research in BioMed Central's open access journal *BMC Medicine*. In a longitudinal study, researchers suggest that those who eat nuts more than three times a week have a reduced risk of dying from cancer or cardiovascular disease than non-nut eaters.

The PREDIMED nutrition trial based in Spain looked at the effect on the primary prevention of cardiovascular disease of over 7000 older people (aged 55 to 90) randomized to a Mediterranean Diet supplemented with extra virgin olive oil or nuts, compared to a control group following a low fat diet. In Mediterranean regions, nut consumption is relatively high compared to other countries. People who ate nuts tended to have a lower BMI and smaller waist. They were also less likely to smoke and were more physically active than those who rarely or never ate nuts. Nut eating was associated with a better diet in general as these people ate more vegetables, fruit and fish.

There were fewer people with type 2 diabetes or people taking medicine for hypertension in the group of people who ate the most nuts. Overall, nut eaters had a 39% lower mortality risk and walnut eaters 45% lower -- meaning that they were less likely to die than the non-nut eaters.

People eating more than 3 servings (1 serving -- 28 g) a week of nuts reduced risk of death due to cardiovascular disease by 55% and cancer by 40%. A similar effect was demonstrated for walnuts.

Prof Jordi Salas-Salvadó, from the Universitat Rovira i Virgili who led this study explained, "Quite how nuts are able prevent premature mortality is not entirely clear, nor why walnut should be better for you than other nuts. Walnuts have particularly high content of alpha-linoleic acid and phytochemicals, especially in their 'skin' both of which, along with fibre and minerals such as calcium, magnesium and potassium, may contribute to their healthy effect."



Chew More to Retain More Energy

July 15, 2013 Science Daily

Almonds may still be considered one of the highest energy food sources but it's not about how much you bite off, instead it's about how much you chew.

"Particle size has bioaccessibility of the energy of the food that is being consumed," said Dr. Richard Mattes (CQ), professor of foods and nutrition at Purdue University, West Lafayette, Ind. "The more you chew, the less is lost and more is retained in the body."

Each individual has their own chewing habits, he said, and although those are often difficult to change they should be considered when making energy food choices. Mattes shared a recent study with conference attendees in which study subjects chewed almonds 10 times, 25 times or 40 times and their fecal fat and energy lost by the number of chews were measured. The study found with fewer chews, the larger particles were eliminated by the body. With more chews, the smaller particles were more readily absorbed into the system.

"If the goal is to include food that is enjoyable and contribute protein, a whole almond is probably the way you want to go," Mattes said. "If you're interested in maximizing Vitamin E intake, chopped almonds, almond butter or almond oil may be a better choice."

Mixed fibers from fruits, vegetables and whole grains also topped the charts as high energy sources, he added.

"When your total diet is higher in fiber, there's a greater loss of fat," Mattes said. "Fiber binds with fatty acids to create energy sources in the body."

Dr. Roger Clemens (CQ), chief scientific officer of Horn Company of La Mirada, Calif., and an adjunct professor of pharmacology and pharmaceutical sciences within the USC School of Pharmacy, explained in his abstract that scientists today continue to estimate the measurements of energy derived from foods based on calculations created over 125 years ago by Wilbur O. Atwater, (CQ) a USDA agricultural chemist who published his findings from more than 200 dietary studies on caloric content in kcal/g of carbohydrates (4), proteins (4) and fats (9) as they were found in foods and metabolized by the body.

Clemens did acknowledge many variables can impact how efficiently the body extracts energy from plant-based foods or ingredients, especially those high in dietary fiber cereals and plant extracts, nuts and seeds.

Clemens added more study and understanding of the digestibility of plant-based foods and ingredients could contribute to more appropriate energy values and more accurate product labeling.

"We may see a resurgence of digestibility studies in humans rather than relying on estimates by Atwater that we have been doing for a number of years," said Malden Nesheim, (CQ) provost emeritus and professor of nutrition emeritus, Cornell University, Ithaca, NY.

Dr. Martin Wickham (CQ), director of nutrition at Leatherhead Food Research in the United Kingdom, also presented an update at the conference session on similar studies in the European Union and recognized a new study released Friday about school lunches.

"It recommended a ban on people bringing in packed lunches which are not as healthy as school meals," Wickham said. "We tend to talk about school meals and their nutritional quality but this is the first time where they talked about the calories playing a major part in childhood obesity in the UK."

Wickham added that in December 2012, the European Union published new regulations on food energy guidelines and a European-wide way to handle calories, also suggesting new measurements of the macro micro nutrients and using averages on food tables. These new regulations, he said, will be imposed in December 2014.



Vegetarians, vegans and elderly at higher risk of B12 deficiency

Friday 19 July 2013 Medical News Today

Vegetarians, vegans and the elderly are at high risk of developing vitamin B12 deficiency through changes in their diets, according to a review of scientific studies published in the *Journal of Agricultural and Food Chemistry*.

Researchers from The United Graduate School of Agricultural Sciences of Tottori University and the Department of Nutrition of the Junior College of Tokyo in Japan reviewed nearly 100 scientific studies analyzing **vitamin B12**.

The study authors say the usual dietary sources of the vitamin are animal-based foods such as eggs, milk, meat and fish, but there are some plant-based foods which contain a high amount.

However, the scientists found that the only living things that can create vitamin B12 are particular bacteria, which live in the digestive tracts of animals. The bacteria can live on or near some types of plants, providing them with the vitamin.

But results of the study review showed that the human body is actually unable to use the plant-based form of vitamin B12, meaning that vegetarians and vegans are at high risk of developing a deficiency in this vitamin.

Additionally, elderly people who suffer from certain gastrointestinal disorders are at risk because their bodies are unable to absorb the normal type of B12 that is in food.

Vitamin B12 is vital for the formation of red blood cells, and **B12 deficiency** can lead to health problems such as pernicious anaemia - a type of blood disorder, as well as nerve and brain damage, which could eventually become irreversible. The vitamin also plays a vital part in helping the body absorb **folic acid**, facilitating the release of energy.

Previous studies have demonstrated the effects of vitamin B12 deficiency. For example, **research** from Rush University Medical Center revealed that elderly people with low B12 levels have a higher risk of developing brain shrinkage, leading to a loss of their cognitive skills.

Other **research** from Finland revealed that a low intake of B12 alongside the vitamin folate, could cause bouts of **depression**.

Interestingly, this most recent study review shows that although there are dietary supplements of B12 available in stores, such as Spirulina - a blue-green algae - and some shellfish, this actually contains a "false" form of vitamin B12 that the human body is unable to use.

In conclusion to the study review, the researchers recommend that vegans and vegetarians add vitamin B12 to their diet by eating fermented foods, particular types of mushroom that contain the vitamin and B12-enriched vegetables.

They recommend that the elderly should eat B12-fortified foods, fish or shellfish and canned clam broth.

In addition, they say that the heat to which vitamin B12 foods are exposed during storing and cooking can lead to the loss of the vitamin.



Most Children And Adults Have A "Nutrition Gap" In Omega-3 Fatty Acids Despite Documented Health Benefits

Friday 19 July 2013 Medical News Today

Because of a diet low in fish and seafood, children and adults in North America and other parts of the world, have a "nutritiongap" of omega-3 fatty acids, particularly docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), according to a presentation at the 2013 Institute of Food Technologists (IFT) Annual Meeting & Expo in Chicago®.

Numerous studies have found that DHA and EPA can prevent or minimize the effects of inflammatory disorders, such as rheumatoid arthritis, promote cardiovascular health and limit the effects of heart disease, said Bruce J. Holub, Ph.D., professor emeritus at the University of Guelph in Guelph, Ontario.

For children, adequate levels of DHA are critical for normal brain and nervous system development, said Alex Richardson, Ph.D., senior research fellow at the Centre for Evidence-Based Intervention at the University of Oxford in Oxford, England, founder and director of the United Kingdom charity Food and Behavior (FAB) Research; and author of the book "They are What You Feed Them."

Richardson said the "physical risks to children from a nutritionally poor diet are now acknowledged, but the damage being done to their behavior, their learning abilities and mood is not."

Richardson cited numerous studies linking low levels of DHA in children and expectant mothers to a wide-range of cognitive and behavioral disorders.

The problem is exacerbated by the fact that half of the fish consumed in the world today is cultivated on farms without diets that foster omega-3 nutrients,saidHolub.

The average American consumes 1.6 grams of omega-3 fatty acids, of which only .2 grams (200 milligrams) are DHA or EPA. The American Heart Association recommends 500 milligrams of DHA and EPA each day for healthy adults and 900 mg/day (one fatty fish meal per day, or one omega-3 supplement) for patients with coronary disease.

Richardson recommends 500 mgs of omega-3 fatty acids a day for children and 1 gram a day for pregnant women.

"I applaud any attempts (to recommend and encourage supplements) in the diets of mothers and women of childbearing age," said Richardson, who believes that consistent, pervasive diets lacking in omega-3 fatty acids could results in genetic modifications affecting future generations.

"It's never too late" to address this issue, said Richardson.



Taking Vitamins And Minerals Boosts Energy And Enhances Mood

Friday 19 July 2013 Medical News Today

Vitamin and mineral supplements can enhance mental energy and well-being not only for healthy adults but for those prone to anxiety and depression, according to a panel discussion at the 2013 Institute of Food Technologists (IFT) Annual Meeting & Food Expo® held at McCormick Place.

Bonnie Kaplan, Ph.D., professor in the faculty of medicine at the University of Calgary, Alberta, Canada, said vitamins and mineral supplements can be the alternative to increasing psychiatric medicines for symptom relief of anxiety and depression. The supplements, she said, also can provide the mental energy necessary to manage stress, enhance mood and reduce fatigue.

In a series of studies she recently conducted in Canada, Kaplan found of the 97 adults with diagnosed mood disorders who kept a three-day food record, a higher intake of vitamins and minerals were significantly correlated with overall enhanced mental functioning.

Other vitamins that have been known to enhance mood, said C.J. Geiger, Ph.D., president of Geiger & Associates, LLC, and research associate professor in the division of nutrition at the University of Utah, include 5-Hydroxytryptophan (5 HTP), Vitamins B and D, as well as ginkgo biloba and Omega 3.

In her research, Geiger has found most adults define energy throughout the day as peaking mid-morning, falling to a valley in the afternoon after lunch and recovering with a pickup in late afternoon, settling back down before bedtime. However, these peaks and valleys did vary with gender, age and climate. She said many adults are known to use coffee, soft drinks, chocolate and candy bars as well as energy drinks, bars and chews with high sugar boosts to maintain energy throughout the day. She found other adults ate more frequent, smaller meals to sustain energy while making time for lots of rest and exercise.



Drinking water boosts your brain's reaction time

Saturday 20 July 2013 Medical News Today

We all know that drinking water regularly is good for the body. But new research has revealed that drinking water when we feel thirsty boosts our brain's performance in mental tests.

Researchers from the University of East London and the University of Westminster in the UK analyzed the potential effects of water on cognitive performance and mood among 34 participants with an average age of 29 years.

The study, published in the journal *Frontiers in Human Neuroscience*, involved participants taking part in a "water" and a "no water" experiment one week apart.

The "water" experiment required the people to complete a number of mental tests after eating a cereal bar and drinking some water. The "no water" test meant the participants consumed just the cereal bar alone. The amount of water drunk by the participants in the "water" test depended on their level of thirst.

Lead study author, Dr. Caroline Edmonds of the University of East London School of Psychology, told *Medical News Today*, "Our study found that reaction times were faster after people drank water, particularly if they were thirsty before drinking." Drinking three cups of water before completing a task can increase the brain's reaction time by 14%.

In both experiments, the participants were asked to fast overnight, consuming no food or drink after 9pm before the day of testing. The participants were assessed via three measurements - a thirst scale, a mood scale and with a computer-administered variety of tasks called the Cambridge Neuropsychological Test Automated Battery (CANTAB).

The researchers analyzed particular areas of the participants' brain, including reaction time, verbal recognition memory, visual memory and learning.

The participants who drank around three cups of water (775 milliliters) just before completing the tests had a 14% increased reaction time compared with those who did not drink any water.

The study authors say that as well as showing that water consumption can increase cognitive performance, this is moderated by the participants' subjective feelings of thirst. The authors say: "The present study revealed water consumption to have contrasting effects on different cognitive processes. Water consumption was found both to impair 'set shifting' performance, and to facilitate speed of responding, but in a manner that was dependent upon subjective thirst.

More specifically, water consumption appeared to have a corrective effect on the response times for thirsty individuals, bringing their speed of responding up to the level of non-thirsty individuals"

In terms of mood, the results revealed that when participants were dehydrated, they were more tense, sad and confused.

But the study also showed that drinking water can have negative effects on cognitive performance. Dr. Edmonds told *MNT* the study "also showed that people performed worse on a complex rule-learning task after drinking."

In a test called the Intra-Extra Dimensional Set Shift (IED) test, the participants were monitored for "attention flexibility" and tested on their error rates in discriminating a series of visual images. Depending on how the researchers ran the test, participants who drank water before doing it performed worse than those who drank no water.

The study authors add that further research is needed to examine how the brain effects of water are mediated by thirst mechanisms, as well as determining why water consumption can also have negative effects on cognitive performance.

Dr. Edmonds told *MNT*: "This study shows that water can be helpful for cognitive performance, and sometimes it can be helpful to be thirsty - we need to do more studies to find out why."

So is there an ideal amount of water that we should be drinking for strong mental performance? Dr Edmonds told us there is no simple answer: "We don't really know the answer to that question at the moment. This study is part of a program of research that is investigating how much water we should consume to affect cognitive performance. [There is also] a whole host of other research questions, such as what cognitive tasks are affected, and how far in advance of performance on these tasks is optimal for improving performance."



'Functional foods:' Creating and marketing food products that prevent disease and obesity

Sunday 21 July 2013 Medical News Today

Creating and promoting foods that contain natural inhibitors of unhealthy angiogenesis - the formation of blood vessels that feed and promote disease, obesity and inflammation - is the "new frontier in dietary health," according to a presentation at the 2013 Institute of Food Technologists (IFT) Annual Meeting & Food Expo® in Chicago.

"Blood vessels are critical to the health of every cell, every organ and for every function in the body," said William W. Li, M.D., president of the Angiogenesis Foundation. "Research is now showing it's possible to promote health and wellness using foods and beverages that influence angiogenesis."

Over 1 billion people throughout the world have an angiogenesis system that is "out of balance," said Dr. Li. These individuals either have, or are at risk for developing, abnormal blood vessel growth and related heart disease, cancer, arthritis, Alzheimer's disease, obesity and other diseases and conditions.

There are many antiangiogenic pharmaceutical products on the market today that are successfully fighting cancer and other diseases. Many foods have the same powerful, naturally-occurring properties including tomatoes, green tea, garlic, broccoli, dark chocolate, turmeric, tuna and olive oil.

"It's quite eye opening," said Dr. Li. "Food is the medicine we consume three times a day. Can we use the same process (to modulate angiogenesis) at an earlier stage in healthy individuals? Can we get away from drugs and medical devices?"

Recent studies have found that combining some of these foods like tomatoes and broccoli, heating some foods to a certain temperature (or not heating others), and/or cooking them in olive oil, may enhance their antiangiogenesis abilities. These findings could impact food design and preparation, said Vincent Li, MD, scientific director at the Angiogenesis Foundation.

"There is a clear global demand for 'functional foods' that provide health benefits beyond what is provided by their nutritive content," said Ravi Menon, Ph.D., senior principal scientist at the Bell Institute for Health & Nutrition at General Mills, Inc. in Minneapolis.

Developing these food products will require extensive tests in food safety and efficacy and comprehensive efforts to educate consumers on their health benefits, said Menon. In addition, "the current regulatory framework struggles to accommodate the expanding repertoire of health benefits in functional foods."

"The best way to conquer society's runaway health problems is to get in front of them by preventing them in the first place," said Dr. Li. "Dietary antiangiogenesis presents an opportunity for improving health at a time that is ripe for innovation."



Food Science & Industry News

Sustainable Intensification May Help Meet Growing Food Demands

July 8, 2013 Food Product Design

OXFORD, United Kingdom—Sustainable intensification, which aims to increase food production from existing farmland, could help meet increasing demands for food from a growing population, according to a new article published in the journal *Science*.

Lead authors Tara Garnett and Charles Godfray from the University of Oxford said sustainable intensification would minimize the pressure on the environment in a world in which land, water and energy are in short supply. They highlighted that the environment is often overexploited and used unsustainably.

The authors, university researchers and policy-makers from non-governmental organizations (NGOs) and the United Nations, outlined a new account of how sustainable intensification should work. Authors recognize this policy has attracted criticism in some quarters by focusing too narrowly on food production or representing a contradiction in terms.

As stated in the article, farmers in many regions of the world need to produce more food, but it is equally urgent that policy makers act on diets, waste and how the food system is governed. The authors emphasize a need to produce more food on existing rather than new farmland because converting uncultivated land would lead to major emissions of greenhouse gases and cause significant losses of biodiversity.

Sustainable intensification is not the only policy introduced that could create a sustainable way of producing enough food globally. Godfray said this policy is "necessary, but not sufficient."

With the global population expected to hit 9 billion by 2050, scientists have developed crop models to forecast food production and have recently reported ways to curb food waste while introducing sustainable farming.

"Achieving a sustainable food system will require changes in agricultural production, changes in diet so people eat less meat and waste less food, and regulatory changes to improve the efficiency and resilience of the food system," Godfray said. "Producing more food is important, but it is only one of a number of policies that we must pursue together."

Increasing productivity does not always mean using more fertilizers and agrochemicals—these technologies frequently carry unacceptable environmental costs, the authors said. A range of techniques, both old and new, should be employed to develop methods of sustainable farming.

The intensification of agriculture will have some implications for other important policy goals, the authors said, such as preserving biodiversity, animal welfare, human nutrition, protecting rural economies and sustainable development. Policy makers will need to find a way to navigate through the conflicting priorities on occasion.

"Improving nutrition is a key part of food security, as food security is about more than just calories," Garnett said. "Around two billion people worldwide are thought to be deficient in micronutrients. We need to intensify the quality of the food we produce in ways that improve the nutritional value of people's diets, preferably through diversifying the range of foods produced and available, but also, in the short term, by improving the nutrient content of commonly produced crops."

Michael Appleby of the World Society for the Protection of Animals said sustainability requires consideration of economic, environmental and social priorities.

"Attention to livestock welfare is both necessary and beneficial for sustainability," he said. "Policies to achieve the right balance between animal and crop production will benefit animals, people and the planet."

Agriculture is a potent sector for economic growth and rural development in many countries across Africa, Asia and South America. Co-author Sonja Vermeulen, from the CGIAR Program on Climate Change, Agriculture and Food Security (CCAFS), said sustainable intensification can provide the best rewards for small-scale farmers and their heritage of natural resources.

"What policy-makers can provide is strategic finance and institutions that support sustainable and equitable pathways, rather than quick profits gained through depletion," Vermeulen said.



Nutritional Story Time Doubles Vegetable Consumption in Children

July 5, 2013 Food Product Design

STANFORD, Calif.—Children, ages 4 to 5, who for three months listened to five stories emphasizing key concepts about food and nutrition during snack time voluntarily consumed more vegetables than students who followed a typical snack time, according to a new study published in the journal *Psychological Science*.

Psychologists Sarah Gripshover and Ellen Markman created five books on digestion, different food groups, characteristics of nutrients, and how nutrients help the body function. Each week one book was read to the group of preschoolers. The study showed that children—even at that age—were capable to understand conceptual approach to nutrition because of the natural curiosity that kids possess.

"We sought to harness this curiosity by creating a framework for guiding children to understand more deeply why they need to eat a variety of healthy foods," the researchers said.

After the books were read and questions were asked about food, nutrition and bodily functions, the researchers found that the children who heard the books had doubled their vegetable intake during snack time. The group of children who did not hear the stories had an unchanged vegetable intake.

In addition, Gripshover and Markman compared the framework to a teaching strategy based on U.S. Department of Agriculture (USDA) materials that emphasize the enjoyment of healthy eating and encouragement of trying new foods. Although both methods increased vegetable consumption, the Stanford study saw more positive results.

"What sets our materials apart from other approaches is the care we took to explain to children why their body needs different kinds of healthy food. We did not train children to eat more vegetables specifically," the researchers said.

More research is needed to find out whether the gains in healthy eating would translate to other mealtimes, including at home, and how long they last.

"There is no magic bullet to encourage healthy eating in young children," the researchers said. "We view our approach as unique but possibly complementary to other strategies. In the future, our concept-based educational materials could be combined with behaviorally focused nutrition interventions with the hope of boosting healthy eating more than either technique alone."

With obesity on a continued incline, and with the recent announcement made by the American Medical Association (AMA) putting obesity in the disease category, organizations, such as the USDA are making changes, especially for schools the younger population across the country.



Minimal Cooking Leads to Maximum Blueberry Benefits

July 3, 2013 Food Product Design

HOUSTON—Blueberries exposed to minimal heating and cooking offer greater health benefits than berries that are baked or cooked in a microwave, according to a new study published in the *Journal of Berry Research*.

Texas researchers measured the levels of beneficial phytochemicals in blueberries after putting them through a variety of cooking methods. They also examined the bioactive potential of wild blueberry extract after cooking using a cell-based culture assay.

"The point of the study was two-fold," said lead researcher Michael Grusak. "Because blueberries are touted as such a health-beneficial food, we wanted to know the nutrient content of blueberries after consumers cook them in a number of ways. But researchers are also beginning to use blueberries in clinical trials, so the information we gained from this study will be important to help researchers design better studies."

Blueberries offer a variety of health benefits, including improved heart health and a decreased risk of colon, breast, oral and prostate cancers.

The study measured phytochemicals in blueberries that are known to have beneficial health impacts: anthocyanin (ANC), proanthocyanidin (PAC) and chlorogenic acid (CA). All of the blueberries used in the study were the quick-frozen type found in the freezer section of grocery markets and commonly used in processed foods.

Phytochemicals in quick-frozen wild blueberries subjected to temperature fluctuations, which are often encountered during distribution and handling for retail sale, were measured. The ANC, PAC and CA levels dropped by about 8%, 43% and 60%, respectively, compared to quick-frozen blueberries stored continuously from harvest at minus 80 degrees Celsius. Baking, boiling and microwaving also reduced the levels of the compounds, with longer cooking times (three to five minutes of microwaving) leading to the biggest declines in the concentrations of these blueberry components.

Researchers also conducted cell-based assays to measure the antioxidant activity of blueberry extracts after various cooking methods. Antioxidants help to fight oxidative stress, a contributor to certain human diseases. Only microwaving for five minutes had a detrimental effect on the antioxidant capacity of the blueberries. Antioxidant activity was not reduced when using shorter microwaving times, baking or boiling.

"What we can say from this study is that cooking and heating, especially longer microwaving, does decrease the amount of beneficial compounds in the berries," Grusak said. "Minimal cooking would be ideal, but there are still measurable levels of health-beneficial components in blueberries, even after a variety of preparations."



Sports Nutrition Market Gaining Strength

July 15, 2013 Food Product Design

ROCKVILLE, Md.— The sports nutritional product market appears healthy, fueled by projected sports beverage sales of \$7.4 billion in 2013, reflecting 6% growth, combined with projected sales of \$2.6 billion for nutrition bars in 2013, reflecting double-digit growth, according to new research from Packaged Facts.

In a summary of its new report, *The Sports Nutritionals Market in the U.S.: Sports Drinks and Nutrition Bars*, the market research company notes that sales had dropped in recent years due to recession-battered consumers pulling back from a wide range of discretionary expenditures.

The company says by 2010, with a recovering economy and PepsiCo's revival of the Gatorade brand, the sports drink category experienced a rebound.

The market is powered by 77 million users of sports drinks and 28 million consumers of nutrition bars. Yet, there are vast demographic and attitudinal differences between those who are high-volume users of sports drinks and those who eat relatively large quantities of nutrition bars. For example, in the last 30 days, 55% of consumers who ate at least one nutrition bar were women. Female consumers of nutrition bars outnumber male counterparts 15.2 million to 12.4 million.

However in contrast, men account for 64% of high-volume users of sports drinks, with younger men most likely to purchase them.

The reports also covers the types of fitness activities these sports nutritional products consumers pursue, noting that individual pursuits rather than team sports are key to success in this retail sports nutrition market.

Nutritional powders, high-protein beverages and energy bars can help build a successful sports nutrition portfolio using the right ingredients and formulating techniques.



FAO: World Cereal Output To Hit Record Level

July 11, 2013 Food Product Design

ROME—World total cereal production is forecast to increase about 7% in 2013 compared to last year, helping to replenish global inventories and raise expectations for more stable markets in 2013/14, according to a new Crop Prospects and Food Situation report from the United Nations' Food and Agricultural Organization (FAO). The increase would bring world cereal production to a new record level of 2,479 million tons.

FAO now puts world wheat output in 2013 at 704 million tons, an increase of 6.8%, which more than recoups the previous year's reduction and represents the highest level in history. World production of coarse grains in 2013 is now forecast by FAO at about 1,275 million tons, up 9.7% from 2012. World rice production in 2013 is forecast to expand by 1.9% to 500 million tons (milled equivalent) although prospects are still very provisional.

Cereal imports of Low-Income Food-Deficit Countries for 2013/14 are estimated to rise by some 5 p%, compared to 2012/13, to meet growing demand. Egypt, Indonesia and Nigeria, in particular, are forecast to import larger volumes.

International prices of wheat declined slightly in June with the onset of the 2013 harvests in the Northern Hemisphere. By contrast, maize prices increased, supported by continued tight supplies. Export prices of rice were generally stable.

Food Insecurity

The new report focuses on developments affecting the food security situation of developing countries. In its review of food insecurity hotspots, the report highlights the following countries:

Syria—2013 wheat production dropped significantly below average due to the escalating civil conflict leading to disruptions in farming activities. Livestock sector has been severely affected. About 4 million people are estimated to be facing severe food insecurity.

Egypt—civil unrest and dwindling foreign exchange reserves raise serious food security concerns.

Central Africa—serious food insecurity conditions prevail due to escalating conflict affecting about 8.4 million people in Central African Republic and Democratic Republic of the Congo.

West Africa—the overall food situation is favorable in most parts of the Sahel following an above-average 2012 cereal harvest. However, a large number of people are still affected by conflict and the lingering effects of the 2011/12 food crisis.

East Africa—although household food security has improved in most countries, serious concerns remain in conflict areas in Somalia, the Sudan and South Sudan, with 1 million, 4.3 million and 1.2 million food insecure people, respectively.

Madagascar—damage caused by locusts and a cyclone is expected to reduce crop production in 2013, causing increased hunger, especially in the southern and western regions of the country.

Democratic People's Republic of Korea—despite improved cereal harvest of the 2012 main season and the near normal outcome of the ongoing harvest of the 2013 early season, chronic food insecurity exists. An estimated 2.8 million vulnerable people require food assistance until the next harvest in October.

Takeaways For Food Companies

Commodity prices are always a top priority for food companies. In fact, commodity prices have been volatile for more than a decade, creating new levels of inflation that have dramatically impacted budgeting and profit margins for food companies. Repercussions from factors that move commodity markets have forced food companies to change how they do business by either raising prices to what the market will bear or changing formulations. Food designers are caught in the middle, struggling to access competitively priced commodities that still meet their needs.



5 ways to use less salt

Sodium chloride (salt) is essential to the body. The sodium in salt helps transmit nerve impulses and contract muscle fibers. Working with potassium, it balances fluid levels in the body. But you only need a tiny amount of salt to do this, less than one-tenth of a teaspoon. The average American gets nearly 20 times that much.

The body can generally rid itself of excess sodium. In some people, though, consuming extra sodium makes the body hold onto water. This increases the amount of fluid flowing through blood vessels, which can increase blood pressure.

Most of the salt that Americans consume comes from prepared and processed foods. The leading culprits include snack foods, sandwich meats, smoked and cured meat, canned juices, canned and dry soups, pizza and other fast foods, and many condiments, relishes, and sauces — for starters. But enough comes from the salt shaker that it's worth finding alternatives. Here are 5 ways to cut back on sodium when cooking or at the table:

- **Use spices and other flavor enhancers.** Add flavor to your favorite dishes with spices, dried and fresh herbs, roots (such as garlic and ginger), citrus, vinegars, and wine. From black pepper, cinnamon, and turmeric to fresh basil, chili peppers, and lemon juice, these flavor enhancers create excitement for the palate — and with less sodium.
- **Go nuts for healthy fats in the kitchen.** Using the right healthy fats — from roasted nuts and avocados to olive, canola, soybean, and other oils — can add a rich flavor to foods, minus the salt.
- **Sear, sauté, and roast.** Searing and sautéing foods in a pan builds flavor. Roasting brings out the natural sweetness of many vegetables and the taste of fish and chicken. If you do steam or microwave food, perk up these dishes with a finishing drizzle of flavorful oil and a squeeze of citrus.
- **Get your whole grains from sources other than bread.** Even whole-grain bread, while a healthier choice than white, can contain considerable sodium. And bread contains salt, not just for flavor but to ensure that the dough rises properly. You can skip that extra salt when you use whole grains outside of baking. Try a Mediterranean-inspired whole-grain salad with chopped vegetables, nuts, and legumes, perhaps a small amount of cheese, herbs and spices, and healthy oils and vinegar or citrus. For breakfast, cook up steel-cut oats, farro, or other intact whole grains with fresh or dried fruit, and you can skip the toast (and the extra sodium).
- **Know your seasons, and, even better, your local farmer.** Shop for raw ingredients with maximum natural flavor, thereby avoiding the need to add as much (if any) sodium. Shop for peak-of-season produce from farmers' markets and your local supermarket.

Harvard Medical School Health Beat July 4, 2013



Regulatory & Safety News

Online Food Ads Targeting Kids Promote Unhealthy Foods

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NEW HAVEN, Conn.—Online advertising targeted at kids may promote unhealthy food choices as most of these food and beverage ads feature products that are high in fat, sugar and/or sodium, according to a recent study published in the journal *Pediatric Obesity*.

The study, conducted at the Rudd Center for Food Policy & Obesity at Yale University, revealed that companies place billions of ads for unhealthy foods and beverages on children's websites despite food company pledges to advertise only healthier foods to children. Researchers examined internet exposure data from syndicated sources for the period between July 2009 and June 2010. The data identified popular kids' websites and the food ads children viewed on these websites. Advertisements were classified according to food category and companies' participation in the food industry's self-regulated program, the Children's Food and Beverage Advertising Initiative (CFBAI) which consists of 16 U.S. companies that pledged to advertise only healthy dietary choices to children. Findings showed that 3.4 billion food advertisements were viewed on popular kids' websites annually. More than half of these ads appeared on only two Viacom sites, Nick.com and NeoPets.com, and children who visited NeoPets.com viewed on average 30 food ads per month. It was also found that CFBAI companies placed 89% of the food advertisements on children's websites.

Further, three-quarters of the advertisements promoted brands that food companies participating in CFBAI identified as healthier dietary choices for advertising targeting children, but the products in 84% of those ads have high levels of fat, sugar and/or sodium. About two-thirds of food ads were for sugary breakfast cereals and fast food and surprisingly, foods that were designated by the CFBAI companies as healthier dietary choices for children-direct advertising were less likely to meet nutrition standards proposed by the government compared to other foods advertised to children. To address limitations of the CFBAI, the U.S. Congress commissioned an Interagency Working Group on Food Marketed to Children (IWG) with representatives from four government agencies to develop more effective guidelines for responsible food marketing to children.

"As previous studies of television advertising to children have shown, our findings demonstrate that CFBAI self-regulatory pledges do not protect children from advertising of nutritionally poor foods on children's websites," said Jennifer Harris, the Rudd Center director of marketing initiatives. Other studies have show that unhealthy food ads targeting children are especially dominate on Spanish-language television. Also, children who spend a significant amount of time watching television and who are exposed to TV advertisements have increases consumption of sweetened beverages.



New FCC standards proposed for pomegranate juice, spirulina, color

The U.S. Pharmacopeial Convention (USP) is proposing new quality standards, or monographs, in its *Food Chemicals Codex (FCC) 9th Edition*, for spirulina, Brilliant Black PN, and a new *FCC Identity Standard* developed for pomegranate juice. The new *FCC Identity Standards* not only provide tests that focus on the confirmation that a product is what it purports to be, but also tests for substances that should not be found in an authentic product, therefore indicating adulteration.

Manufacturers and other parties are encouraged to comment on these proposals, which are posted in the most recent *FCC Forum* (www.usp.org/fcc/fccForum.html)—the free, online vehicle for the public to review and comment on draft *FCC* standards. The proposed standards are available for public review and a 90-day comment period, which ends on September 30, 2013.

"USP's public standards in the *FCC* define the identity, quality, and purity of food ingredients," said V. Srinivasan, USP's Executive Vice President for Global Science and Standards, and Chief Science Officer. "These can be an important resource for manufacturers as they source ingredients from suppliers around the world, offering assurance that they are receiving what they expect. The new *FCC Identity Standards* take food safety one step further, not only describing a food ingredient, but testing for components that could help manufacturers and formulators make sure their ingredients are not adulterated."

Highlights of the *FCC Forum* include:

- **Pomegranate Juice**—Pomegranate juice is obtained from the arils of the pomegranate fruit (*Punicagranatum*), which may be filtered, treated with pectinase enzymes for clarification, and pasteurized. The *FCC Identity Standard* for pomegranate juice gives users a description of the ingredient as well as a series of identification tests and acceptance criteria. Geographical and seasonal variations were taken into consideration in development of the standard, and a series of tests for substances that should not be present in pomegranate juice (e.g., sorbitol and tartaric acid).
- **Spirulina**—Spirulina is the dried biomass of the cyanobacterium *Arthrospiraplatensis*. Rich in protein (up to 60% of its contents), spirulina is considered safe for consumption by humans and animals, and it has been cultivated and used as a food source worldwide. The U.S. Food and Drug Administration (FDA) has not questioned the basis for the Generally Recognized as Safe (GRAS) designation to spirulina under the conditions of its intended use, thus restricting it as a food additive in amounts 0.5–3.0 g per serving. The new USP monograph has a specific test to ensure the absence of microcystins—toxins produced by certain types of cyanobacteria that may lead to severe liver damage.
- **Brilliant Black PN**—This synthetic food color is used in products requiring the color black in their formulations (e.g., jams, chocolate syrup, candies). FDA has not approved this color for use in food in the United States but it has been approved in other countries. Because the *FCC* is a global compendium, it includes monographs for ingredients such as food colors that are used widely and considered safe in other countries. One challenge in testing synthetic colorants is the measurement of impurities and the availability of reference materials for those impurities. USP is developing new reference standards for the impurities proposed in the monograph for Brilliant Black PN to support this need, allowing more accurate testing and ultimately helping provide a better safety profile for this ingredient.

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