

PFNDAI Bulletin April 2009

Editorial

Staying healthy is extremely important in today's context as medical care has become very expensive and is getting even more expensive. Public health care centres/hospitals are going down in standards as there is too much pressure on their resources. Private ones are highly commercially oriented so middle class will find it very difficult to get cure even with such insurance as medi-care etc.

Thus it is imperative that prevention is better than cure, so we must try to stay healthy. One way is choosing better diet such as good quality protein, good fats containing proper amounts of omega-3 and omega-6 fats, better carbohydrates from whole grains, fruits and vegetables and vitamins and minerals from a variety of foods that would also provide phytochemicals essential for health.

Thus a good diet with reduced salt, sugar and fat would contribute to good health but by itself will not ensure staying healthy. There is another aspect that has become extremely important in today's context and that is physical activity.

People especially in cities are increasingly getting less physically active as time and luxury are becoming more important especially in urban surroundings. With small cars becoming more affordable and government apathy towards mass transit, more and more people are going to have their own vehicles either two- or four wheelers and will not only have very little physical activity by way of walking to and from bus or railway stations, climbing stairs etc. but also will be experiencing a lot of pollution and stress of road traffic.

Getting regular exercise is one of the best things one can do for attaining good health besides not smoking. Exercise lowers risk of heart disease, diabetes, stroke, hypertension, osteoporosis, and certain cancers. Plus, it helps control weight, help control stress, and also gives a boost to mood.

The best part of it is it does not need any elaborate training to see good health gains. Half an hour walk at least five days a week is all that is needed by most people and is easily achievable. Besides walking, any amount of exercise is better than none and will give further health benefits.

If one can have 20 minutes of more vigorous activity such as jogging, step aerobics and some sports like badminton, tennis, table tennis etc. three days a week will add benefits enormously. However, the senior citizens should mostly stick to walking briskly and not attempt any more vigorous activity unless under expert supervision and or advice.

Exercise can be made more enjoyable with a friend so each one can also motivate the other along with making the whole exercise a pleasurable event. One can also find time in

a busy day's schedule by walking up a stair rather than taking a lift. Taking short breaks and walks around if one has a desk job. Even part of the lunch time can be utilised to take a short walk or working out if there are gym facilities available.

Combination of healthy diet and physical activity goes a long way in ensuring staying healthy. Some people also go for picnics and treks on holidays and weekends with their families and friends. Combining activity with pleasure will make staying healthy more enjoyable.

Wishing you all a very healthy diet and physical activity,

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FUNCTIONAL FOODS WITH PROTECTIVE BENEFITS

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“The concept that foods can have a third function in addition to a primary role in providing essential nutrients and a secondary need for desirable organoleptic qualities has become well established .This third property or function of food is its role in the prevention of human health”.

Consumers worldwide are becoming increasingly sophisticated in their food choices, & are routinely demanding more from foods than a calorie quota and a balance of protein, carbohydrate and fats .In Particular, educated consumers now demand extra health related benefits from their foods. This increased awareness of the physiological activities of food components, and their role in our well-being has heralded the introduction of a large number of health foods; for the past five years, approximately 10% of all new foods introduced have made reference to health. Examples include cholesterol lowering margarines, hypoallergenic rice, low phosphorus milk and probiotic fermented milk. However, in addition to these new healthier functional foods, there has also been increased interest in the potential health benefits associated with ordinary every day food items. In this short article, a selection of potential protective effects of food is presented, & some of the chemical components in these foods, which have particular health related physiological activities, are described.

In the table below (Table I), foods with protective benefits are listed along side the disease or diseases against which they are effective.

Table I: Foods with protective effects against disease(s).

Disease	Foods
Cancer	Garlic, Rosemary, Fish oils, Brussels sprouts, Tomatoes & Processed tomato products, Soybeans & Processed soy products, Turmeric, Bilberries, Mustard oil, Yoghurt, Citrus fruits, Green tea, Carrot, Spinach.
Hypertension	Milk protein hydrolysates, Cocoa beans, Squid protein hydrolysates, Fermented dairy products, Wine.
Stroke	Garlic, Fruits & Vegetables, Green tea, Lemon peel extracts, Fish
Depression	Fish oils, Carbohydrate based foods.
Hyperlipidaemia	Aubergines, Green tea, Wine, Coriander, <i>Allium</i> species, shiitake mushrooms, Fish oils, Carbohydrate based foods.
Arthritis	Fish oils & other fish products, Shiitake mushrooms, Fermented plant foods, Kombucha(a fermented tea beverage).
Osteoporosis	Soybeans & processed soy products, Dairy products, Xylitol.
Cardiovascular diseases	Milk & other dairy products, Turmeric, Tomatoes & Processed tomato products, Citrus fruits, Red wine, Black tea, Oily fish, Fruits & vegetables.

NB: A few words of caution must be introduced to accompany the above table. Many of the associations between foods & health are either preliminary findings, or have been proven in animal or cell culture studies, but not in humans. Additionally, foods can confer risks as well as benefits, and excessive consumption of given category of foods is not recommended.

Physiological activity of specific food components.

Phytoestrogens.

Isoflavone phytoestrogens, which protect against atherosclerosis & cancer, are found principally in soybeans & processed soy products; the major Isoflavones are Genistein & Diadzein. Examples of Phytoestrogen - containing soy products include soy sauce, tofu, soy milk, soy based textured vegetable protein. Phytoestrogens are thought to act by modulating Oestrogen metabolism, binding to Oestrogen receptors but without stimulating cell division. In this manner, they are acting as anti-Oestrogen, possibly in

similar fashion to the drug tamoxifen. Cardio protective effects of Phytoestrogens have been linked to increased production of low density lipoprotein (LDL) receptors in liver, thereby lowering rates of LDL oxidation. Soybean Isoflavones also have anti-oxidant activities which may contribute to the protective effects of Soy foods by protecting against oxidative damage implicated in many diseased states. Unfortunately, Phytoestrogen may also cause infertility in some animals, & their influence on reproductive hormones in infants has been questioned.

Glucosinolates.

Brussels sprouts and other members of Brassica family (Cabbage, Broccoli, Cauliflower) are thought to act as preventive agents against degenerative diseases such as Cancer & Coronary Heart Disease(CHD).Two important mechanisms by which these vegetables exert their effects as anti carcinogens may be anti oxidant potential and altered biotransformation capacity; these protective mechanism were investigated in humans in short term intervention studies. Results suggested that detoxification enzymes were introduced and a decrease in the rate of oxidative DNA damage occurred upon consumption of Brussels sprouts. These effects were attributed to the presence of Glucosinolates.

FLAVONOIDS

Flavonoids, a group of polyphenolic compounds common in plants, are believed to protect against cancer and cardiovascular diseases. The major types of Flavonoids (Flavonols, Flavones, Flavanones) are found in fruits & vegetables, and Catechins are found in green & black teas .The main dietary source of flavonoids are tea, onions, apple & wine. The protective effect of Flavonoids are thought to be due to inhibition of LDL oxidation although the mechanism of this inhibitory effect is unclear , Flavonoids may be acting as free radical scavengers, metal chelators or protectants which inhibit oxidation of endogenous vitamin E.

Carotenoids.

Atleast epidemiological studies correlate a high intake of beta-carotene rich foods with reduced risk of developing cancer, particularly lung cancer. Other carotenoids have also been shown to reduce cancer risks, including Canthaxanthin, which can induce apoptosis in tumour cells; Astaxanthin in enriched egg yolk, which can have anti-carcinogenic effect; and Lycopene, a major carotenoid in tomatoes & processed tomato products, which is associated with reduced risk of several forms of cancer .Carotenoids have antioxidant activities ; Lycopene & beta carotene also have hypocholesterolaemic activities.

ACE inhibitors.

Angiotensin converting enzymes (ACE; EC 3.4.15.1) is a controlling factor for blood pressure, being involved in vasoconstriction of peripheral blood system. ACE inhibitors are therefore antihypertensives. Their physiological action leads to decrease in blood pressure. ACE inhibitors are mainly peptides, formed during hydrolysis of proteinaceous foods such as milk, fermented whey beverages & other dairy products, squid and some

cereals and legumes. Cocoa beans, polyphenols & tea tannins also have ACE inhibitor effects

Organosulphur compounds.

Organic sulphur compounds are present in Garlic and other *Allium* species such as onions, & leeks. These flavour compounds also have anti-carcinogenic properties. One possible mechanism through which these sulphur compounds act is via induction of detoxifying enzymes such as NAD(P)H: quinone oxidoreductase & Glutathione transferase. In combination with mustard oil, garlic has also been reported to have anticlastogenic effects; this was attributed to the fatty acids in mustard oil, in combination with the organic sulphur compounds in garlic, which together acted as strong radical scavengers. Other physiological activities attributed to *Allium* organosulphur compounds include their ability to lower blood lipid & cholesterol levels, induced anti platelet aggregation & fibrinolytic activities, & act as immunostimulants, enhancing leukocyte, Lymphocyte & macrophage levels & natural killer cell functions.



NEW MEDIA

For Communicating Food Safety

Blogs are an important and growing source of information for the general public and should be used to convey food safety messages and inform consumers.

Communications with consumers must evolve to reach a new generation of food handlers. Producers, processors and retailers are now realizing the necessity of this evolution. There are several toll-free talk-lines that help consumers clear their doubts on various issues, by providing useful instructions and guidelines.

Many web chats and Blogs have been hosted by seasoned home economists (York, 2008). These channels must be used to provide food safety messages to food handlers in such a way that it is utilized and appreciated by them. According to a study, the fastest growing resource of health information for Americans now, is the Internet. Particularly Blogs are growing tremendously in popularity and are becoming useful sources of information. These should be used for the distribution of food safety information.

What is a Blog?

They were first known as Web Logs. They are Internet spaces in which authors comment and give their personal opinion on issues, events and ideas and also allow for interaction and creation of new ideas. Blogs were, in the past, seen as web sites having comment-threads and links to other web sites. Now, they mostly consist of personal comments on non-personal things. They create an emotional connection between the information and the readers making Blogging a very popular and unique experience.

The other reason for their increasing popularity is due to the availability of user-friendly software that enables users to create and maintain their own Blogs. The value of Internet indexing is another factor. The one problem with Blogging is that anyone can post any information without having any credentials, which allows the sharing of unverified claims and information. Nevertheless, Blogs are mostly used to give out evidence-based, analyzed information and to start a conversation with readers.

History and evolution of Blogs

The first Web site that could be considered to be a Blog was created in 1992. Then in 1997 the term Web log was coined. Two years after this, all personal Web sites were called Blogs. www.blogger.com was the first free public Blogging service, launched in 1999. It provided simple Blog creation tools that led to a rapid rise in their usage. Their growing popularity led to Google releasing a search engine in 2004, which was blog specific.

Blogs are now a form of communication for our present “Internet generation” that has grown up using the Internet. Students use it to learn and share information and ideas etc. Some, health Web sites like WebMD have Blogs that have been written by medical professionals on topics of common interest, e.g. pregnancy, asthma etc. Blogs written by non-professionals are mainly on personal experiences.

Such topics of common interest attract consumers due to the “emotional connection” that is formed and felt. It has been said, however that despite the connection, information on Blogs related to health queries should not be used as a substitute for a visit to a qualified healthcare center. In South Korea, bloggers used their opinion sharing against some unverified information, which resulted in the resignation of several members of the president’s cabinet. Small every-day issues can very easily become major political topics, through Blogs. They act as a medium for public debate, which affects both the media and politics.

Food safety Blogs

A lot of people these days rely on the Internet for food safety instructions. Outbreaks of recent food borne illness have also increased the usage of Blogs. Hence producers, retailers, processors and regulators of agricultural commodities must pay more attention to the numerous networking sites, which lets individuals act as their own media outlet. Research done on health and its related behaviours has shown that one usually makes rational decisions about such behaviours, when they have sufficient knowledge of the subject and are aware of the risks associated with it.

In order to encourage safe-food handling and reduce food borne illness, new safety food messages and mediums should be tried and evaluated. Producers, regulators etc. should start acquainting themselves with internet-based media, if they wish to be pro-active. These Blogs, should be made use of to facilitate and improve discussions of food safety issues. An attorney; litigating food borne illness cases, on his web site comments on food

poisoning outbreaks and litigation. He also gives information on newsworthy safety events. By using Blogs, he is trying to be an instrument of change.

An example: barfblog.com

This web site works on getting audiences to change their practices by providing them with reliable, relevant, rapid and repeated food safety messages. Its posts are based on media coverage and personal experiences following the theme of food safety culture, which consists of a set of values. Food safety risks are freely identified and discussed. This Blog went online in 2005. Due to certain software problems and excess spam, it was revised and re-launched in 2007.

Researchers provide users with rapid and brief comments on food safety issues related to current events and public discussions. The Blog and its posts are meant to serve three main purposes: 1. To entertain readers and to encourage repeat visits. 2. To increase awareness of food safety information. 3. To respond to readers effectively by actively analyzing public search strategies and previous comments to posts. Posts with unique and timely information and those that concern celebrities are most frequently viewed.

Employed food handlers generally do not seek information related to food safety nor do many consumers, who prepare food at home. A survey done, revealed that mainly people with average incomes and education levels would look for such information related to food safety.

Therefore messages on food safety must give special consideration to audiences that give little importance to such messages. For this reason, the blog posts useful information on safe food handling along with pop culture images and references to keep readers, both employed food handlers and consumers who handle food; engaged. To increase the reader's interest, celebrity experiences with food related illness and personal references are also shared. Personal experiences are shared to create a personal connection with the audience.

Stories and narratives have proven to be an effective method for sharing information than simple prescriptive messages. A study was conducted that showed that stories and narratives seemed to be more persuasive. Also another study with farmers showed that stories had a better impact on them as compared to consequence-based statistics. They are more effective because story telling and narratives allow the reader to see himself as a part of it and not just an observer.

Barfblog.com works on increasing awareness by posting useful food safety messages with reference to current events, based on scientific evidence from time to time. This approach of barfblog.com has made it a useful source of information. Reporters and columnists also use blogs to gather information on several issues.

Moreover, readers comment to posts on blogs, which allows online discussions and an understanding of the reader's interests. This in turn helps the authors to address their doubts and concerns and give them timely feedback.

Extracted from an article of DA Powell, AL Hubbell, B Chapman & CJ Jacob in Food Technology January 09 by Sonia Khudanpur



Colouring Foods Naturally

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Even before a consumer tastes a food product, the propensity to buy is enhanced by the colour of the product. An attractive colour is associated with quality and freshness. Consumers select food products based on an attractive colour.

Why go Natural?

One of the most significant studies deterring consumers from artificial colourings was the Southampton study published in September 2007, "The Lancet", which found that a concoction of artificial colours led to hyperactivity in children.

As a result of such studies major companies have been searching for natural alternatives to their synthetic colours particularly those involved in producing products aimed at children.

The value of International colouring market was estimated at around US\$1.15bn in 2007 according to Leatherhead Food International (LFI). The most important single colour is caramel with sales worth over US\$112m and other natural colours were worth US\$353m

Natural colours now make up 31% of the colouring market, compared to synthetic with 40% and this percentage ratio will completely change after the hype created as a result of Southampton report. Many international companies are finding solutions for replacing synthetic colours with Natural stable and cost effective counterparts.

Colouring of the food product is required:

- To restore original appearance of food where natural colours have been destroyed by heat processing & subsequent storage
- To ensure uniformity of colour due to natural variations in colour intensity

- To intensify colours naturally occurring in foods to meet consumer expectations
- To give an attractive appearance to foods otherwise that looks unappetizing
- To help preserve identity or character by which foods are recognized & thus aid in product identification
- To serve as visual indication of food quality

These colours are added to foods either in synthetic or Natural form.

Synthetic dyes: Synthetic dyes do not occur in nature and have to be manufactured artificially. These are petroleum products that can be made with a high degree of purity, intense colour concentrate and consistent quality. These colours exhibit good tolerance towards heat, light and chemical influences.

Colouring Foodstuff/ Natural colours:

If foods need to be coloured there are options available like using colours derived from colouring foodstuffs or by adding Natural colours that are allowed to be used in foods as per the legislation for the product in question and in appropriate quantities. It depends on the properties of the food, their stability towards heat, light, pH, packaging and storage conditions, interactions with the ingredients used for manufacturing. All these are very critical parameters to be considered when a Natural colour/ colouring foodstuff is added to the food and at all events preliminary experiments and stability tests should be carried out to stabilize the natural colour.

Some of the Natural Colours/ Colouring Foodstuff mostly used for food applications are enlisted:

Turmeric: It is a bright yellow colourant made from the roots of *Curcuma Longa*. The pigment responsible for the colour are known as curcuminoids, curcumin and related compounds. Turmeric solubility depends on the medium in which the pigment is dispersed. It can be available in water soluble or oil soluble/dispersible forms. It can be used to all food products to achieve a bright fluorescent yellow shade under good manufacturing practices. It dose exhibits excellent heat stability but shows poor light stability and cannot be used in food products that are directly exposed to sunlight, Turmeric also has been associated with claims as antioxidant, anticancer and antimutagenic properties through scientific studies.

Annatto: Annatto is another yellow colourant obtained from the seeds of *Bixa Orellana*. Pigments responsible for the yellow/orange colourant are the carotenoids bixin and norbixin. These are available in water, oil soluble and dispersible forms. Annatto dose not exhibit a very good stability towards heat and light and these have to be considered when used in food product.

Beta Carotene: Beta Carotene is a precursor to Vitamin A in addition to imparting an orange yellow colour to food products. Beta carotenes are available as Naturals extracted

from palm and vegetable sources or are derived from algae, fungus or synthesized. Beta Carotene is oil soluble but can be processed into water dispersible and emulsified forms. They exhibit fairly good heat and light stability and can be used over a wide range of pH conditions when used under GMP conditions. Beta Carotenoids have been associated with antioxidant properties and is also critical to optimal immune system support.

Paprika is extracted from the pod of *Capsicum annum* or paprika. It contains three main naturally occurring pigments, capsanthin, capsorubin and beta carotene. These combinations deliver a bright orange to red orange colour to food products. These oleoresins are oil soluble but can be emulsified to produce a water soluble/dispersible form. Paprika exhibit fairly good heat and light stability and can be used over a wide range of pH conditions when used under GMP conditions.

Lutein: Lutein is extracted from tagetes flowers (marigold). It exhibits fairly good heat, light and pH stability in foods delivering yellowish shade. Recent studies have demonstrated that the intake of carotenoid rich vegetables is inversely related to the risk of certain diseases like advanced age related macular degeneration. Lutein and Zeaxanthin are accumulated in the retina and may help to retard destructive processes in the retinal pigment epithelium.

Riboflavin is yellow or yellow-orange in color and in addition to being used as a food colouring it is also used to fortify some foods. It is used in baby foods, breakfast cereals, fruit drinks, vitamin-enriched milk products, some energy drinks. It exhibits good heat stability however degrades rapidly when exposed to light.

Beetroot juice is prepared by pressing beets & subsequent concentration process. Main ingredients, apart from sugar, minerals & protein, are pigments betanin & vulgaxanthin that exhibit colour to food products. It shows good pH stability however cannot be used in food products where higher processing temperatures are used as the pigment degrades rapidly

Red Cabbage, Grape extract, Black carrot and elderberry concentrates as a source of red colourant. They exhibit bright red to purple red colour hues at pH level of 3.8. A higher pH causes the anthocyanin based pigment to turn to unstable purplish blue colour. Anthocyanin exhibits fairly good light and heat stability, however they cannot be used in products containing Vitamin C as the pigment degrades rapidly. Anthocyanins act as antioxidants and may help prevent coronary heart disease and strokes. Studies show they may have anti-inflammatory properties and have antiviral and anti microbial activity as well.

Caramel: Complex mixtures of compounds, some of which are in the form of colloidal aggregates, manufactured by heating carbohydrates either alone or in the presence of food-grade acids, alkalis or salts; classified according to the reactants used in their manufacture as follows:

Class I: Prepared by heating carbohydrates with or without acids or alkalis; no ammonium or sulfite compounds are used.

Class II: Prepared by heating carbohydrates with or without acids or alkalis in the presence of sulfite compounds; no ammonium compounds are used.

Class III: Prepared by heating carbohydrates with or without acids or alkalis in the presence of ammonium compounds; no sulfite compounds are used.

Class IV: Prepared by heating carbohydrates with or without acids or alkalis in the presence of both sulfite and ammonium compounds.

Caramel colours are water-soluble and produce colour ranging from golden brown to nearly black.

Trends in colours around the globe: Natural colours will remain at the forefront with use of more concentrated colouring solutions directly extracted from fruits and vegetables and their different blends delivering a vast range of colour shades matching with their synthetic counterparts, with added nutritional benefits. These are specifically formulated to suit particular applications.

Apart from these are some of the interesting concepts that are possible with use of colours.

- Colours to increase the visual excitement through addition of sparkling effects (these are colours coated on edible gum based films. This is an easy way to create a new look to “old favourites” with simple line extensions.
- Food grade inks to print on food products like potato chips, bakery products that are applied to the food by direct contact methods.
- Colour Changing effect that can be achieved by using a lake and dye colourant in a dry mix with colour changing effect being triggered by water addition to the dry mix, addition of dry powder to a wet product, or during consumption to colour the mouth.
- luster effects due to reflection, interference and refraction creating shimmering effect to products such as Cereals, Confections and Frostings, Hard and soft candies (including lozenges), Nutritional supplement tablets and gelatin capsules and Chewing gum.

These concepts are possible with use of colours, however Country specific legislation needs to be taken into account prior to its usage.

Future Scope for Colours

As the negative press about side effects with artificial colours continues worldwide, natural colours are taking the centrestage. Also shift towards healthy lifestyle drives consumer markets, the demand for natural colours and colouring foodstuffs is going to gain importance significantly.



PROTEIN BLENDS RAISE THE BAR

As dairy producers develop new expertise in protein processing, ingredients are changing for the better. Milk and whey concentrates, not traditionally favoured for bar applications, are now stepping up with both improved functionality as well as flavour advantages.

Consumers these days are fully aware of the important role that protein plays in their daily intake of food. They use it for various reasons like weight management, for building lean muscle, sports performance and recovery. The source of the protein determines its nutritional quality, with dairy protein, especially whey, that tops the list in terms of Bioavailability. Protein digestibility corrected amino-acid score (PDCAAS) and protein efficiency ratio (PER) is all common measures for protein quality.

An increasing number of protein-fortified products are being produced by bar manufacturers. These also include some that traditionally contain low levels of protein, e.g. Granola bars. Even high protein products such as nutrition and sports bars are being introduced with much higher levels of protein or in new, appealing formats.

Proteins, along with their benefits also have certain limitations that need to be taken into consideration and managed carefully. Some of the problems include unpleasant flavours, changes during shelf life and bar hardening. There are many protein-enhanced products that are bought by niche customers who are okay with giving up their enjoyment to receive the nutritional advantages. But, to fulfill the needs of the mainstream consumers it is necessary that the products be good for health as well as good to taste.

There are many protein-fortification ingredients that can be used, which makes it difficult to decide which one to choose. All ingredients have a different composition, as a result of which their functionality differs.

Bar formulators usually use protein blends to cope with the problems arising from individual elements. Trade-offs are made in order to obtain the best compromise in terms of processability, shelf life, flavour, colour and formulation cost. As the level of protein increases, trade-offs become more difficult. Dairy products are often blended with vegetable proteins like soy, to enjoy cost benefits. However, not much can be done about the flavour with vegetable proteins. Some of the other blend components used are Calcium caseinate, whey protein hydrolysate and soy protein isolate.

With dairy producers developing new ways of processing protein, ingredients are getting better. Products such as milk-protein concentrates (MPC), whey-protein concentrates (WPC), which were not favoured previously in bar manufacturing, can now be altered to work well in bar formulations and also to improve the flavour.

Recently Fonterra introduced three new functionalised ingredients, which were designed specially for bars. Studies done at the Fonterra research center showed that PowerProtein 4857 (MPC 48457) and PowerProtein 515 (WPC 515) have similar functional

performance to calcium caseinate and whey-protein hydrolysate, respectively. They have also been showed to have a cleaner flavour and reduced rates of bar hardening as compared to formerly used ingredients. Analysis of their texture showed that the rate of hardening of 30% protein per gram is much lower for these functionalised ingredients.

It should be noted that all milk-protein concentrates and whey-protein concentrates are not same in their functional performance. They can be altered to produce different results in the end product.

Whey ingredients can sometimes be difficult to process and consume, as they are highly sticky and cohesive. They usually cause problems in shelf life of the product due to hardening of the bar. The new WPC developed by Fonterra permits high levels of whey incorporation because the dough made with WPC is less cohesive and sticky as compared to dough made with a typical whey-protein concentrate.

WPC is quite similar to whey-protein hydrolysate (WPH) in its bar-softening and shelf life improving properties. However, WPC has a very clean flavour, unlike WPH and is also cost-effective.

The effect of every ingredient, on the texture of the final protein blend is different. A mixture study was carried out to find out the effect of each PowerProtein on the bar texture. This study showed that PowerProtein 4857 gives a shorter texture with a shorter bite, whereas PowerProtein 515 has a soft texture but has greater cohesiveness (not excessive).

PowerProtein 4861 (MPC 4861) is used to build texture in bar formulations like in energy bars with high carbohydrate content.

A variety of textures can be obtained, when these ingredients are blended together, having better taste and improved shelf life. This will allow formulators to make protein-containing bars that appeal to a larger audience. These new ingredients have replaced the traditionally used ingredients, as they don't have any limitations.

Now consumers who are conscious of their health can enjoy indulgent food without affecting their health.

**Extracted from an article by Rachel Marshall from Functional Ingredients
February 09 by Sonia Khudanpur**



Regulatory News

Claims regime threatens functional sector

Companies must improve EFSA dossiers, expert warns

The European Commission risks putting legions of small- and medium-sized companies out of business if it doesn't relax its hard-line stance on health claims, a leading expert has warned.

The European Food Safety Authority (EFSA) is in the process of evaluating the scientific evidence for thousands of claims under the Nutrition & Health Claims Regulation, which will make it illegal to make a claim for a product unless it has been authorised.

But Nigel Baldwin, senior scientific and regulatory consultant at Cantox Health Sciences International, believes such a black-and-white approach — coupled with the credit crunch — will make life hard for those marketing functional products for which the evidence is promising but not conclusive.

"There are many small- and medium-sized enterprises out there that have some pretty good evidence to back their claims, but the evidence is only sufficient to say 'may' or 'might'," he said. "As things are, however, this isn't enough, because the EFSA's brief from the European Commission is simply to look at each dossier to see if there is a cause-and-effect relationship, not to state whether there may be a relationship. The problem is that in order to get the money to do more studies, companies need to borrow money. But where is that money going to come from?"

The nature and scale of the problem is illustrated by the fact that the EFSA has issued negative opinions on about 80 per cent of the applications it has evaluated so far, he said, and this could have far-reaching consequences for the health food industry.

"There has to be a discussion at some point on the levels of evidence required because if there isn't, the realistic outcome is that a high percentage of the industry will fail in the next year."

Baldwin doesn't blame the EFSA. "They have been asked by the commission to say yes or no, and if they can't say yes, they have to say no," he said. Instead, he believes the commission must relax its attitude to claims by allowing them to be made with caveats where the evidence is good but not yet 100 per cent conclusive.

"You don't want to mislead consumers, but there has to be some sort of halfway house. ... The industry has to put pressure on the politicians to say, we need something with a bit more flexibility, otherwise we are going to kill R&D and all the SMEs. If that happens, then all the research in universities, and all the other positive things about the health-food industry will just die."

Despite this pessimistic view of the claims regime, Baldwin said companies should not be deterred from submitting applications. But he warns that they must do so correctly to increase their chances of success. Many, however, are making fundamental mistakes in their dossiers, he said.

"If you look at every negative opinion that has come out of the EFSA you can see why they have issued that negative opinion. There is quite a lot of basic stuff: the studies involve the wrong kind of subjects; the studies are poorly designed; many of the studies submitted actually don't show a positive effect — they are either neutral or negative.

"Some companies are not being tough enough on themselves beforehand. You really do have to do it very objectively and look at the totality of the evidence. Be hard on yourself, rather than taking the list of studies your marketing people have always talked about in seminars and dress them up nicely."

Toronto-based Cantox which has offices worldwide, has analysed all unsuccessful health-claims applications so far and will present its findings at a seminar in March. "We'll help companies understand what they need to do to make submissions that can at least be reviewed with a view to success," Baldwin said.

European Health Claim Submissions: Mistakes Made and Lessons Learned takes place on 24 March in Geneva, Switzerland.

From: Functional Ingredients March 2009

Many Consumers Ignore Food Product Recalls According To Rutgers Study

Rutgers' Food Policy Institute (FPI) has released a study showing that many Americans fail to check their homes for recalled food products. Only about 60 percent of the studied sample reported ever having looked for recalled food in their homes, and only 10 percent said they had ever found a recalled food product. The study was based on a survey of 1,101 Americans interviewed by telephone from Aug. 4 to Sept. 24, 2008. The study can be downloaded at <http://www.foodpolicy.rutgers.edu>.

Most respondents said they pay a great deal of attention to food recalls and, when they learn about them, tell many other people. But 40 percent of these consumers think that the foods they purchase are less likely to be recalled than those purchased by others, appearing to believe that food recalls just don't apply to them.

Despite widespread awareness of recent foodborne illness outbreaks and a sense that the number of food recalls is increasing, about half of Americans say that food recalls have had no impact on their lives, said psychologist William K. Hallman, a professor of human ecology at Rutgers, The State University of New Jersey, School of Environmental and Biological Sciences. "Getting consumers to pay attention to news about recalls isn't the hard part," he said. "It's getting them to take the step of actually looking for recalled food products in their homes." Hallman is also the director of FPI and lead author of the study report.

The Rutgers researchers also offered suggestions about how to improve communications about food recalls. Nearly 75 percent of those surveyed said they would like to receive personalized information about recalls on their receipt at the grocery store, and more than 60 percent said they also would also like to receive such information through a letter or an e-mail.

Hallman said that personalizing communications about food recalls may be the way to overcome the sense that the messages are meant for someone else. Providing consumers with recall information about specific products they have purchased makes it harder for them to ignore the

advice to look for the recalled items.

But even when people find recalled food, not all do what they are told. Approximately 12 percent reported eating a food they thought had been recalled. At the other extreme, some consumers take a "better safe than sorry" attitude. More than 25 percent reported that they had simply discarded food products after hearing about a recall, potentially wasting safe, nutritious food. Many consumers also avoid purchasing products not included in the recall but which are similar, or are from the same manufacturer.

"Our research also points out that instructions to consumers must be clear and comprehensible if you want them to act appropriately after a food recall," Hallman said. He cites the Food and Drug Administration's recent advice to consumers not to eat pistachios, but to hold onto them and not throw them away as confusing to consumers.

"We found that clear, direct messages such as 'throw the food in the garbage' or 'return the food to the store for a refund,' should motivate action. Keeping people in a holding pattern is more likely to result in inaction, and it certainly increases the likelihood that someone might eat the food by accident."

From: Medical News Today 16 Apr 2009



Food & Nutrition News

ADA Releases Position Paper on Obesity, Reproduction and Pregnancy Outcomes

Diet and nutrition counseling for virtually all overweight and obese women of childbearing age can reduce health risks associated with excess weight for mothers and children alike, according to a newly released position paper from the American Dietetic Association and the American Society of Nutrition.

The position, published in the May issue of the *Journal of the American Dietetic Association*, represents the associations' official stance on obesity, reproduction and pregnancy outcomes:

Given the detrimental influence of maternal overweight and obesity on reproductive and pregnancy outcomes for the mother and child, it is the position of the American Dietetic Association and the American Society for Nutrition that all overweight and obese women of reproductive age should receive counseling prior to pregnancy, during pregnancy and in the interconceptional period on the roles of diet and physical activity in reproductive health, in order to ameliorate these adverse outcomes.

The joint ADA/ASN position and accompanying paper were written by Anna Maria Siega-Riz, PhD, RD, LDN, assistant professor of maternal and child health at the University of North Carolina; and Janet C. King, PhD, senior scientist at Children's Hospital and Research Center, Oakland, Calif.

An estimated 33 percent of U.S. women are obese, according to the authors, who write that a long-term goal of health professionals must be to reduce the number of women

who become pregnant while obese. They add that the effect of a woman's nutritional status prior to pregnancy is an issue of great public health importance.

"Among obese women, who already have aberrations in glucose and lipid metabolism, the further adjustments induced by hormonal changes in pregnancy create a metabolic milieu that enhances the risk for metabolic disorders such as gestational diabetes mellitus and preeclampsia," according to the position paper.

Infants born to obese mothers have "a higher prevalence of congenital anomalies than do offspring of normal-weight women, suggesting that maternal (obesity) alters development in the sensitive embryonic period." The authors note neural tube defects such as spina bifida and anencephaly are about twice as common among children of obese women. "Other birth defects more frequent in offspring of obese women include oral clefts, heart anomalies, hydrocephaly and abdominal wall abnormalities."

Objectives of the new ADA/ASN position are to provide guidance to nutrition professionals in becoming aware of risks and possible complications of excess weight and obesity for fertility, course of pregnancy, birth outcomes and short and long-term maternal and child health; and to commit ADA and ASN to identifying gaps in scientific research needed to improve knowledge of risks and complications and develop effective strategies "that can be implemented before and during pregnancy as well as during the interconceptional period," the authors write.

From: [Science Daily \(Apr. 28, 2009\)](#)

ADA Supports Functional Foods' Health Claims Based on Strong Science, Says Updated Position Statement

The American Dietetic Association has released an updated position on functional foods that says fortified, enriched or enhanced foods can benefit a person's health when consumed as part of a varied diet, encourages further research and urges continued efforts to educate the public on such foods. ADA's position, published in the April issue of the *Journal of the American Dietetic Association*, represents the Association's official stance on functional foods:

"All foods are functional at some physiological level, but it is the position of the American Dietetic Association that functional foods that include whole foods and fortified, enriched or enhanced foods have a potentially beneficial effect on health when consumed as part of a varied diet on a regular basis, at effective levels. ADA supports research to further define the health benefits and risks of individual functional foods and their physiologically active components. Health claims on food products, including functional foods, should be based on the significant scientific agreement standard of evidence and ADA supports label claims based on such strong scientific substantiation. Food and nutrition professionals will continue to work with the food industry, allied health professionals, the government, the scientific community and the media to ensure that the public has accurate information regarding functional foods and thus should continue to educate themselves on this emerging area of food and nutrition science."

ADA's position statement and accompanying paper were written by Clare M. Hasler, PhD, MBA, executive director of the Robert Mondavi Institute for Wine and Food

Science at the University of California – Davis; and Amy C. Brown, PhD, RD, Department of Complementary and Alternative Medicine at the University of Hawaii's John A. Burns School of Medicine.

The paper includes definitions of the term as used in different countries and notes "functional foods" is not a legal term but a marketing term. The American Dietetic Association defines functional foods as those that "move beyond necessity to provide additional health benefits that may reduce disease risk and/or promote optimal health. Functional foods include conventional foods, modified foods (fortified, enriched or enhanced), medical foods and foods for special dietary uses."

Examples of conventional food with functional properties include broccoli, nuts and tomatoes. Modified foods include calcium-enhanced orange juice, folate-enriched breads and foods formulated with bioactive ingredients like fish oils, plant sterol esters or lutein. Medical foods include PKU formulas free of phenylalanine. Foods for special dietary uses include gluten-free and lactose-free foods.

ADA's position paper reviews aspects of functional foods including:

Factors driving the growth of the functional foods industry, such as increased consumer interest in controlling one's own health; rising health-care costs; and scientific research linking diet to chronic disease reduction.

Regulation of functional foods in the United States, noting that "boundaries between what is a food and what is a medicine have been challenged by both consumers and manufacturers since the mid-1980s," leading to "dramatic changes in food regulation that have fueled a so-called functional foods revolution."

Emphasizing that health claims on the benefits of functional foods and their physiologically active components should be based on the standard of significant scientific agreement.

"Take-home messages" for food and nutrition professionals, such as staying informed on this growing field of food and nutrition; educating clients and patients on appropriate intake of functional foods in the context of a healthful diet; working with corporations to develop functional foods that maximize health benefits; conducting research that expands the knowledge base on functional foods; and working with government regulators "to safeguard the public by protecting the definition, use and regulation of functional foods."

ADA's position paper on functional foods concludes: "The study of how diet impacts disease prevention and health promotion is more important than ever. Consumer interest in the health benefits of foods and food components is at an all-time high and will continue to grow. Food and nutrition professionals are uniquely qualified to interpret scientific findings on functional foods and translate such findings into practical dietary applications for consumers, other health professionals, policy makers and the media.

Food and nutrition professionals must continue to be leaders in this exciting and ever-evolving area of food and nutrition."

From: Soytech E-News April 1, 2009

Crisps add newness to bar texture

Characteristics of dairy protein ingredients used in bars				
Ingredient characteristics	Calcium caseinate (Ca Cas)	Milk-protein concentrate (MPC) / isolate (MPI)	Whey-protein concentrate (WPC) / isolate (WPI)	Whey-protein hydrolysate (WPH)
Protein	>90%	>80%/>90%	80%/>90%	>90%
Casein:whey ratio	100:0	80:20	0:100	0:100
Flavour	Musty	Clean; milky	Clean	Bitter; musty
Rate of bar hardening	Medium	Medium	High	Low
Firmness of bar	Medium	Medium to hard	Medium to hard	Medium
Cohesiveness of bar	Low	Very low	High	Medium to high

As the key source of protein, many protein bars contain powders such as calcium caseinate, whey-protein hydrolysate, whey-protein isolate or soy-protein isolate. This can be limiting in terms of texture, and can lack variety for consumers. When a unique texture is in order, addition of dairy-protein crisps can bring a welcome point of difference. Dairy-protein crisps are available with a range of protein levels, with a clean milky flavour and a light, crisp crunch.

They can be used as a component of a dough layer for a hint of crunch, or as the bulk of a bar to make more of a texture statement. In addition to the texture and nutrition they contribute, they can be used to reduce bar hardening by weakening the dough structure.

Crisps are an excellent format for children, who are often looking for variety, fun and may find a dough-style bar difficult to chew. They work well with inclusion of other ingredients such as granola or fruit pieces. Their mild, clean flavour means that they do

not interfere with other flavour components as some crunchy alternatives do. Dairy protein crisps can be a convenient means of incorporating dairy into formulations that do not usually include dairy, but would benefit from the goodness of milk.

From: Report by Rachel Marshall in *Functional Ingredients* February 2009

Chemistry of Cooking

a Biochemist Explains the Chemistry of Cooking

A biochemist and cook explains that cooking is all about chemistry and knowing some facts can help chefs understand why recipes go wrong. Because cooking is essentially a series of chemical reactions, it is helpful to know some basics. For example, plunging asparagus into boiling water causes the cells to pop and result in a brighter green. Longer cooking, however, causes the plant's cell walls to shrink and releases an acid. This turns the asparagus an unappetizing shade of grey.

You love to cook, but have you whipped up some disasters? Even the best recipes can sometimes go terribly wrong. A nationally recognized scientist and chef says knowing a little chemistry could help.

Long before she was a cook, Shirley Corriher was a biochemist. She says science is the key to understanding what goes right and wrong in the kitchen. "Cooking is chemistry," said Corriher. "It's essentially chemical reactions."

This kind of chemistry happens when you put chopped red cabbage into a hot pan. Heat breaks down the red anthocyanine pigment, changing it from an acid to alkaline and causing the color change. Add some vinegar to increase the acidity, and the cabbage is red again. Baking soda will change it back to blue.

Cooking vegetables like asparagus causes a different kind of reaction when tiny air cells on the surface hit boiling water. "If we plunge them into boiling water, we pop these cells, and they suddenly become much brighter green," Corriher said. Longer cooking is not so good. It causes the plant's cell walls to shrink and release acid.

"So as it starts gushing out of the cells, and with acid in the water, it turns cooked green vegetables into [a] yucky army drab." And that pretty fruit bowl on your counter? "Literally, overnight you can go from [a] nice green banana to an overripe banana," Corriher said. The culprit here is ethylene gas. Given off by apples and even the bananas themselves, it can ruin your perfect fruit bowl -- but put an apple in a paper bag with an unripe avocado, and ethylene gas will work for you overnight.

"We use this as a quick way to ripen," Corriher said. Corriher says understanding a little chemistry can help any cook. "You may still mess up, but you know why," she said. When it works, this kind of chemistry can be downright delicious.

WHAT ARE ACIDS AND BASES? An acid is defined as a solution with more positive hydrogen ions than negative hydroxyl ions, which are made of one atom of oxygen and one of hydrogen. Acidity and basicity are measured on a scale called the pH scale. The value of freshly distilled water is seven, which indicates a neutral solution. A value of less than seven indicates an acid, and a value of more than seven indicates a base.

Common acids include lemon juice and coffee, while common bases include ammonia and bleach.

WHY DOES FOOD SPOIL? Processing and improper storage practices can expose food items to heat or oxygen, which causes deterioration. In ancient times, salt was used to cure meats and fish to preserve them longer, while sugar was added to fruits to prevent spoilage. Certain herbs, spices and vinegar can also be used as preservatives, along with anti-oxidants, most notably Vitamins C and E. In processed foods, certain FDA-approved chemical additives also help extend shelf life.

From: Science Daily January 1, 2009

Energy drinks work -- in mysterious ways!

Runners clutching bottles of energy drink are a common sight, and it has long been known that sugary drinks and sweets can significantly improve athletes' performance in endurance events. The question is how?

Clearly, 'sports' drinks and tablets contain calories. But this alone is not enough to explain the boost, and the benefits are felt even if the drink is spat out rather than swallowed. Nor does the sugary taste solve the riddle, as artificial sweeteners do not boost performance even when they are indistinguishable from real sugars.

Writing in the latest issue of *The Journal of Physiology*, Ed Chambers and colleagues not only show that sugary drinks can significantly boost performance in an endurance event without being ingested, but so can a tasteless carbohydrate – and they do so in unexpected ways.

The researchers prepared drinks that contained either glucose (a sugar), maltodextrin (a tasteless carbohydrate) or neither, then carefully laced them with artificial sweeteners until they tasted identical. They asked endurance-trained athletes to complete a challenging time-trial, during which they rinsed their mouths with one of the three concoctions.

The results were striking. Athletes given the glucose or maltodextrin drinks outperformed those on 'disguised' water by 2 - 3% and sustained a higher average power output and pulse rate, even though didn't feel they were working any harder. The authors conclude that as-yet unidentified receptors in the mouth independent from the usual 'sweet' taste buds must be responsible. "Much of the benefit from carbohydrate in sports drinks is provided by signalling directly from mouth to brain rather than providing energy for the working muscles," explained Dr Chambers.

The team then used a neuro-imaging technique known as fMRI to monitor the athletes' brain activity shortly after giving them one of the three compounds. They found that both glucose and maltodextrin triggered specific areas of the brain associated with reward or pleasure, while the artificial sweetener did not. This acts to reduce the athletes' perception of their workload, suggest the authors, and hence enables them to sustain a higher average output.

Their findings support the emerging 'central governor hypothesis' – the theory that it is not the muscles, heart or lungs that ultimately limit performance, but the brain itself, based on the information it receives from the body. Stimulating the brain in certain ways

– such as swilling sugary drinks – can boost output, perhaps giving athletes that all-important edge over their rivals.

From: Eurekaalert 14 Apr 09

Maryland may follow California on Menu Labelling Laws

Maryland could be the next place to weigh in with restaurant food labeling laws. Hearings are scheduled in Annapolis today.

(California is one of the places that already has menu labeling laws. Gov. Arnold Schwarzenegger talked about the law last fall, with, from left, California Medical Assn. President Dr. Richard Frankenstein; Department of Public Health Chief Deputy Director Dr. Bonnie Sorensen; Sen. Alex Padilla (D-Pacoima); and Assemblyman Mark DeSaulnier (D-Concord).)

One bill introduced in the Maryland General Assembly would require calorie counts on the menu boards at fast food spots. Would people think twice before ordering if they had that information?

That bill, **HB601**, was sponsored by state Sen. David Harrington and Delegate Doyle Niemann. It also calls for expanded nutrition information on printed menus for chains with at least 15 outlets.

The second bill, **HB 567**, introduced by Delegate James Hubbard, would require restaurants to phase out partially hydrogenated oil — a source of artery-clogging artificial trans fat — by October 2010. Most national chains have already cut trans fat or are in the process of doing so.

The Restaurant Assn. of Maryland said it would support the trans fat law if it also included packaged goods. "The restaurant industry strongly supports phasing out the use of artificial trans fats. ... Our goal is to be virtually trans fat-free by the time this legislation takes effect in October 2010."

The association strongly opposes Bill 601, in part, the organization's Melvin Thompson said, because "it contributes to a growing patchwork of different menu labeling regulations that prove to be challenging for businesses operating in multiple states." Thompson said the association supports a national plan to require chain restaurants to provide nutrition information in one of several formats.

"Customers need calorie information at the point-of-ordering to make informed decisions," said Michelle Forman, government affairs manager at the nonprofit advocacy group Center for Science in the Public Interest. "How else would one know that a plain bagel — without cream cheese — at Dunkin' Donuts has 120 more calories than a jelly-filled donut? Or that a large chocolate shake at McDonald's has more calories than three hamburgers?"

From: Los Angeles Times March 11, 2009

High Fiber Products Getting a Boost from Major Food Companies

Food makers are pumping up the fiber contents of their packaged foods in attempt to appeal to health conscious shoppers and help combat obesity, according to Datamonitor.

In the U.S., the percentage of new food products claiming to be “high in fiber” hit 6% in 2008, up from 5% in 2006 per Datamonitor’s Product Launch Analytics. Companies jumping on the high fiber bandwagon include multinationals like PepsiCo, Kraft, Campbell Soup, Kellogg and Dannon.

Kellogg’s Pop-Tarts brand is on-trend with its new Toaster Pastries—featuring 20% Daily Value (DV) of fiber—recently launching in the U.S. Available in Brown Sugar Cinnamon and Frosted Chocolate Fudge flavors, the pastries contain 16 grams of whole grains per serving. The company’s new Kellogg’s Fiber Plus Antioxidants Chewy Bars also join the trend by promising to deliver 35% of the DV for fiber.

Along similar lines, Quaker Fiber & Omega-3 Chewy Oat Granola Bars recently debuted from PepsiCo’s Quaker Oats unit. Sold in flavors like Dark Chocolate Chunk and Peanut Butter Chocolate, these bars are said to be an “excellent source” of fiber along with omega 3 derived from flax. In February, Kraft added Fiber Fit Cookies and Fiber Fit Granola bars to its South Beach Living line in the USA.

Bread, chips and yogurt are other food categories getting a helping hand from fiber. Campbell Soup’s Pepperidge Farm unit has launched Pepperidge Farm Light Style Wheat Bread in an Extra Fiber version. Claimed to contain 16% more of the DV of fiber than the leading premium white breads, the product is made with whole grains. Snyder’s of Hanover’s new MultiGrain All Natural Tortilla Chips include whole grains and tout a higher fiber content than regular tortilla chips. As for yogurt, Dannon recently added a With Fiber extension to its Activia Lowfat Yogurt.

Fiber can play a key role in satiety, and while many of the new high fiber products do not make any overt weight loss or weight control claims, it may only be a matter of time before they do, according to Datamonitor.

Kraft Foods recently added On The Go Hunger Satisfaction Drink Mix to its Crystal Light brand. The powdered drink mix contains 5 grams of fiber and 3 grams of protein per serving to help satisfy hunger. Also going the more overt route is Tree Top Trim Enlightened Fruit Beverage from Tree Top, Inc. This product is said to help promote a healthy metabolism and curb appetite with ingredients like L-carnitine and chromium.

In the Netherlands, Campina International recently unveiled its Campina Optimel Control Drink that is specially formulated to help consumers eat less without dieting. The fruit-flavored drink is formulated with natural plant extracts said to activate satiety, causing consumers to eat less between and during meals. Nestle is going in a similar direction

with its Nestle Sveltesse Saciante Yogurt Drink that is sold in Portugal and Spain. Sveltesse Saciante was created to give consumers a feeling of satiety and comes in a Strawberry, Apple and Cereals flavor.

From: Nutraceuticals World 2009-02-26

Partnership to study childhood malnutrition worldwide

The Foundation for the National Institutes of Health (FNIH), together with the Fogarty International Center (FIC), announced the launch of a five-year study (MAL-ED) to investigate the links between malnutrition and intestinal infections and their effects on children in the developing world, funded by a grant of nearly \$30 million from the Bill & Melinda Gates Foundation. FNIH and FIC will be coordinating the nearly \$30 million research effort for the next five years. This project will establish a network of sites in the developing world for researchers, using a shared and harmonized protocol, to identify the risk factors for malnutrition, intestinal diseases, and associated health consequences, including developmental impairment, in children. The geographically diverse sites, located in Asia, Africa, and South America, will enable the investigators to make comparisons across sites and to characterize the environmental and genetic factors responsible for observed differences and similarities. Lastly, the outcomes from this partnership will be the development of models to estimate the distribution and burden of malnutrition and intestinal infections as well as the benefits of various interventions. The network will be coordinated by Co-Principal Investigators Michael Gottlieb, Ph.D., of FNIH, and Mark Miller, M.D. of FIC.

“I am pleased the Foundation can convene such a collaborative research and funding partnership to better understand the complex relationship between malnutrition and intestinal infections,” said Charles Sanders, FNIH Chairman. “This collaboration has the very real potential for developing new and improved interventions aimed at reducing morbidity and mortality in diseases indigenous to the developing world.”

From: IFT Newsletter Apr 8, 2009



Research in Food & Nutrition

Antioxidant Levels in Cooked Vegetables Vary with Cooking Method Healthier to Griddle-Cook or Microwave

Some vegetable cooking methods may be better than others when it comes to maintaining beneficial antioxidant levels, according to a new study in the *Journal of Food Science*, published by the Institute of Food Technologists. Results showed that, depending on the vegetable, cooking on a flat metal surface with no oil (griddling) and microwave cooking maintained the highest antioxidant levels.

Fruits and vegetables are considered to be the major contributors of nutritional antioxidants, which may prevent cancer and other diseases. Because of their high antioxidant levels and low-calorie content, consumers are encouraged to eat several servings of fruits and vegetables daily.

Researchers at the University of Murcia and the University of Complutense in Spain examined how various cooking methods affected antioxidant activity by analyzing six cooking methods with 20 vegetables. The six cooking methods were boiling, pressure-cooking, baking, microwaving, griddling and frying. Their findings showed the following:

- The highest antioxidant loss was observed in cauliflower after boiling and microwaving, peas after boiling, and zucchini after boiling and frying.
- Green beans, beets, and garlic were found to keep their antioxidant levels after most cooking treatments.
- The vegetables that increased their antioxidant levels after all cooking methods were green beans (except green beans after boiling), celery and carrots.
- Artichoke was the only vegetable that kept its high antioxidant level during all the cooking methods.

Griddle- and microwave-cooking helped maintain the highest levels of antioxidants, produced the lowest losses while “pressure-cooking and boiling [led] to the greatest losses,” says lead researcher A. M. Jiménez-Monreal. “In short, water is not the cook’s best friend when it comes to preparing vegetables.”

Journal reference: Jiménez-Monreal et al. Influence of Cooking Methods on Antioxidant Activity of Vegetables. *Journal of Food Science*, 2009; 74 (3): H97 DOI: 10.1111/j.1750-3841.2009.01091.x (from: News Wise (Apr. 15, 2009))

Dairy Better For Bones Than Calcium Carbonate

A Purdue University study shows dairy has an advantage over calcium carbonate in promoting bone growth and strength. Connie Weaver, distinguished professor and head of the food and nutrition department, found that the bones of rats fed nonfat dry milk were longer, wider, more dense and stronger than those of rats fed a diet with calcium carbonate. Calcium carbonate is the most common form of calcium used in calcium-fortified foods and supplements.

Weaver said the study, funded by the National Dairy Council, is the first direct comparison of bone properties between calcium from supplements and milk. It will be published in the August print issue of the [*Journal of Bone and Mineral Research*](#).

"A lot of companies say, 'If you don't drink milk, then take our calcium pills or calcium-fortified food,'" Weaver said. "There's been no study designed properly to compare bone growth from supplements and milk or dairy to see if it has the same effect."

Data from Purdue's Camp Calcium, a research effort that studies how calcium and other nutrients affect bone growth, show that between the ages of 9 and 18 people require 1,300 milligrams of calcium a day for optimal bone growth. This is the equivalent of about 4 cups of milk or yogurt or the equivalent from cheese or other sources, Weaver said. After the age of 9, due mostly to peer pressure, the gap between the calcium youths need and actually get widens, she said.

The study involved 300 rats that were divided into two groups. For 10 weeks, the rats

were given all the nutrients they require, but one group was given dairy and the other was given calcium carbonate as the source of calcium. After 10 weeks, the bones of 50 rats from each group were measured for strength, density, length and weight. "We found those measurements were up to 8 percent higher for those who had milk over calcium carbonate," Weaver said.

The study also found a strong effect of having dairy as a calcium source followed by periods of inadequate calcium. Over a second 10-week period, the remaining rats were fed as adults. Half of those were given adequate calcium as carbonate or milk. The other half were switched to half as much calcium as recommended, but were given calcium carbonate.

"This is comparable to humans who, during their early growth, drink a lot of milk to the age of 9 to 11, or maybe even adolescence, but then get only half as much milk calcium as they need after that," Weaver said. "Some take calcium supplements, but few adults get adequate calcium."

Weaver said the study showed the rats raised on dairy still had advantages over those who were given calcium carbonate even later when they were given half enough calcium as dairy or calcium carbonate. "We found it was an advantage having milk or dairy while bones were growing over calcium carbonate, and it protects you later in life," Weaver said.

She is not sure why dairy is better, but said further study is needed. "I think this will spark some people to want to figure out what it is about milk that gives it an advantage," she said. "It's not due to increased calcium absorption. It's more about protecting against bones losing calcium, according to our results of calcium metabolism. Bones are in constant turnover, especially when they are growing. Youth need to have bone formation outweigh bone loss."

Journal reference: Weaver et al. Dairy vs. Calcium Carbonate in Promoting Peak Bone Mass and Bone Maintenance During Subsequent Calcium Deficiency. *Journal of Bone and Mineral Research*, 2009; 090323104508033 DOI: 10.1359/jbmr.090303

From: *Medical News Today* (Apr. 30, 2009)

Low-Fat Fried Food?

Food Chemist Develops Protein-Based Batter for Healthier Frying

Deep-fried fish could get healthier with a new protein-based batter extracted from the muscle of discarded fish parts. When coated onto the fish it forms a barrier, locking in taste and moisture while blocking out fat.

GLOUCESTER, Mass.--Low-fat, fried food sounds like a contradiction, but those types of products may soon be popping up at your local grocer.

Fish sticks slathered in oil and deep-fried are tasty, but the after-effects can take a toll on your waistline. The love affair with food usually ends when it's time to weigh in. Now, a

new discovery may tip the scales in your favor when it comes to eating some of your favorite fried foods.

Stephen Kelleher, a food chemist at Proteus Industries in Gloucester, Mass., says, "People like fried food, but there's a lot of bad things associated with fried food." Understanding the bittersweet fondness for fried cuisine, Kelleher invented a way to cook low-fat, fried food.

The protein solution is extracted from fish muscle. When coated onto the fish it forms a barrier, locking in taste and moisture, but blocking out fat and carbohydrates. "These protein molecules after we treat them and extract them the way we do, they form these very, very, micro-thin films that -- when they are sprayed onto the surface -- become this invisible, impenetrable, film that forms on the surface," Kelleher says.

The protein molecules go through a treatment process. Water and other ingredients are filtered then added to the batter. Kelleher says the finished product has 25-percent to 75-percent less fat. Plus the added protein cuts down the carbohydrates by 15 percent.

When put to the test, comparing traditional fried batter to the special protein coating, both food tasters agreed there was nothing fishy about the low-fat, fried meal.

The process is FDA approved and can be used to fry low-fat chicken, too. They are also testing the application on other foods, like potato chips.

BACKGROUND: A chemist has created a protein solution that can be used to coat chicken. When the chicken is then deep-fried, it contains 50 percent less fat than if it had been deep-fried without the coating.

HOW IT WORKS: Chicken is bathed in a liquid of water and protein molecules that have been taken from a slurry of chicken or fish tissue. This forms a thin shield around the meat, and when it is then submerged in oil, the coating keeps fat from being absorbed from the fryer.

GOOD FATS VS. BAD FATS: Fats should account for no more than 30 percent of the total calories we consume, but good health also depends on whether those are "good" fats or "bad" fats. Mono-unsaturated fats, like olive oil and canola oil, are considered good because they can help lower cholesterol. Saturated (animal) fats are thought of as bad because they clog the arteries. A third type of fat is made when corn oil or other fats that are usually liquid at room temperature are solidified through heating. This type of partially hydrogenated vegetable oil, called trans fatty acid, is a main ingredient in vegetable shortening and margarine. It is the worst kind of fat. In the body, the enzymes responsible for processing fats have trouble breaking down trans fatty acids and spend so much time trying to do so that it interferes with the processing of essential fatty acids.

WHAT ARE EFAs? There are two types of essential fatty acids (EFAs): Omega-3 and Omega-6. Omega-3 fatty acids are found in foods like fish, flax and pumpkin seeds, and walnuts. Omega-6 fatty acids can be found in corn oil, sunflower oil and soybean oil, for example. EFAs have been shown to protect against heart disease, but the body can't make them, so we must consume them in food. Ideally, these should be balanced in the diet at a ratio of 2-to-1; in most Western diets, that ratio is 20-to-1.

WHERE THE BODY STORES FAT: Men and women store fat differently because they have different sex hormones: testosterone and estrogen. Adult men store fat in the

chest, abdomen, and buttocks, producing an apple shape. Adult women carry fat in the breasts, hips, waist and buttocks, creating a pear shape.

From: Science Daily January 1, 2006

Simple device can ensure food gets to the store bacteria free

WEST LAFAYETTE, Ind. - A Purdue University researcher has found a way to eliminate bacteria in packaged foods such as spinach and tomatoes, a process that could eliminate worries concerning some food-borne illnesses.

Kevin Keener designed a device consisting of a set of high-voltage coils attached to a small transformer that generates a room-temperature plasma field inside a package, ionizing the gases inside. The process kills harmful bacteria such as *E. coli* and salmonella, which have caused major public health concerns.

Keener's process is outlined in an article released online early in *LWT - Food Science and Technology*, a journal for the Swiss Society of Food and Technology and the International Union of Food Science and Technology.

"Conceptually, we can put any kind of packaged food we want in there," said Keener, an associate professor in the Department of Food Science. "So far, it has worked on spinach and tomatoes, but it could work on any type of produce or other food."

By placing two high-voltage, low-watt coils on the outside of a sealed food package, a plasma field is formed. In the plasma field, which is a charged cloud of gas, oxygen has been ionized and turned into ozone. Treatment times range from 30 seconds to about five minutes, Keener said.

Ozone kills bacteria such as *E. coli* and salmonella. The longer the gas in the package remains ionized, the more bacteria that are killed. Eventually, the ionized gas will revert back to its original composition.

The process uses only 30-40 watts of electricity, less than most incandescent light bulbs. The outside of the container only increases a few degrees in temperature, so its contents are not cooked or otherwise altered.

Other methods of ozone treatment require adding devices to bags before sealing them to create ozone or pumping ozone into a bag and then sealing it. Keener's method creates the ozone in the already sealed package, eliminating any opportunity for contaminants to enter while ozone is created.

"It's kind of like charging a battery. We're charging that sample," Keener said. "We're doing it without electrode intrusion. We're not sticking a probe in the package. We can do this in a sealed package."

Keener said testing has worked with glass containers, flexible plastic-like food-storage bags and rigid plastics, such as strawberry cartons and pill bottles. He said the technology also could work to ensure pharmaceuticals are free from bacteria.

According to the Center for Disease Control and Prevention, about 40,000 cases of Salmonellosis, an infection caused by salmonella, are reported each year in the United States, causing 400 deaths. The CDC reports that about 70,000 *E. coli* infections are reported each year, causing dozens of deaths.

From: Eurekalert 2 Mar 09

Effects of Soy Isoflavone Consumption on Bone Structure

A new study, 'Effects of soy isoflavone consumption on bone structure and milk mineral concentration in a rat model of lactation-associated bone loss,' is now available (see also <http://www.newsrx.com/library/topics/Menopause-Therapy.html>)>Menopause Therapy). According to recent research from the United States, "Like menopause, during complete lactation, circulating estrogen concentrations are markedly reduced, resulting in amplified bone resorption. To investigate the effects of soy isoflavones, common dietary components used to mitigate the bone loss of menopause, on the bone loss associated with lactation."

"Lactating rats were randomized to one of four diets supplemented with different levels of soy isoflavones (0, 2, 4, 8 mg aglycone isoflavone/g protein). Milk was collected from all dams between days 12 and 15 of lactation and was analyzed for calcium, phosphorus and genistein concentrations. Serum and bones from half of the animals from each diet group were taken at weaning and from the remaining half at 4 weeks post-weaning. Bones underwent histomorphometric analysis and serum was used for genistein determinations. Serum genistein and milk concentrations reflected dietary isoflavone dose. Isoflavone intake had no effect on any of the bone changes associated with lactation or recovery. Milk calcium and mineral concentrations were unaffected by dietary isoflavones," wrote C.A. Peterson and colleagues, University of Missouri, Department of Nutritional Sciences.

The researchers concluded: "Consumption of soy isoflavones, in levels that can be readily attained through soy foods, have neither protective effects on bone nor deleterious effects on milk quality or quantity during lactation."

Peterson and colleagues published their study in European Journal of Nutrition (Effects of soy isoflavone consumption on bone structure and milk mineral concentration in a rat model of lactation-associated bone loss. European Journal of Nutrition, 2009;48(2):84-91).

From: Soytech E-News March 19, 2009

Fruit and vegetable consumption may lower risk of colorectal cancer

A study published in *The American Journal of Clinical Nutrition* shows that a high consumption of fruit and vegetables may be associated with a reduced risk of colorectal cancer, especially of colon cancer. The researchers used the European Prospective Investigation into Cancer and Nutrition (EPIC) data, which had a total of 452,755 subjects (131,985 men and 320,770 women). The subjects completed a dietary questionnaire in 1992–2000 and were followed up for cancer incidence and mortality until 2006. A multivariate Cox proportional hazard model was used to estimate adjusted hazard ratios. After an average follow-up of 8.8 years, 2,819 incident colorectal cancer cases were reported. Consumption of fruit and vegetables was inversely associated with colorectal cancer in a comparison of the highest with the lowest EPIC-wide quintile of consumption, particularly with colon cancer risk. Only after exclusion of the first two years of follow-up were these findings corroborated by calibrated continuous analyses for a 100-g increase in consumption. The association between fruit and vegetable consumption and colorectal cancer risk was inverse in never and former smokers, but positive in current smokers. This modifying effect was found for fruit and vegetables combined and for vegetables alone.

From: IFT Newsletter Apr 15, 2009

NIH Study Finds Calories DO Count for Weight Loss

Heart-healthy diets that reduce calorie intake can help overweight and obese adults achieve and maintain weight loss—regardless of differing proportions of fat, protein or carbohydrates—according to a study funded by the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health and published in the *New England Journal of Medicine*.

Researchers from the Preventing Overweight Using Novel Dietary Strategies (POUNDS LOST) study found similar weight loss after six months and two years among participants assigned to four diets that differed in their proportions of these three major nutrients. The diets were low or high in total fat (20% or 40% of calories) with average or high protein (15% or 25% of calories). Carbohydrate content ranged from 35% to 65% of calories. The diets all used the same calorie reduction goals and were heart-healthy—low in saturated fat and cholesterol while high in dietary fiber.

On average, participants lost 13 pounds at six months and maintained a 9-pound loss at two years. Participants also reduced their waistlines by 1 to 3 inches by the end of the study. Craving, fullness, hunger and diet satisfaction were all similar across the four diets.

“These results show that, as long as people follow a heart-healthy, reduced-calorie diet, there is more than one nutritional approach to achieving and maintaining a healthy weight,” said Elizabeth G. Nabel, MD, director, NHLBI. “This provides people who need to lose weight with the flexibility to choose an approach that they’re most likely to sustain—one that is most suited to their personal preferences and health needs.”

In the POUNDS LOST study, 811 overweight and obese adults aged 30 to 70 were

assigned to one of four diets, and asked to record their food intake in a diary or an online tool that showed how intake compared with goals. Group diet counseling sessions were held at least twice per month throughout the two years of the study, and individual sessions were held every eight weeks. Participants were given personalized calorie goals, ranging from 1200 to 2400 calories per day, which reduced their overall caloric intake as compared with their daily energy requirement. All participants were asked to do moderate-intensity physical activity, such as brisk walking, for at least 90 minutes per week. Study participants were diverse in gender and ethnicity, with 38% men and 22% representing minorities. Participants did not have diabetes or severe heart disease but could have had other risk factors, such as high blood pressure or high cholesterol.

Overweight is defined by having a body mass index (BMI)—a calculation of the relationship between weight and height—greater than 25 and less than 30. Those with a BMI of 30 or higher are considered to be obese. Sixty-six percent of American adults are overweight and of those, 32% are obese, according to the Centers for Disease Control and Prevention.

Research was conducted in Boston at Harvard University School of Public Health and at the Pennington Biomedical Research Center of Louisiana State University in Baton Rouge, LA. Diets were adapted during sessions to the diverse cuisines from these two regions of the country.

“We were encouraged that, in addition to achieving and maintaining weight loss, study participants experienced other positive health changes as well,” said Catherine Loria, PhD, a nutritional epidemiologist at NHLBI and co-author of the study. “The findings emphasize the importance of weight loss in reducing heart disease risk.”

All diets improved risk factors for cardiovascular disease at both six months and two years in ways consistent with previous studies. Improved risk factors include reduced levels of triglycerides, LDL (low-density lipoprotein) cholesterol, lowered blood pressure and increased HDL (high-density lipoprotein) cholesterol. All diets decreased the presence of metabolic syndrome, a cluster of related conditions, overweight, high triglycerides, high blood sugar, high blood pressure and low HDL cholesterol, which increases heart disease risk.

Previous studies have shown that a loss of 5% to 10% of body weight will help reduce risk factors for heart disease and other medical conditions. In this study, 15% of patients achieved a 10% weight loss after two years.

“This new information should focus weight loss approaches on reducing calorie intake rather than any particular proportions of fat, protein or carbohydrate. This is important information for health professionals who prescribe weight loss for their patients, and for adults who are seeking ways to sustain a healthful eating pattern,” said Frank Sacks, MD, principal investigator of POUNDS LOST and professor of Cardiovascular Disease Prevention in the Nutrition Department at the Harvard School of Public Health.

The target nutrient compositions of the four diets were:

- Low-fat, average protein: 20% fat, 15% protein, 65% carbohydrate
- Low-fat, high protein: 20% fat, 25% protein, 55% carbohydrate
- High-fat, average protein: 40% fat, 15% protein, 45% carbohydrate
- High-fat, high-protein: 40% fat, 25% protein, 35% carbohydrate

From: Nutraceuticals World 2009-02-26

Omega-3 EPA Could Be Sourced From Biodiesel, New Study Says

Omega-3 fatty acid EPA (eicosapentaenoic acid) can be produced by fungal treatment of a biodiesel product which according to the researchers can lead to production of an EPA-rich biomass that could be used as an omega-3 fortified food. The study published in the Journal of Agricultural and Food Chemistry found that results indicated the great potential of producing EPA from biodiesel-derived crude glycerol by fungal fermentation but compared with microalgae (e.g., diatom) for EPA production, particularly at heterotrophic conditions, the biomass, EPA content, and EPA yield obtained from this research were still low. Lead researcher Zhiyou Wen states that commercialisation depends on many factors including process optimization, the EPA yield/productivity, the price of EPA in the existing market, and the FDA approval of this product.

From: Soytech E-News March 20, 2009

Trans Fatty Acids (TFA) Are Largely Consumed From Partially Hydrogenated Vegetable Oils

"In both developed and developing countries, trans fatty acids (TFA) are largely consumed from partially hydrogenated vegetable oils (see also <http://www.newsrx.com/library/topics/Life-Sciences.html>)>Life Sciences). This article focuses on TFA as a modifiable dietary risk factor for cardiovascular disease, reviewing the evidence for lipid and non-lipid effects; the relations of trans fat intake with clinical endpoints; and current policy and legislative issues," scientists in the United States report.

"In both observational cohort studies and randomized clinical trials, TFA adversely affect lipid profiles (including raising LDL and triglyceride levels, and reducing HDL levels), systemic inflammation, and endothelial function. More limited but growing evidence suggests that TFA also exacerbate visceral adiposity and insulin resistance. These potent effects of TFA on a multitude of cardiovascular risk factors are consistent with the strong associations seen in prospective cohort studies between TFA consumption and risk of myocardial infarction and coronary heart disease (CHD) death. The documented harmful effects of TFA along with the feasibility of substituting partially hydrogenated vegetable oils with healthy alternatives indicate little reason for continued presence of industrially produced TFA in food preparation and manufacturing or in home cooking fats/oils," wrote R. Micha and colleagues, Brigham and Women's Hospital.

The researchers concluded: "A comprehensive strategy to eliminate the use of industrial TFA in both developed and developing countries, including education, food labeling, and policy and legislative initiatives, would likely prevent tens of thousands of CHD events

worldwide each year."

Micha and colleagues published their study in *Prostaglandins Leukotrienes and Essential Fatty Acids* (Trans fatty acids: Effects on cardiometabolic health and implications for policy. *Prostaglandins Leukotrienes and Essential Fatty Acids*, 2008;79(3-5 Sp. Is):147-152).

From: Soytech E-News February 23, 2009

Vitamin Studies Suggest Protective Health Impact

Three new studies published in the *Archives of Internal Medicine* demonstrate the positive role certain vitamins and minerals play in supporting health and preventing disease conditions.

The first study suggests that women with higher intakes of calcium from both food and supplements—up to 1300 mg/day—appear to have a lower risk of cancer overall, and both men and women with high calcium intakes have lower risks of colorectal cancer and other cancers of the digestive system.

An additional study showed that women who took a combination of B vitamins, including folic acid (2.5 mg/day), pyridoxine hydrochloride (vitamin B6, 50 mg/day) and cyanocobalamin (vitamin B12, 1 mg/day), decreased their risk of age-related macular degeneration (AMD), the leading cause of severe irreversible vision loss for older Americans. The third study suggests that higher blood levels of vitamin D are inversely associated with the incidence of upper respiratory tract infections.

"These results are encouraging and may lead us in new directions of research," said Andrew Shao, PhD, vice president, scientific and regulatory affairs, for the Council for Responsible Nutrition (CRN), Washington, D.C. "We've known for many years that these essential nutrients play important roles in health—vitamin D and calcium for bone health and folic acid for the prevention of neural tube birth defects—but these latest studies suggest new and exciting benefits that need further exploration."

Previous observational studies have shown an inconsistent relationship between calcium intake and cancer. This large prospective study, part of the National Institutes of Health (NIH) AARP Diet and Health Study, followed 293,907 men and 198,903 women, ages 50 to 71. Participants were given a food frequency questionnaire when they enrolled in the study, asking how much and how often they consumed dairy, as well as other conventional foods, and whether they took supplements.

After seven years of follow-up, the study found that women with a calcium intake of up to 1300 mg/day, from a combination of conventional foods and supplements, had a decreased risk of total cancer. The study also found that women who were in the top one-fifth of calcium consumption (1881 mg/day from a combination of conventional food and supplements) had a 23% lower risk of digestive types of cancer, particularly colorectal cancer, than those in the bottom one-fifth (494 mg/day). Men who consumed the most

calcium from conventional foods and supplements (about 1530 mg/day) also had a 16% lower risk of digestive types of cancer than those who consumed the least calcium.

“What this means for consumers is that there may be benefits to calcium supplementation that go beyond bone health; but more research is still needed to help explain the observed differences in gender and to better assess the effects on other non-digestive cancers,” said Dr. Shao. “It’s also interesting to point out that the women in this study who had the highest calcium intakes—and lower risks of cancer—had lower body mass indexes, tended to be physically active, and were less likely to smoke cigarettes or drink alcohol. This further reinforces the notion that good health is truly a combination of overall healthy practices—and vitamins and other supplements are an important part of that formula.”

Regarding the second trial, previous observational studies have suggested an association between lower homocysteine concentrations in the blood and lower risk of age-related macular degeneration (AMD), while intervention studies have shown that folic acid, vitamin B6 and vitamin B12 may lower homocysteine levels. However, no intervention study had yet examined the effect of B vitamin supplementation on AMD risk.

This randomized, double-blind, placebo-controlled trial, part of the Women’s Antioxidant and Folic Acid Cardiovascular Study (WAFACS), followed 5442 female healthcare professionals, age 40 years or older, who already had or were at high risk for heart disease for about seven years. Participants were assigned to receive a placebo or a combination of folic acid (2.5 mg/day), vitamin B6 (50 mg/day) and vitamin B12 (1 mg/day). After two years, the beneficial effects on women taking B vitamins emerged and persisted throughout the entire trial. After 7.3 years of follow-up, women taking the supplements had a 34% lower risk of any AMD and a 41% lower risk of visually significant AMD.

Finally, vitamin D inadequacy has reemerged recently, resulting in the resurfacing of diseases such as rickets in children. According to the Dietary Guidelines for Americans 2005, “Older adults, people with dark skin, and people exposed to insufficient ultraviolet band radiation (i.e., sunlight) should consume extra vitamin D from vitamin D-fortified foods and/or supplements.”

In a secondary analysis of the Third National Health and Nutrition Examination Survey (NHANES), a survey of the U.S. population, found that individuals with low blood levels of a vitamin D marker (25-hydroxyvitamin D) were also more likely to have an upper respiratory tract infection (URTI). Specifically, the analysis found that compared to those with levels greater than 30 nanograms/milliliter (ng/ml), individuals with less than 10 ng/ml had a 36% higher risk of having a recent URTI; those with 10 to less than 30 ng/ml had 24% higher odds.

“The bottom line for consumers is that vitamins are an important component of good health,” said Dr. Shao. “Science is an evolving process, and this recent good news about

vitamins should certainly be encouraging to consumers, particularly those who take them consistently over the long-term in combination with other healthy habits.”

From: Nutraceuticals World 2009-02-24

