



Editorial

Vegitarian symbol is becoming popular all over the world. In different countries there are different symbols. In India, there is a green dot while for non-vegetarian foods it is brown dot. Other countries also have started using vegetarian symbols in order to make it easier for people to choose foods on their vegetarian preference. Some have green V of different styles others have other ways to signify.

In India, popularity of vegetarian symbol has gone beyond foods and even cosmetics and medicinal preparations especially of traditional type have started using vegetarian symbols on their products.

In Indian food laws, non-vegetarian food means that which contains whole or part of an animal including birds, fresh water or marine animals or eggs or products of any animal origin but not including milk or milk products as ingredient. And vegetarian food is any food other than non-vegetarian food. This is a simple definition but may have some doubts which are not elaborated by law.

The US does not have any regulations for vegetarian foods. There is a petition sent to US FDA for creating regulations concerning vegetarian and vegan foods but the FDA has not yet taken action on it. UK Food Standards Authority has given guidelines for vegetarian foods. It did a regulatory impact analysis for making a regulation for vegetarian food and realized that it would be better to prepare guidelines rather than have regulation.

It has published the guidelines and explained in more details the various types of vegetarian including vegan, lacto-vegetarian, ovo-vegetarian, and ovo-lacto-vegetarian etc. It considers all foods including livestock, meat, poultry, fish, shellfish and other seafood, insects and all the slaughter byproducts like fat and blood as non-vegetarian. Even excluded are products like gelatine, additives, flavourings etc. as well as processing aids made from above like isinglass from fish for clarification.

It has permitted products of living animals and insects e.g. milk, eggs, honey, bee pollen or waxes to be called vegetarian. Also the products made with this category such as cheese made with vegetarian rennet, whey, lecithin and other additives are all called vegetarian. Presence of eggs must always be indicated on labels for allergen reason.

Vegans category will not allow any of these categories of food, ingredients, by-products or additives made from non-vegetarian source whether dead or alive. So all these are excluded from foods acceptable to vegans.

In India, there are many who are lacto-ovo-vegetarians. There are also many who follow Jain vegetarianism which excludes eggs and root vegetables like onions and garlic. Honey in India is considered as vegetarian. Hence vegetarian classification is much more complex and will not suffice simpler classification of FSA of UK. The present Indian classification does not adequately give thought to this complexity. There needs to be more information on label to give confidence to those who view processed foods to contain certain ingredients and additives that may or may not have come from non-vegetarian foods. This suspicion is the result of inadequate information.

Indian regulation recently has also allowed indication if eggs are the only non-vegetarian food or ingredients or additives source in food. So ovo- and lacto-ovo-vegetarians would safely consume the food. This is a heartening trend that regulators are considering the important concerns seriously and taking action to provide legislation for that. We hope that we see more such actions in future. With season's greetings

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APPROACHING STREET FOOD SAFETY

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Introduction

FAO defines street vended foods as ready to eat foods or beverages prepared and/or sold in the street or other public places. Street foods may be sold in places such as a market or fair, by a hawker or vendor, often from a portable stall. This sector has experienced tremendous growth during the past few decades owing to the socioeconomic changes in many countries. This growth is expected to increase significantly with the increasing urbanization and population growth, especially in developing countries.

Street foods reflect the traditional local culture and is one of the best ways to experience the real cuisine of any community. While some street foods are regional, many others spread beyond their region of origin. Street vended foods can be found in clusters around public places, places of work, schools and colleges, railway stations, hospitals and bus terminals and may be vended from roadside makeshift stalls, carts or small establishments.

In India, street food today can be purchased for a few rupees from the makeshift stalls found in towns and cities. Indian street foods vary from region to region. The '*Chaat*' fare in North India consists of many tangy and spicy delicacies. In the Eastern parts, a typical street food is *Chop* which is like potato patties dipped in flour batter and deep fried. *Jhalmuri*, a delicacy made from puffed rice is a famous Kolkata street food. *Vada – pav* and *pav bhaji* from Maharashtra are the concoctions famous from the West. In the Southern region, there are *thattu dosas*, *omelettes*, *spicy pork fry* etc. Ices such as the *gola sherbet*, all kinds of ice cream and the indigenous *kulfi* in multiple colors and flavors are there to relish. A plethora of beverages like lassi, all variants of tea like masala tea, milk tea and normal tea can also be enjoyed. In India, street food eating habit is increasing day by day. Considering food safety issues, it is important that street food be under strict control for food safety.

Benefits of street vended foods

Street foods play an important socio-economic role in terms of employment potential and in serving the food and nutritional requirements of consumers at affordable prices. Street vended foods serve as a source of inexpensive, convenient and often nutritious food for millions of low and middle income consumers, in urban areas, on a daily basis. Street foods are an attractive experience of varied food for tourists. In developing countries, making and vending street food provides a regular source of income for vast number of men and particularly women, who lack education or skills. It requires a low capital investment, offers a chance for self employment and provides business opportunities for developing entrepreneurs. It also contributes to local and national economic growth by supporting local agricultural producers and food processors. Thus the socio economic significance of street foods is immense.

Street foods are inexpensive compared to a restaurant meal and less costly as compared to home cooked food. For many low income groups, street food acts as the most accessible means of obtaining a nutritionally balanced meal outside the home, provided the consumer is informed and able to choose proper combination of foods. Thus street foods also are nutritionally significant.

Need for safety of street foods

Street food vending forms a very important segment of the unorganized sector of the food industry. The street foods have a significant contribution in the daily food consumption in the urban areas of both developing and urbanized countries. With the increasing pace of globalization and tourism, the safety of street food has become one of the major concerns of public health. Food borne pathogens are recognized as a major health hazard associated with street foods. There are other concerns like poor hygiene, inadequate access to potable water supply and waste disposal means. Further, unsanitary environmental conditions like proximity of the establishment to sewers or garbage dumps, pollution from traffic add to the public health risks associated with street foods. Additional hazards may also be in the form of use of improper food additives (often unauthorized colouring agents), mycotoxins, heavy metals and other contaminants (such as pesticide residues) in street foods. Street food vendors are often poor and uneducated and lack appreciation for safe food handling.

Improving the safety of street vended foods

The cheap cost and instant availability of street foods has made them very popular. However, the cleanliness and the hygiene content of these foods is questionable. The standards of street food safety can be upgraded by the vendors through implementation of some basic good practices with respect to hygiene and food handling. Appropriate location and

condition of vending stalls, observation of personal hygiene by vendors, employing washed and clean utensils, using potable water and proper drainage and waste disposal are some steps to be taken which can lead to hygienic and safe food.

Regulatory requirements

Under FSSAI rules, schedule 4 has described various provisions required for street food vendors. Once the FSSAI act get enacted (August 2011) these requirements will come in force.

The requirements are as follows.

- **Location & environment of vending stall:** The vending stall should be located in a sanitary place away from unhygienic conditions and should be far from any source of contamination (rubbish, waste water, open drains, toilet facilities and animals).
- **Vending cart:** The vending carts shall be built of solid, rust/ corrosion resistant materials and kept in clean and good condition. Vending cart shall be protected from sun, wind and dust and when not in use, food vending vans shall be kept in clean place and properly protected. The working surfaces of vending carts shall be hygienic, impermeable, easy to clean, 60 to 70cm from ground. Sale points, tables, awnings, benches, boxes, cupboards, glass cases etc. shall be clean and tidy.
- **Water supply:** Transported drinking water (treated water like bottled water, boiled/filtered water through water purifier etc.) shall be in protected containers of at least 20 litres.
- **Handling of street foods:** Fresh/raw foods like vegetables, fruits must be thoroughly washed with potable water before preparation or selling.
- **Cooking and serving utensils:** cooking utensils and crockery should be clean and in good condition. It should not be broken or chipped. All containers shall be kept clean, washed & dried at the close of day's business to ensure freedom from mold/fungi growth and infestation. Cooking, serving and storage shall not be done in utensils of copper, cadmium, lead, non food grade plastic & other toxic materials. Utensils shall be cleaned of debris, rinsed, scrubbed with detergent and washed under running tap water after every operation. Wiping utensils shall be done with clean cloth. Removing dust or crumb shall not be by blowing on plates/utensils.
- **Storage of cooked food:** Adequate number of racks shall be provided for storage of articles of food, with clear identity of each commodity. Proper compartment for each class shall also be provided wherever possible. All articles that are stored or intended for sale shall have a proper cover to avoid contamination.
- **Personal hygiene of vendors:** person suffering from infectious diseases shall not be permitted to work. Unhygienic habits like eating, chewing, smoking, sniffing, spitting and nose blowing should be avoided. Washing hands with soap and detergent every time after using the toilet and before handling food, keeping finger nails trimmed and such other personal hygiene practices should be followed. All food handlers should avoid wearing jewellery, false nails or other items that might fall into food and also avoid touching their face or hairs
- **Drainage and waste disposal:** Adequate drainage and waste disposal systems and facilities should be provided to prevent contamination of foods and potable water. Rubbish bin with cover shall be provided.

Conclusion

Implementing these basic good practices can help street food vending to shed its disorganized image and become an important segment of the food industry. Since large population in India is consuming food through street food sources, food safety is a big concern to consumer safety. The improved food quality and assured safety topped by variety will attract consumers from even the high income groups thus broadening the consumer base and increasing business potential and this will also increase consumer safety.



Technologies for Enhancing Functional Properties: Prof. Jagadish S. Pai

Functional foods have been defined in many different ways and do not have a universally accepted definition. However, it is mostly accepted that these foods have ingredients and substances present or added to them that give benefits beyond commonly accepted role of nutrients. Their benefits include reduction of risk of many diseases including cardiovascular diseases, cancer, diabetes, AMD (age-related macular degeneration) etc. as well as they provide benefits in healthy physical and mental development. Some of the examples are food containing omega – 3 fatty acids, probiotics, lycopene & lutein, antioxidants, isoflavones, dietary fibre etc.

Global market of functional foods was about \$ 75 billion and is expected to reach over \$ 175 billion by 2013 according to BCC Research. Market is growing faster for functional beverages than foods as probably consumer acceptance as well as ease of adding functional ingredient is better for beverages. There are also supplements that are growing rapidly in functional category. These comprise of tablets, capsules and powder etc.

Indian market is still small compared to Europe, US and Japan, but it is showing excellent growth with many products appearing in the market ranging from children's and women's foods to health food beverages, yogurt, ice cream, biscuits, breads etc. Not only are Indians getting worried about their modern lifestyle prone to many non-communicable diseases but also the awareness that diet could be an important factor in reducing the risk of many of these. There is also the traditional medicinal system of Ayurveda that has shown relevance of diet in health. There are many herbs and spices that are used in daily food preparations in India with benefits in controlling many diseases. This also will help in the marketing efforts of these foods.

There are two types of functional foods, ones that naturally have certain substances called nutraceuticals that make the food functional and secondly, foods that could be made into functional foods by adding ingredients derived from other sources and having ability to reduce the risk of certain diseases.

Natural Functional Foods

Many common foods do have substances that help in preventing certain diseases but we were not quite aware of these benefits until recently. There are certain ancient medicinal systems that used these foods for providing health and reduce risk of diseases but we never acknowledged this until now.

Some Natural Functional Foods & Substances That Make Them So

Natural Functional Food	Substance (Nutraceuticals) Present
Fish	Omega 3 Fatty Acids
Fermented Milk Products	Probiotics
Fruits & Vegetables	Fibre, Carotenoids & Anthocyanins
Whole Grains	Prebiotics/Fibre
Rice Bran Oil	Oryzanol
Grape Wine	Resveratrol
Soya Products	Isoflavonoids
Red Palm Oil	Carotenoids

There are many foods in fruits and vegetable, herbs and spices, whole grains, fish and seafoods and dairy products categories that have many beneficial substances which provide protection against certain diseases. However, sometimes for the processing ease we tend to make changes in the foods that sometimes deprive us from the benefits of natural substances with unique properties. Whole wheat is processed to prepare refined flour that can be used to prepare very soft bread. In the process we lose bran that not only has fibre but also contains many essential minerals.

When fruits juices are prepared, commonly fibre is removed to a great extent to avoid settling that reduces the attractiveness of juice. Palm oil and rice bran oil are chemically refined to produce clear oils with no colour and odour, but in the process we remove essential carotenoids and oryzanol respectively that provide health benefits.

Functional Foods with Added Nutraceuticals

Because of the lack of such substances with health benefits or for processing benefits some of these are removed from the raw materials, we can always add back these substances called nutraceuticals to ordinary foods making them functional foods with health benefits. These substances can be extracted from rich sources that may be foods or some other plant sources.

Fish especially salt water fish is rich source of omega 3 fatty acids. Those who do not eat fish can still get the benefits of these if fish oil like cod liver oil which is rich in omega 3 is added to foods to make them functional foods. Similarly isoflavones can be extracted from soy, carotenoids can be extracted from carrots and certain leafy vegetables, anthocyanins could be extracted from berries etc. and may be added to foods that do not have them. Bran removed in grain milling can be the source of fibre in bread and biscuits. Thus many foods could be made functional foods by incorporating these ingredients.

The substances having health benefits are many times very susceptible to losses due to processing conditions so whether natural or fortified, functional foods may lose some of the health benefits due to the presence of these substances before processing. There are many technological possibilities to ensure that these losses are minimal and the functional properties are enhanced to ensure maximum health benefit. Sometimes innovative processes are used to provide these benefits in foods.

Difficulties in Functional Foods

There are many obstacles in functional foods so health benefits are not fully realised as anticipated. There are many substances that are less bioavailable. Foods contain materials such as fibre and phytic acid that make many phytochemicals less available when consumed. Examples are carotenoids, capcaisin etc. These go through the GI tract partly digested and underutilised, so their benefits are not fully realised.

Secondly, many phytochemicals added are highly sensitive to processing conditions used in manufacturing and in cooking. High temperature, low pH, exposure to oxygen, light, humidity and warm storage conditions are deleterious for such substances like omega 3, carotenoids, antioxidants including anthocyanins etc. that are extremely sensitive.

Hence when these phytochemicals are used in common foods, there must be a strategy to protect them and derive the maximum benefit derived from them when consumed. There are some new technologies available for this that will make use of such substances in foods easier and enhance their action in functional foods.

Examples of Functional Foods

There are many products in the market with functional benefits in US, Europe and Japan. The largest sectors have been beverages and dairy products but there are other products such as bakery and cereals, confectionery, savoury snacks etc. that have ingredients to make them functional foods. Some of the ingredients that have been added include omega 3 fatty acids, isoflavones, probiotics and prebiotics, antioxidants including catechins, polyphenols, anthocyanins, cocoa flavonoids, beta-glucans, plant sterols, etc. among other things. Some of the biggest categories have focused on heart health, bone health, gut health, and to manage weight, cholesterol and sugar.

There are many Indian products launched in last few years that have included omega 3 and probiotics in milk, yogurt, ice cream, health drink etc., beta-glucan through oats in breakfast cereals, phytosterols in cereal flours, prebiotics in snacks, fibre in bakery products etc. New products are appearing frequently in the market showing that market is growing and consumers are interested in preventing diseases rather than treating them with more expensive cures.

Omega 3 fatty acids

Benefits of Omega 3 fatty acids

- Reduce all-cause mortality & various CVD outcomes like sudden death, cardiac death, myocardial infarction
- Lower blood triglycerides and blood pressure
- Prevention or treatment of asthma in adults & children
- Reduce joint tenderness in rheumatoid arthritis
- Development of brain in fetus & infants
- Reduce risk of Alzheimer's disease

Omega 3 fatty acids have become extremely important in many foods because of many benefits they have shown in all age groups. Marine fish is the richest source of omega 3 and 100g of salmon, mackerel or sardine would have about 2000 mg omega 3 and although there are no RDA for omega 3, workshop by NIH and International Society for Study of Fatty Acids has recommended about 220 per day for children and healthy adults and about 300 mg for pregnant and lactating women. American Heart Association has recommended that while healthy individuals may eat two servings of fish every week and foods rich in alpha linolenic acid (flaxseed, soybean oil, walnut etc.), patients with CHD are recommended 1g of EPA (Eicosa Pentaenoic Acid) + DHA (Docosa Hexaenoic Acid) per day and patients who need to lower triglycerides 2 to 4 g of EPA + DHA.

As vegetarians do not consume fish so they have to rely on vegetarian sources of omega 3. Alpha linolenic acid (ALA) is one of the omega 3 fatty acid and rich sources are flax seeds, soya oil, nuts and other seeds. However, ALA needs to be converted to DHA and EPA for the physiological benefits of omega 3 and this conversion is extremely low. So one has to consume large amounts of ALA or depend on more useful forms like DHA and EPA.

There are many products in the market that contain added omega 3, but according to an international foundation study in UK, many of these expensive products contain only tiny quantities of omega 3 while most consumers believe that such products can make a significant difference to their health. The study estimated that if these were the only sources of omega 3, one must eat 16 slices of fortified bread, five omega 3 enriched eggs, six omega 3 drinks or a litre of omega 3 enriched milk each day to get required amounts. Hence there must be innovative methods to enhance the functional properties of foods when fortifying them with omega 3. Some of these methods are as follows.

Pork fat does contain some amount of ALA about 232 mg per 100 g meat. When pigs were fed with flax seeds in their diet, they incorporated more of omega 3 with lesser amounts of saturated and omega 6 fatty acids. The pork of pigs fed with flax seeds contained 412 mg ALA per 100 g.

Hens respond more favourably than pigs are they can convert substantial amounts of omega 3 into DHA in eggs. Normal eggs contain small amounts of omega 3, ALA and DHA. When hens were fed with flaxseed, the modified egg contained 350 mg omega 3 compared to 60 mg in standard egg. Of omega 3, ALA was 250 mg and DHA was 100 mg in modified egg compared to about 40 mg and 20 mg in standard egg. Even cholesterol content in modified egg reduced to 180 mg from 210 mg per standard egg.

Feeding hens with marine algae or fish oil produces higher yolk DHA contents of about 150 mg per egg. Even small amounts of EPA, about 20 mg are also deposited in eggs. However, feeding high levels of fish oil causes fishy off-flavour in eggs particularly if they are overcooked. Algae not only give high DHA but also add carotenoids to yolk giving a rich dark yolk.

Dietary Fibre

Different Types of Fibre & Sources

Insoluble fibre	Cellulose: all plants especially cereals, wholegrain breads, & vegetables	➤ accelerate the passage of food through the gastro-intestinal tract
	Hemicelluloses: some insoluble, e.g. in wheat and corn, others soluble	➤ promote bowel movements
	Lignin: tough woody parts of small seeds & older vegetables (carrots)	➤ slow down starch digestion and glucose absorption
Soluble fibre	Pectins in fruits & vegetables, and most abundant in citrus fruit, apples	➤ delay the passage of food through the intestines
	Hemicelluloses in bran from oats, psyllium & barley	➤ delay glucose absorption
	Gums & Mucilages: rich sources are legumes & fruits; used as stabilizers & thickeners	➤ bind with bile acids in the intestines
	Resistant Starch: raw potatoes or certain maize; whole or coarsely-ground seeds and cereals	➤ lower blood cholesterol

Dietary fibre has many benefits both for soluble and insoluble forms. Over the decades people have preferred products made from refined materials like wheat flour, white polished rice as well as clarified fruit juices. This has reduced the content of fibre in our food intake drastically with the consequent losses of their benefits.

When manufacturers wanted to include raw materials with higher levels of fibre, there were problems in processing. When fibre is not removed from juices there is separation of insoluble materials which causes loss of appeal. This problem may be solved by either partial hydrolysis of fibrous material by enzymes or using emulsifiers and stabilizers so separation is delayed or prevented. Even disintegrating the substance to extremely small size also stabilizes them.

Breads need refined wheat flour because bran material which is high in fibre disrupts the formation of gluten which is responsible for leavening due to capture of gas bubbles. Since consumer preference demands whole grain products, breads made with whole wheat flour are appearing. Basic problem with fibre is it makes leavening difficult so enzymes like cellulase could be used to still make soft breads. Also use of high speed mixers helps increase the volume. By making changes in the process one can get high fibre products without much loss in product sensory quality.

Probiotics

Many microorganisms lactic acid bacteria group have the ability to improve the gut health as well as impart many health benefits upon regular consumption. Many strains have been shown to have these benefits and are now being used in many products.

Role of Probiotics in Diet

- Prevention and treatment of diarrhoea, lactose intolerance, gastritis and constipation
- Resistance to pathogens
- Enzyme production in the large intestine
- Stimulation of the intestinal immune system
- Reduction of risk of colon cancer
- Reduction of blood cholesterol concentration.

The benefits derived depend on the balance of these beneficial microbes in intestine. Their proportion may decline due to infections, medications especially antibiotics and the diet. When diet contains food for these beneficial microbes i.e. prebiotics, these thrive well in intestine. In order to ensure their balance foods must contain probiotics or may be enriched with probiotics.

One UK research study showed that now all bacteria survive digestion process. When there are many strains in combination, they perform better in survival. They also get protection from food ingredients like milk protein and lactose. So if they are consumed with foods containing these ingredients there are better chances of effectiveness rather than when they are given separately in capsules or tablets. Probiotics may also be enteric coated so they are protected from stomach acids and other harsh conditions in digestive process until they arrive in intestine where they will be released and can start their activity.

Miscellaneous Ingredients

Antioxidants are becoming very important due to their possible risk reduction in cancer, coronary heart diseases etc. They are also being studied for their possible effectiveness against Alzheimer's disease, Parkinson's disease etc. Many others including green tea polyphenols, resveratrol etc. have also been shown to have health benefits. By their very nature they are highly reactive and need to be protected from degradation before reaching the body upon consumption. There are processes including microencapsulation that can protect them from environment and from other food ingredients and substances.

Some of the antioxidants like anthocyanins are extremely sensitive. It has been shown that they could be converted to more stable forms using enzymatic bioconversion. Oryzanol from rice bran oil has many benefits including lowering cholesterol and reducing risk of heart disease. When rice bran oil is chemically refined in the alkali refining step all the oryzanol will be removed from oil. Hence process needs to be modified to physical refining to retain oryzanol. Alternatively, oryzanol could be recovered from soap stock of chemical refining and can be added to food products.

Nanotechnology has shown the promise of providing protection to various highly sensitive substances used in functional foods so many different nutraceuticals could be added to food products, each separated by nanoparticles which are then packed in microencapsulation to be then added to food products.

(Based on a talk Presented in the International Conference on Processed Foods & Beverages for Health: Beyond Basic Nutrition organised in N. Delhi in April 2011 organised by ILSI-India)



Research in Health & Nutrition

Enzyme treatment may remove peanut allergens, suggests study

By Nathan Gray, 02-Mar-2011 Food Navigator

The study, published in Food Chemistry investigated the use of enzymatic treatments to reduce the levels of allergens in peanut kernels, using two major peanut allergens (Ara h 1 and Ara h 2) as indicators of effectiveness.

The researchers found the treatment of roasted peanut kernels with alpha-chymotrypsin or trypsin enzymes for 1 to 3 hours significantly increased the solubility of peanut protein, whilst reducing Ara h 1 and Ara h 2 in kernel extracts by 100 per cent and 98 per cent respectively.

“Results from this study indicate the potential for producing peanuts with reduced allergenicity using post-harvest processing approaches such as food grade enzymatic treatment,” said senior authors Drs. Mohamed Ahmedna and Jianmei Yu from North Carolina A&T State University in Greensboro.

Allergy issues

Consumption of peanuts or peanut containing food products can cause severe and even fatal allergic reactions. “While avoidance is the best way to guard against manifestation of allergy, the ubiquitous use of peanuts and peanut products by the food industry makes it very hard for allergic individuals to avoid accidental ingestion,” said the researchers. “Therefore, it would be useful to reduce the level of allergens in peanuts that are mixed with other food ingredients,” they added.

Enzymatic processing is an approach that has worked to reduce or eliminate allergenicity in certain foods and ingredients, said Dr Ahmedna and his colleagues. They noted examples of enzyme treatment used to remove allergens include production of hypoallergenic rice by a two-stage enzymatic proteolysis process and the development of hypoallergenic whey protein hydrolysate.

Study details

An enzymatic treatment process was reported to effectively reduce Ara h 1 and Ara h 2 in roasted peanut kernels by up to 100 per cent under optimal conditions. Upon treatment with alpha-chymotrypsin solution, protein solubility increased, whilst detectable/extractable levels of Ara h 1 and Ara h 2 decreased in both blanched and non-blanched peanuts, said Dr Ahmedna and his co-workers.

They noted that the blanching of kernels enhanced the effectiveness of enzyme treatment in roasted peanuts. Chymotrypsin treatment of blanched, roasted peanuts resulted in reduction of detectable soluble allergens by as much as 100 per cent. “In fact, Ara h 1 and Ara h 2 levels in blanched peanut kernels were non-detectable ... at enzyme concentration of 0.1–0.15 per cent,” said the authors.

Trypsin treatment of roasted peanuts also significantly reduced Ara h 1 and Ara h 2 while increasing the soluble proteins in both blanched and non-blanched soluble extracts, they added. “The optimum enzyme treatment conditions for roasted peanut kernels consists of 5 minutes of blanching prior to incubation of peanut kernels in 0.12 per cent enzyme for 3 hours ... Under these conditions, Ara h 1 and Ara h 2 were not detectable in soluble peanut protein extracts,” said Dr Ahmedna and his co-workers.

Allergen removal

“The results confirm that our enzyme treatment process degrades the allergens into smaller peptides which may or may not retain their IgE binding and other allergenic properties in the soluble fractions of treated whole roasted peanuts,” said the researchers. However, they added that because the results presented in the current study are from in vitro tests only, the allergenic potential of the enzyme treated extracts must be further tested in vivo to confirm any reduction in allergenicity.

Omega-3 Fatty Acid Intake Linked with Reduced Risk of Age-Related Macular Degeneration in Women

Regular consumption of fish and omega-3 fatty acids found in fish is associated with a significantly reduced risk of developing age-related macular degeneration in women, according to a report posted online that will appear in the June issue of Archives of Ophthalmology, one of the JAMA/Archives journals.

"An estimated nine million U.S. adults aged 40 years and older show signs of age-related macular degeneration (AMD)," the authors write as background information in the article. "An additional 7.3 million persons have early age-related macular degeneration, which is usually associated with moderate or no vision loss but does increase the risk of progression to advanced age-related macular degeneration."

Using the Women's Health Study, William G. Christen, Sc.D., of Brigham and Women's Hospital and Harvard Medical School, Boston, and colleagues collected data on 38,022 women who had not been diagnosed with age-related macular degeneration. Information on women's eating habits was obtained via questionnaire at the beginning of the study and included information on intake of docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) [Omega-3 fatty acids found in fish], and arachidonic acid and linoleic acid (omega-6 fatty acids). During ten years of follow-up, additional questionnaires tracked the women's eye health, with specific focus on diagnosis of age-related macular degeneration.

Over the course of follow-up, 235 cases of age-related macular degeneration were reported. In analyses that adjusted for age and treatment assignment, women who consumed the most DHA compared with women who consumed the lowest amount had a 38 percent lower risk of developing age-related macular degeneration. Similar results were observed for higher intake of EPA and for higher consumption of both types of acid together.

Results for fish intake showed that consumption of one or more servings of fish per week, when compared to less than one per month, was associated with a 42 percent lower risk of age-related macular degeneration. "This lower risk appeared to be due primarily to consumption of canned tuna fish and dark-meat fish."

For omega-6 fatty acids, higher intake of linoleic acid but not arachidonic acid was associated with an increased risk of age-related macular degeneration, however this association was non-significant after adjustment for other risk factors and fats. "In summary, these prospective data from a large population of women with no prior diagnosis of AMD indicate that regular consumption of DHA and EPA and fish significantly reduced the risk of incident AMD," the authors conclude.

Fish Oil Reduces Muscle Loss from Chemo

March 2, 2011 **Food Product Design**

Daily intake of fish oil may reduce muscle loss in patients undergoing chemotherapy, according to a new study published in the journal **Cancer**. Researchers at the University of Alberta conducted a trial that involved newly referred patients with non-small cell lung cancer who took either fish oil containing 2.2 g/d eicosapentaenoic acid (EPA, n=16) or standard of care (SOC) (no intervention, n=24) from the time of initiation to completion of first-line chemotherapy. Researchers measured skeletal muscle and adipose tissue using computed tomography images, collected blood and recorded weight at baseline and throughout chemotherapy.

Results showed patients in the fish oil group maintained their weight (0.5 ± 1.0 kg, or 1.1 ± 2.2 lbs.), while those in the SOC group experienced an average weight loss of 2.3 ± 0.9 kg ($\sim 5.1 \pm 2$ lbs.). About 69 percent of fish oil patients gained or maintained muscle mass, compared to only 29 percent in the SOC group—overall the SOC group lost 1 kg of muscle. Further, patients with the greatest increase in plasma EPA concentration after supplementation had the greatest gains in muscle ($r^2 = 0.55$; $P = .01$). Researchers found no difference in total adipose tissue between the two groups.

The researchers concluded daily supplementation with fish oil containing 2.2 g EPA in chemotherapy patients appears to better maintain weight and muscle mass compared to SOC, and they plan to confirm these findings in future larger-scale study.

Good Cholesterol' Structure Identified, Could Help Explain Protective Effects

Nutrition Horizon 3/14/2011 ---

University of Cincinnati (UC) researchers have determined the structure of human HDL cholesterol and say the finding could help explain how this "fat packet" protects against cardiovascular diseases, including heart attack and stroke. The study, led by W. Sean Davidson, PhD, professor in UC's pathology and laboratory medicine department, appears online ahead of print March 13, 2011, in the journal *Nature Structural & Molecular Biology*.

HDL (high-density lipoproteins) also known as "good cholesterol," are packets of protein and fat that deliver fat to specific locations within the body. There is an increasing effort to create drugs that help to raise levels of HDL working in conjunction with existing drugs that lower "bad cholesterol," or low-density lipoproteins (LDL).

Studies of synthetically derived HDL have shown that an abundant protein in HDL, apolipoprotein A-I, plays a key role in HDL's cardioprotective anti-inflammatory and anti-oxidative properties. "Unfortunately, we've known very little about the molecular details that explain HDL's protective effects," says Davidson. "A major reason for this is an almost complete lack of understanding of HDL's structure and how it interacts with other important plasma factors."

Rong Huang, PhD, a post-doctoral fellow in Davidson's laboratory, has isolated human HDL and analyzed its 3-D structure as it circulates in human plasma. "Previous studies have only focused on synthetic HDL made in the test tube," Davidson says. "By isolating human HDL, we were able to focus on the broad range of HDL particles actually circulating in humans."

Team members used a series of sophisticated spectroscopic and mass spectrometric techniques to study HDL and have found that proteins of HDL form a cage-like structure that encapsulates its fatty cargo. They determined that most of the HDL particles circulating in human plasma are remarkably similar in structure; however, they found evidence that the particles have a twisting or shock absorber-like motion that allows them to adapt to changes in particle fat content.

By determining the structure of HDL, Davidson and his team were able to conclude that the majority of physiological interactions occurring with HDL including its twisting movement occur at the particle surface, which is dominated by the cardioprotective protein apolipoprotein A-I.

This monopolization of the particle surface, Davidson says, suggests that other proteins have very little room to bind to HDL and probably have to interact with the protein itself, which could explain how apolipoprotein A-I plays such a dominant role in HDL function and its protective effects. "This work presents the first detailed models of human plasma HDL and has important implications for understanding key interactions in plasma that modulate its protective functions in the context of cardiovascular disease," says Davidson.

Microencapsulated bioactive compounds may boost availability: Rat study

By Nathan Gray, 28-Feb-2011 NutraIngredients.Com

The study, published in the *Journal of Functional Foods*, examined the distribution of the three bioactives (resveratrol, fish oil and tributyrin) in different formulations after oral administration to rats. The authors, from the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia detected the bioactives and their respective metabolites by using of radioactive tracers, finding that microencapsulation had no effect on gut transit of the compounds, but did increase levels in the liver and blood - thus indicating an increase in bioavailability.

The researchers demonstrated that microencapsulation could be used "for the effective delivery of a mixture of bioactives within a single emulsion formulation. The results provide information regarding the effects of microencapsulation on the distribution of the bioactive mixture and their degradation products when delivered within a single formulation," said the authors, led by Dr Mary Ann Augustin from the Division of Food and Nutritional Sciences, at CSIRO.

Bioactive benefits

The researchers explained that there is a “strong demand” for natural bioactives –which are suggested to help maintain health and reduce the risk of disease. Dr Augustin and her colleagues said fish oil, butyrate, resveratrol, and resistant starch are ingredients “that are of particular interest” because they all may have benefits has been for improving cardiovascular and gastrointestinal health.

The authors said that an important aspect of the delivery of bioactives is their bioavailability on ingestion. They explained that some of the “challenges in the delivery of sensitive ingredients into functional foods may be potentially met with the use of microencapsulation.” They said that microencapsulated delivery via an emulsion-based system has the potential to protect bioactives from oxidation, and mask the taste of undesirable components.

The new study investigated the release and availability of the three bioactive compounds in a single delivery vehicle, using radioactive ‘tracer’ compounds in either a non-encapsulated or one of two microencapsulated preparations. “A growing trend is the co-delivery of range of bioactive ingredients ... it is recognized that a wide range of therapeutic effects are obtained when there is an additive or synergistic effect between different bioactives,” said Augustin and co-workers.

The researchers used an oil-in-water emulsion system stabilized by a heated mixture of a milk protein, glucose and a modified resistant starch as the single delivery vehicle for fish oil, tributyrin and resveratrol.

Study details

The researchers explained that the major difference between the microencapsulated preparations was the method resveratrol dispersion. They said that the first formulation resveratrol was directly mixed with the oils prior to homogenization, whereas in the second resveratrol was dispersed in a solid fat particle which was then dispersed in a fish oil/tributyrin mixture prior to homogenization.

The authors observed that the time-course of transit, and relative distribution along the rat digestive system, were not altered by microencapsulation. “As a percentage of the relative distribution along the GI tract tissue walls, the majority of the radioactivity from the bioactives was associated with the walls of the small intestine,” said the authors.

Augustin and colleagues reported that microencapsulation increased the levels of the radioactivity from the bioactives in the blood and liver, which is “consistent with an increase in the bioavailability of agents.” They concluded that an emulsion “is an effective delivery system for a mixture of fish oil, tributyrin and resveratrol,” adding that microencapsulation of such bioactives in an emulsion does not affect transit through GI tract, but may increase increases levels in blood and liver.

Spanish Consortium Develops Ingredients and Diets for an Elderly Population

Nutrition Horizon 3/15/2011 ---

Research organizations and companies are working together to help create diets and foods with specific characteristics designed for an aging population. SENIFOOD is an initiative aimed at designing specific foods for older people in order to maintain balanced nutrition in this part of the population. The developed ingredients and diets are intended to ameliorate the metabolic syndrome, and to improve bone, muscle, gastrointestinal and visual health, in addition to cognitive function and neurodegenerative disorders. The need to address this topic arises, among other reasons, from figures provided from official institutions: in Spain, the percentage of older people accounts for approximately 17% of the population and this trend is expected to increase in the coming years.

The SENIFOOD project (www.senifood.com) is part of the CENIT Program to support R&D, funded by the Spanish Ministry of Science and Innovation. Led by NATUREX, the leading manufacturer of natural specialty ingredients, the project has a budget of more than 26 million euros and its completion is scheduled for 2012.

SENIFOOD brings together the efforts of a broad range of Spanish institutions: four manufacturers of functional ingredients (NATUREX, BIÓPOLIS, BIOIBÉRICA and NUTRAFUR), seven food manufacturers (CAMPOFRÍO, CENTRAL LECHERA ASTURIANA, TUTTI PASTA, MUGALA INNOVA, LABORATORIOS ORDESA, BODEGA MATARROMERA and CUSTOMDRINKS), a manager of nursing homes (FUNDACIÓN MATÍA), and a network of 25 technological centers and universities.

From the scientific point of view, the aim of the SENIFOOD project is to advance the understanding of the mechanisms of action of the functional food ingredients targeting the most common metabolic diseases in the elderly. From the technological point of view, functional properties of these active ingredients will be combined with the physico-chemical (texture, fluidity) and organoleptic characteristics (taste, aroma) of food products to make suitable, simple and enjoyable products for consumption.

USDA allots \$5.5 M to encourage healthier meals in schools

On March 2, U.S. Agriculture Secretary Tom Vilsack kicked off National Nutrition Month by announcing the availability of Team Nutrition Training Grants for Healthy Meals to states to help children develop healthy eating and physical activity habits for healthier lifestyles.

“We know that to win the future, we have to win the race to educate our children and that means that our kids must have access to nutritious meals and healthy lifestyles,” said Vilsack. “These grants provide states important new resources, technical assistance, and flexibility to help schools and daycare settings raise the bar for our kids so that they can reach their full potential.”

The U.S. Department of Agriculture (USDA) will be investing \$5.5 million in grants with approximately \$2.5 million set aside to provide non-competitive grants (up to \$50,000) to each State Agency that commits to specific strategies to increase the number of HealthierUS School Challenge (HUSSC) applications submitted for approval. Up to \$350,000 may be requested to include both competitive and non-competitive grants.

This funding provides training and technical assistance to school nutrition professionals to help them prepare and serve nutritious and appealing meals, provide fun and interactive nutrition education for children, teachers, parents, and caregivers in childcare settings, and build school and community support for creating healthy school environments.

Team Nutrition Training Grants are one of the anchor delivery systems for supporting the implementation of USDA’s nutrition requirements and the Dietary Guidelines for Americans in meals served in schools and childcare institutions. The grants offer funding to state agencies to establish or enhance sustainable infrastructures for implementing Team Nutrition’s goal of improving children’s lifelong eating and physical activity habits.

IFT Newsletter March 9, 2011

Milk and Cereal Shown to Be “The Best Breakfast”

Nutrition Horizon 3/3/2011 ---

A breakfast consisting of milk and cereal is the best start to the day. A recent study conducted in England has shown that people who begin their day with milk and cereal get their day off to a more energetic start and eat more healthily throughout the day.

Cereal and milk are an excellent source of calcium and represent an important element of daily nutritional needs. In other words, they ensure the intake of sufficient vitamins, minerals, proteins and fibres. Chances are that if you start the day with cereal and milk, you will be less likely to snack in between meals.

The research was carried out on behalf of the English Breakfast Panel. One of the panel members, Professor Chris Seal of the University of Newcastle, was clearly delighted with the results: “This research shows how important it is to start the day with a good breakfast. People who have milk and cereal for breakfast usually consume less fat and less sugar than people who do not have breakfast. Eating well in the morning also means a greater intake of proteins and micronutrients such as iron, vitamins and calcium.”

The research team analysed data from the British National Diet and Nutrition survey. More than 12,000 Britons aged between 19 and 64 were interviewed for this study.

Here are some results from the study:

- 20 per cent of adults skip breakfast
- 30 per cent have milk and cereal for breakfast
- 45 per cent have breakfast with other foods than cereal and milk

The research also revealed that 82 per cent of people who have breakfast include milk in this first meal of the day.

The study shows that a breakfast consisting of milk and cereal is the healthiest. People who have these products at breakfast consume less saturated fats and have a higher vitamin intake. But starting the day with breakfast is always better than skipping breakfast. People who eat something between 6 and 10 o' clock in the morning consume less fat and more carbohydrates than their non-breakfasting counterparts.

Skipping breakfast can lead to tiredness, loss of concentration and poorer performances at school or at work. People who skip breakfast also eat more (sweet) snacks and eat larger portions during lunch and dinner.

The secret to better health — exercise

Whether you're 9 or 90, abundant evidence shows exercise can enhance your health and well-being. But for many people, sedentary pastimes, such as watching TV, surfing the Internet, or playing computer and video games, have replaced more active pursuits.

What exercise can do for you

Millions of Americans simply aren't moving enough to meet the minimum threshold for good health — that is, burning at least 700 to 1,000 calories a week through physical pursuits. The benefits of exercise may sound too good to be true, but decades of solid science confirm that exercise improves health and can extend your life. Adding as little as half an hour of moderately intense physical activity to your day can help you avoid a host of serious ailments, including heart disease, diabetes, depression, and several types of cancer, particularly breast and colon cancers. Regular exercise can also help you sleep better, reduce stress, control your weight, brighten your mood, sharpen your mental functioning, and improve your sex life.

A well-rounded exercise program has four components: aerobic activity, strength training, flexibility training, and balance exercises. Each benefits your body in a different way.

Fighting disease with aerobic activity

Aerobic exercise is the centerpiece of any fitness program. Nearly all of the research regarding the disease-fighting benefits of exercise revolves around cardiovascular activity, which includes walking, jogging, swimming, and cycling. Experts recommend working out at moderate intensity when you perform aerobic exercise — brisk walking that quickens your breathing is one example. This level of activity is safe for almost everyone and provides the desired health benefits. Additional health benefits may flow from increased intensity.

Protecting bone with strength training

Strength or resistance training, such as elastic-band workouts and the use of weight machines or free weights, is important for building muscle and protecting bone.

Bones lose calcium and weaken with age, but strength training can help slow or sometimes even reverse this trend. Not only can strength training make you look and feel better, but it can also result in better performance of everyday activities, such as climbing stairs and carrying bundles. Stronger muscles also mean better mobility and balance, and thus a lower

risk of falling and injuring yourself. In addition, more lean body mass aids in weight control because each pound of muscle burns more calories than its equivalent in fat.

Ease back pain with flexibility exercises

Stretching or flexibility training is the third prong of a balanced exercise program. Muscles tend to shorten and weaken with age. Shorter, stiffer muscle fibers make you vulnerable to injuries, back pain, and stress. But regularly performing exercises that isolate and stretch the elastic fibers surrounding your muscles and tendons can counteract this process. And stretching improves your posture and balance.

Preventing falls with balance exercises

Balance tends to erode over time, and regularly performing balance exercises is one of the best ways to protect against falls that lead to temporary or permanent disability. Balance exercises take only a few minutes and often fit easily into the warm-up portion of a workout. Many strength-training exercises also serve as balance exercises. Or balance-enhancing movements may simply be woven into other forms of exercise, such as tai chi, yoga, and Pilates.

Exercise at a glance

In a nutshell, exercise can:

- Reduce your chances of getting heart disease. For those who already have heart disease, exercise reduces the chances of dying from it.
- Lower your risk of developing hypertension and diabetes.
- Reduce your risk for colon cancer and some other forms of cancer.
- Improve your mood and mental functioning.
- Keep your bones strong and joints healthy.
- Help you maintain a healthy weight.
- Help you maintain your independence well into your later years.

From: Harvard Medical School Publication Health Beat February 2011

High Levels of 'Good' Cholesterol May Cut Bowel Cancer Risk

Nutrition Horizon 3/8/2011 ---

High levels of "good" (high density lipoprotein) HDL cholesterol seem to cut the risk of bowel cancer, suggests research published online in Gut. The association is independent of other potentially cancer-inducing markers of inflammation in the blood. The researchers base their findings on participants in the European Prospective Investigation into Cancer and Nutrition (EPIC) study. This is tracking the long term impact of diet on the development of cancer in more than half a million people in 10 European countries, including the UK.

Some 1,200 people who developed bowel and rectal cancers - 779 bowel and 459 rectal cancer - after agreeing to take part in EPIC were matched with another 1,200 participants of the same age, gender, and nationality. Blood samples taken when they joined the study, and the dietary questionnaires these participants had completed, were compared to see if there were any discernible differences between the two groups.

The analysis showed that those who had the highest levels of HDL cholesterol, and another blood fat, apolipoprotein A, or apoA - a component of HDL cholesterol - had the lowest risk of developing bowel cancer. Each rise of 16.6 mg/dl in HDL and of 32 mg/dl in apoA reduced the risk of bowel cancer by 22% and 18%, respectively, after taking account of diet, lifestyle, and weight. But HDL and apoA levels had no impact on the risk of rectal cancer.

After excluding those who had only been monitored for two years, as they may have already been undergoing cancerous changes when they joined the study, only levels of HDL were associated with a reduction in bowel cancer risk. The

association remained intact, irrespective of other indicators of inflammation, insulin resistance, and oxygen free radicals levels, all of which are associated with the development of cancer.

The authors explain that low HDL levels have been linked to higher levels of proteins involved in inflammation, while higher levels of proteins that dampen down the inflammatory response have also been linked to high HDL levels. The pro-inflammatory proteins boost cell growth and proliferation while curbing cell death, so HDL may alter the inflammatory process in some way, they suggest.

Dairy calcium shows promise in cholesterol control.

By Joanna Cosgrove

Published February 28, 2011 Nutraceuticals World

A study published in the February issue of the British Journal of Nutrition found that the combination of calcium and milkfat present in dairy products like milk and cheese may not only play a key role in reducing fat absorption but also have the ability to favorably impact good cholesterol levels (HDLs) while minimizing an increase in bad cholesterol levels (LDLs).

The clinical trial, authored by Janne Lorenzen, PhD, and Arne Astrup, MD, professor and director of the Department of Human Nutrition at the Faculty of Life Sciences, University of Copenhagen, followed nine male subjects (average age of 32 years) as they completed four separate diets over a period of 10 days, with each diet differing in the calcium and fat content amounts.

Blood variables were measured before and after each diet period, with fecal and urine lipid profiles collected at the end of each diet period. Data showed that high fat diets increased LDL and HDL cholesterol concentrations by 9% and 13% against low fat diets. The high calcium diets, however, decreased concentrations of total and LDL cholesterol levels (10% and 4%, respectively). And while the high calcium diets did not directly affect HDL cholesterol levels, the authors credited it with a “protective effect” as it relates to cardiovascular disease.

According to the researchers, intervention studies have historically pointed to a relationship between a diet high in saturated fat and increases in total cholesterol and LDL cholesterol. As a result, some nutrition experts have recommended that consumers limit the intake of high-fat dairy products. However, observational studies have found an inverse relationship between intake of milk and other dairy products with a high content of calcium and incidence of cardiovascular disease. Drs. Astrup and Lorenzen aimed to study whether the high calcium content of dairy products influences the effect of dairy fat on the lipid profile.

“We have previously found that a high intake of dairy calcium increases fecal fat excretion and that a high intake attenuates postprandial lipidemia. This indicated that perhaps a high dairy calcium intake may have an effect on cholesterol,” Dr. Lorenzen explained to Nutraceuticals World. “In agreement, data from observational studies indicates that intake of dairy products with a high content of calcium may be inversely related to cardiovascular diseases. Our results indicate that this may at least partly be due to the calcium.”

“In theory, without calcium, dairy would have a bigger impact on LDL levels. The protective function of dairy calcium seems to set it apart from other sources of fat,” concurred Dr. Astrup. “This study supports previous research we have conducted that indicates dairy intake may actually play a role in minimizing the risk for cardiovascular disease versus increasing the risk.”

The Dairy Research Institute in Rosemont, IL, was heartened to learn about the findings of the study. “We know there are many adults today concerned about their fat intake, cholesterol levels and heart disease risk,” said Gregory Miller, PhD, president of the Dairy Research Institute and executive vice president of the National Dairy Council. “We believe this study underscores the importance of dairy as a good daily source of calcium, protein and other nutrients while mitigating the impact on cholesterol. The study reinforces findings published in the Dietary Guidelines Advisory Committee report in 2010 that suggests ‘bioactive components that alter serum lipid levels may be contained in milk fat,’ or the effect of milkfat on blood lipids is different than what might be predicted. This is valuable information for the industry and for the

consumer.”

Researchers are eager to understand the mechanisms responsible for the results documented by the University of Copenhagen trial . “The effect that we found on cholesterol, especially LDL cholesterol, was larger than what could be explained by the increased fecal fat excretion,” said Dr. Lorenzen, who noted that several new studies related to dairy calcium and blood lipids are planned. “Similar results have been observed by others which indicate that other mechanism may be involved as well. At the moment we don’t know which mechanisms, but we do hope to found out in the near future.”

Researchers Compare the Effects of Various Protein Sources

Nutrition Horizon 3/8/2011 ---

Not all proteins are alike. Some are digested and absorbed rapidly, while others may impact metabolism and glucose control. Scientists at the Nestlé Research Center, Lausanne, Switzerland, compared the effects of various protein sources on energy metabolism, satiety and glucose control in humans.

Protein is a beneficial nutrient for weight control not only because it takes more energy to digest and absorb proteins, but also because protein may influence appetite and satiety (the feeling of fullness after a meal). Since little is known about the magnitude of these effects among different protein sources (milk, vegetable or animal proteins), Nestlé researchers conducted a clinical trial to find answers.

Three meals of equal calorie content consisting of 50% protein from whey, casein and soy protein respectively (with 40% carbohydrate and 10% fat), and a fourth, high-carbohydrate (95% carbohydrate) meal were given to healthy adults. Researchers measured the energy expenditure, thermic effect, glycemic response and appetite sensations before and after the four different meals.

Results showed that the protein-rich meals led to a greater energy expenditure and thermic effect than the high-carbohydrate meal, that the effects of whey were significantly greater than those of casein and soy and were accompanied by a trend for greater fat oxidation. All three proteins (in the presence of glucose) significantly lowered peak glycemia after the meal. Furthermore, casein and soy protein lowered glycemia with little, if any, increase in insulin secretion above that of the glucose component of the meal.

“Our study confirmed that protein-rich meals promote greater energy expenditure than carbohydrate-rich meals of equal calorie content.” says Dr. Kevin Acheson, Nestlé scientist leading the study. “These findings strengthen the evidence that increased protein content in the diet promotes weight control. Different protein sources could be used for personalized nutrition needs.”

Resveratrol May Help Reduce Body Fat

March 7, 2011 Food Product Design

Incorporating resveratrol into a low-calorie diet may help reduce body fat and combat obesity, according to new research from the University of the Basque Country. Researcher Arrate Lasa studied the fat-reducing effect of Conjugated Linoleic Acid (CLA) and resveratrol on laboratory hamsters fed a low-calorie diet. According to the findings, CLA did not increase weight or body fat loss and did not induce greater lipolysis or improvement in serum parameters in glucose homeostasis or insulin function to any greater extent than with the slimming diet itself. However, resveratrol reduced the accumulation of triglycerides, in part by activation of lipolysis, in both the adipocytes of mice and of humans.

Hidden veggies may help cut calorie intake

A study published in the American Journal of Clinical Nutrition shows that adding hidden pureed vegetables to entrees can reduce the number of calories the meals pack without sacrificing texture or taste. The study included 20 men and 21 women who agreed to eat at a laboratory once a week for three weeks. Volunteers were served as much as they wanted to eat, along with side dishes such as bread rolls, strawberry yogurt, broccoli, and green beans, depending on the meal, and given snacks such as carrot sticks or fig cookies to take home. The meals were always the same: carrot bread for breakfast, macaroni and cheese for lunch, and chicken-and-rice casserole for dinner. Portion sizes were controlled by weight and the researchers kept a close account of the amount of food eaten.

Unknown to the diners, some of the main dishes contained vegetables that had been steamed and then pureed—cauliflower, squash, or carrots, depending on the entree. The result was a helping of food that was either 15% or 25% vegetable by weight, although it looked, tasted, and otherwise resembled the original. Some participants got the traditional version of the entree.

The participants all ate about the same amount of a given entree regardless of how much puree, if any, it contained. But those who were eating the altered foods saw their calorie intake drop substantially—as much as 360 calories a day—at the same time their vegetable intake rose. Nearly half the subjects said at the end of the study that they could tell something was different about the altered meals, but only two said they could taste the extra vegetables. The researchers concluded that “this strategy can lead to substantial reductions in energy intakes and increases in vegetable intakes.”

IFT Newsletter March 9, 2011

Coffee Drinking Linked to Reduced Stroke Risk in Women

Nutrition Horizon 3/11/2011 ---

Drinking more than a cup of coffee a day was associated with a 22 percent to 25 percent lower risk of stroke, compared with those who drank less, in a study reported in *Stroke: Journal of the American Heart Association*.

Low or no coffee consumption was associated with an increased risk of stroke in a study of 34,670 women (ages 49 to 83) followed for an average 10.4 years. It's too soon to change coffee-drinking habits, but the study should ease the concerns of some women, researchers noted.

Coffee is one of the most widely consumed beverages in the world. "Therefore, even small health effects of substances in coffee may have large public health consequences," said Susanna Larsson, Ph.D., lead author of the study and a researcher in the Division of Nutritional Epidemiology, National Institute of Environmental Medicine, Karolinska Institute in Stockholm, Sweden.

Groups who reported drinking 1-2 cups per day, 3-4 cups per day or 5 or more cups per day had similar benefits compared with those who reported daily intake of less than a cup of coffee, researchers said. The differences were unchanged by smoking status, body mass index, history of diabetes, hypertension or alcohol consumption, indicating that coffee's effects are not influenced by those known cardiovascular risk factors.

Scientists have theorized that coffee could have either beneficial or harmful effects on the cardiovascular system, but earlier studies have been inconclusive. Only one previous prospective study, which was also inconclusive, examined the association between coffee consumption and stroke incidence in healthy women. "Our research group has previously observed an inverse association between coffee consumption and risk in Finnish male smokers," Larsson said. "We wanted to assess the situation in women."

The women participated in the long-running Swedish Mammography Cohort, an epidemiological study investigating the association between diet, lifestyle and disease development. All the women were free of cardiovascular disease and cancer at baseline in 1997, when they answered the food frequency questionnaire analyzed in the study.

Researchers collected data on cases of first stroke that occurred between Jan. 1, 1998 and Dec. 31, 2008, by linking the study group with the Swedish Hospital Discharge Registry that provides almost complete coverage of Swedish hospital

discharges. Researchers documented 1,680 strokes: 1,310 cerebral infarctions/ischemic strokes (caused by blockages), 154 intracerebral hemorrhages (caused by bleeding inside the brain), 79 subarachnoid hemorrhages (caused by bleeding on the surface of the brain) and 137 unspecified strokes.

After adjustment for other risk factors, coffee consumption was associated with a statistically significant lower risk of total stroke, cerebral infarction and subarachnoid hemorrhage, Larsson said. The small numbers of intracerebral hemorrhage could have factored in the lack of an association with that stroke subtype, she said. In general, cerebral infarction is most strongly associated with dietary factors.

The food frequency questionnaire made no distinction between regular and decaffeinated coffee but decaffeinated coffee consumption in the Swedish population is low, Larsson said. Potential ways that coffee drinking might reduce the risk of stroke include weakening subclinical inflammation, reducing oxidative stress and improving insulin sensitivity, she said.

The study's limitations include the use of a self-administered questionnaire to determine medical history and history of coffee consumption which inevitably includes some measurement error and misclassification of exposure and the possibility of an unrecognized confounding factor associated with either low or moderate coffee consumption, Larsson said. "Some women have avoided consuming coffee because they have thought it is unhealthy. In fact, increasing evidence indicates that moderate coffee consumption may decrease the risk of some diseases such as diabetes, liver cancer and possibly stroke." More studies on coffee consumption and stroke are needed before firm conclusions can be reached, Larsson said.

The nutrition of cognition: Review considers the evidence for Alzheimer's

By Nathan Gray, 09-Mar-2011 Nutra Ingredients.Com

Related topics: Research

The study, published in *Nutrition Reviews*, assesses previous research and clinical trials that have attempted to use nutritional modification to aid brain functioning, suggesting that certain compounds may bring about physiological and cognitive benefits for the brain.

"The rates at which brain neurons form new dendritic spines and then synapses depend upon brain levels of three limiting compounds – uridine, DHA, and choline ... Hence, oral administration of these compounds can increase brain phosphatide levels," explained the reviewers, led by Dr Richard Wurtman, Professor of Neuropharmacology at the Massachusetts Institute of Technology (MIT), USA – who also works as a consultant for Danone (US name Donnon) Nutricia.

They added that administration of such compounds over several weeks "can enhance cognitive functions and neurotransmitter release in experimental animals," whilst their administration to patients with mild Alzheimer's disease "significantly improved memory in a clinical trial involving about 220 subjects."

Cognitive function

The researchers explained that diseases of aging, such as Alzheimer's disease, decrease the number of synapses thereby impairing cognition and "ultimately compromising most brain functions."

Loss of function is generally thought to result from the toxic effects of amyloid-beta and its aggregates on synapses, and their precursors' dendritic spines. However, no treatment strategy has been found to increase the number of synapses in brains of Alzheimer patients.

"An extensive and often frustrating search has been pursued for several decades to find a treatment that might block amyloid-beta formation, aggregation, or toxic effects or perhaps remove the amyloid-beta using a monoclonal antibody," said Wurtman and colleagues.

They explained that synapses are made up of a special membrane, made up of phosphatide lipids and a specific set of proteins – known as the 'synaptic membrane'.

Previous research has shown that treating animals with three particular phosphatide precursors present in the blood and formed within the body (uridine and choline) or derived from foods (choline and omega-3 fatty acids) can have beneficial

effect. “It increases brain phosphatides, synaptic proteins, neurite outgrowth, and the formation of dendritic spines,” said the reviewers. They noted that the treatment also “enhances cognition and the release of some brain neurotransmitters in the animals.”

Review details

Prof Wurtman and his colleagues explained that the brains of patients with Alzheimer's disease are deficient in choline and DHA, which leads to a selective decreases in numbers of P2Y2 receptors, dendritic spines, and synapses.

Previous studies have suggested that when animals treated for several weeks with uridine, choline, and the omega-3 fatty acid docosahexaenoic acid (DHA), the quantities of synaptic membrane synthesized from these compounds increase significantly – both in whole brain and per brain cell.

The researchers noted that treatments which raise blood DHA levels rapidly have been found to increase its uptake into and retention by brain cells; they explained that dietary omega-3's, such as DHA, are “preferentially incorporated into brain.” Wurtman and co-workers also noted that administering a uridine-DHA-choline mixture has been found to improve cognition and increase dendritic spine number synaptic membrane levels. They said that therefore seems reasonable “to explore whether this treatment might also improve cognition in impaired patients with Alzheimer's disease.”

A previous clinical trial (Scheltens et al - Alzheimer's & Dementia; Volume 4) involving subjects with mild Alzheimer's disease examined the effects of a cocktail of phospholipids, proteins and nutrients, on a delayed verbal memory task and the item-modified Alzheimer's Disease Assessment Scale. The study found that the group receiving the mixture had “a significant benefit”

“This proof-of-concept study was interpreted as demonstrating that giving a drink that contains DHA, uridine, choline, and other nutrients for 12 weeks can improve memory in mild and very mild Alzheimer's disease, and that further studies now in progress are justified,” said the reviewers.

Maternal diet linked to offspring health: Rat study

By Nathan Gray, 11-Mar-2011 Food Navigator.Com

The study, published the Proceedings of the National Academy of Sciences (PNAS), investigated how environmental pressures – in this case the mother's diet while pregnant – can affect the expression of genes in their offspring. The research found that when pregnant rats are fed a low-protein diet, their offspring are smaller, but have normal glucose metabolism until they are young adults, when they develop an age-related loss of glucose intolerance.

“Our findings reveal a novel mechanism by which maternal diet and aging interact through epigenetic processes to determine our risk of age-associated diseases,” said Dr Miguel Constancia, from the University of Cambridge, senior co-author of the paper. “We show that the transcription factor Hnf4a, which has been implicated in the etiology of type 2 diabetes, is epigenetically regulated by maternal diet and aging,” explained the authors.

Maternal bond

The researchers said it is well established that environmental factors interact with genes throughout life, affecting the expression of those genes and, consequently, tissue function and disease risk, and noted that previous studies have revealed that maternal diet can affect the physical health of the offspring.

Constancia and colleagues explained that prior research has shown that the gene hepatocyte nuclear factor 4-alpha (HNF 4-alpha) plays an important role both during development of the pancreas and later in the production of insulin, and suggested that diet during pregnancy may influence the expression of this gene later in life – thereby influencing the risk of diabetes. Other research has linked HNF 4-alpha to a genetic region known as the P2 promoter. The new study assessed whether maternal diet was linked to the functioning of HNF 4-alpha and the P2 promoter region in the pancreas.

Study details

The researchers collected pancreatic cells from rats aged three and 15 months, whose mother had been exposed to a normal or a low-protein diet during pregnancy. They then compared structure and function of parts of the DNA between the ‘normal’ and ‘low’ protein groups.

Constancia and his co-workers reported that the offspring of rats fed a normal diet had greater levels of HNF 4-alpha than those born to malnourished mothers. They said that the offspring of poorly fed mothers also showed evidence of malfunctions in particular parts of their DNA and this was slightly worse in older rats. The authors concluded that their study had identified "a fundamental mechanism by which diet interacts with the genes during critical periods of development."

Adding that suboptimal nutrition during early life modifies interactions in HNF 4-alpha, which may lead to malfunctioning pancreatic cells and the subsequent development of type 2 diabetes.

Interpretation

Commenting on the research, the UK website NHS choices highlighted the fact that the research was conducted in rats, and therefore may not translate into humans. "Animal research is important, but it is preliminary and the physiology of rats and humans differs. ... While these researchers have established that the DNA region they were studying in rats was also present in human pancreatic cells, they have yet to prove that maternal diet has a similar effect on these regions in human offspring," said NHS choices.

Professor Jeremy Pearson, Associate Medical Director at the British Heart Foundation, added that the new research was "no reason for expectant mothers to be unduly worried", stressing that the findings do not change advice that pregnant women should try to eat a healthy, balanced diet.

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Gut Bacteria Can Control Organ Functions

Nutrition Horizon 3/1/2011 ---

Bacteria in the human gut may not just be helping digest food but also could be exerting some level of control over the metabolic functions of other organs, like the liver, according to research published this week in the online journal mBio. These findings offer new understanding of the symbiotic relationship between humans and their gut microbes and how changes to the microbiota can impact overall health.

"The gut microbiota enhances the host's metabolic capacity for processing nutrients and drugs and modulates the activities of multiple pathways in a variety of organ systems," says Sandrine Claus of the Imperial College of London, a researcher on the study.

Claus and her colleagues exposed germ-free mice to bedding that had previously been used by conventional mice with normal microbiota and followed their metabolic profiles for 20 days to observe changes as they became colonized with gut bacteria.

Over the first 5 days after exposure, the mice exhibited a rapid increase in weight (4%). Colonization also triggered a number of processes in the liver in which sugars (glucose) are converted to starch (glycogen) and fat (triglycerides) for short-term and long-term energy storage. Statistical modeling between liver metabolic functions and microbial populations determined that the levels of glucose, glycogen and triglycerides in the liver were strongly associated with a single family of bacteria called Coriobacteriaceae.

"Here we describe the first evidence of an in vivo association between a family of bacteria and hepatic lipid metabolism. These results provide new insights into the fundamental mechanisms that regulate host-gut microbiota interactions and are of wide interest to microbiological, nutrition, metabolic, systems biology and pharmaceutical research communities," says Claus.

Another important finding in the paper, according to Claus, is that gut colonization strongly stimulated the expression and activity of the cytochrome P450 3A11, an essential enzyme in drug-detoxification pathways.

Although she warns about being careful to extrapolate the specific findings from mice to humans, Claus notes the results of this research will provide a basis to further develop new strategies to beneficially modulate host metabolism by altering microbial communities in the gut.



Dairy Colostrum Boosts Athletic Performance

February 25, 2011 Food Product Design

Individuals who consume bovine colostrum may boost their athletic performance and digestive health, according to a new study published in the **American Journal of Physiology-Gastrointestinal and Liver Physiology**.

Researchers at The London School of Medicine and Dentistry sought to investigate natural ways to enhance athletic performance. They examined athletes who were asked to run for 20 minutes at 80 percent of their aerobic maximum. At the end of the exercise, they measured changes in the subjects gut permeability—known as leaky gut syndrome—and core temperature. Under standard conditions, gut leakiness had increased by 250 percent and temperature had risen by 2 degrees. When the athletes drank dairy colostrum for two weeks before the trial, the rise in gut leakiness was reduced by 80 percent, despite the same effort and temperature rise.

The researchers identified changes in gut barrier function in laboratory studies: gut cells were cultured at normal 37 degrees body heat and at 39 degrees to replicate the temperature after exercise. The death rate of gut cells was much increased at the higher temperature yet when colostrum was added to the culture medium the rise in cell death rate was reduced by two thirds.



Food Safety & Regulation

Study identifies new tomato allergen

By Nathan Gray, 09-Mar-2011 Food Navigator.Com

The study, published in Food Chemistry, found that the newly identified allergen, known as ARP60S, is related with allergic sensitisation and shows Immunoglobulin E (IgE) binding capacity – IgE is the predominant antibody associated with an allergic response.

“The capacity to bind IgE has been suggested in different tomato proteins but new allergens, related probably with different populations, are now under study ... We have identified a new tomato allergen with high homology with previous known and described allergens from moulds and almond,” said the researchers, led by Maria Angeles Lopez-Matas, from Laboratorios LETI, Spain.

The discovery of the new allergen adds to the current knowledge of food allergens for which food manufacturers need to be aware; due to the challenges posed by ingredients with allergic potential being used in foods where their presence may not be immediately apparent.

Tomato allergy

Food allergies are caused by an adverse immune response, usually to a food protein, when the immune system identifies a protein as harmful. Estimates of incidence vary, but in recent years the sector of the food industry catering to allergy-sufferers – the ‘free-from’ market – has developed rapidly.

The authors said that although the prevalence of tomato allergy remains relatively unknown, the incidence of sensitisation can be considered important in areas where the fruit is frequently consumed.

Previous research (Woods et al, European Journal of Clinical Nutrition, Vol. 55, Pages 298-304) estimated that the prevalence of tomato sensitisation among subjects attending Allergy Clinics in the Mediterranean Coast of Spain, was approximately 6.5 per cent, however worldwide the self-reported estimation of allergy to tomato is about 0.3 per cent, noted the authors.

They explained that until now three tomato allergens have been characterised: Lyc e 1 (profilin), Lyc e 2 (beta-fructofuranosidase), and Lyc e 3 (lipid transfer protein – LTP).

“However, previous studies have suggested and demonstrated the existence of other proteins involved in tomato sensitisation ... The objective of this study was to identify new tomato allergens by molecular biology techniques,” said Lopez-Matas and her colleagues.

Study details

Tomato peel DNA from a stock library was screened using a pool of serum from tomato sensitised individuals. From the data, the researchers were able to identify sequences of allergens that caused sensitisation reactions.

Lopez-Matas and her co-workers identified the new allergen identified, containing 34 amino acids on the C-terminal region of the acidic ribosomal protein 60S. They reported that the protein showed more than 85 per cent of homology (similarity) with fungal allergens and 93.8 per cent homology with the almond allergen Pru du 5.

The authors reported that an immunoblot test showed that a recombinant version of the ARP60S allergen protein is recognised by IgE. They concluded that because the allergen has not been identified or purified under native conditions, the relevance and clinical importance of the allergen “should be studied further.”

Codex fish oil standard must be flexible: GOED

By Mike Stones, 24-Feb-2011 Nutra Ingredients.Com

Harry Rice, VP regulatory and scientific affairs told NutraIngredientsUSA.com: “GOED’s primary concern is that the adopted standard will not be flexible enough to allow for rapid innovation and natural variations in oil composition due to environmental factors.”

Defining fish oils by their fatty acid profiles is very problematic, warned the organization. “Fatty acid profiles of short lifespan fish vary significantly based on environmental factors, so a static set of defined fatty acid ranges could limit the commercial trade of oils due to causes outside the control of industry,” said Rice.

Global market

For example, anchovy oils make up most of the global market for omega-3 oils but fatty acid levels can vary significantly from, season-to-season and from region-to-region. Factors influencing this variation include climatic patterns such as El Niño and La Niña, season and geographic region of capture and even change in response to natural disasters like earthquakes.

While traditionally the fatty acid profiles in longer life fish are less varied, GOED’s members are seeing that the fatty acid levels are beginning to fluctuate more due to fishery management practices, according to the organization. Adopting of an inflexible standard could have severe consequences, said Rice.

“The adoption of an inflexible standard would result in restriction, rather than promotion, of free trade. It would also limit consumers’ access to quality sources of EPA and DHA which are critical to human nutrition.”

The proposed standard will cover only oil from fish and shellfish. Algal and mammal oils, such as seal and whale, will be excluded from the scope of the proposed work.

Swiss proposal

In July, the Codex Alimentarius Commission will consider whether to endorse the CCFO recommendation to develop the standard for fish oil. Some countries have raised concerns about the need for more technical details on the processing of fish oils and trade data in the Swiss proposal. “It is GOED’s understanding that the Codex member countries will be responsible for getting this information to the Swiss delegation by the end of April,” said Rice.

No one from the Codex Committee on Fats and Oils (CCFO) was available for comment before publication. The Codex Alimentarius Commission was created in 1963 by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) to develop food standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Programme.

The program aims to protect consumers’ health, ensure fair trade practices in the food trade, and to promote the coordination of all food standards work undertaken by international governmental and non-governmental organizations. Meanwhile, fish oil is the largest source of omega-3, accounting for about 85 percent of the market by volume, according

to market analysts Frost & Sullivan. GOED estimates that up to 10 percent of the total 1m tons crude fish oil produced per year is used to produce omega-3 for human consumption.

The balancing act of allergen labelling

By Jess Halliday

01-Mar-2011 Food Navigator.Com

Many of us are used to scouring food labels for as much information as we can glean. After all, too much saturated fat, salt and sugar could contribute to an early demise. But imagine if just one bite could, in the worst case, kill you in minutes. That is the reality faced by millions of food allergy sufferers around the globe, for whom information on food labels is not 'nice to know'. It can be a matter of life and death.

It is crucial, then, that food labels flag up allergens on labels. Indeed, labelling allergenic ingredients has been a requirement in Europe since EU directive 2003/89/EC came into effect in November 2005. The same is not the case all over the world: Incredibly Canada has only just unveiled plans to make allergenic ingredient labelling mandatory. Brewers have secured an exemption, presumably on the grounds that those with gluten-containing grain allergies know what not to plug.

Allergens in disguise

Especially important, however, is the need to draw attention to allergens in product formats where a consumer wouldn't expect to encounter them. If you are allergic to fish and seafood, you know you will be better off ordering a steak. But dairy proteins in a fruit drink? Soy in a doughnut? Go figure.

Such added extras are even more likely to crop up when food manufacturers are looking to bolster protein to give foods a functional edge. And there is essentially nothing wrong with that, as long as the allergens are marked as **BIG** and as **bold** as can be.

Last year New Zealand company Fonterra withdrew from market a clear beverage product containing bovine whey protein due to poor sales – but not before two children with dairy allergies suffered reactions. Because the product was clear it did not occur to the parents or carers to check the label, where the dairy ingredient was noted.

Labelling de-sensitisation

But there is another issue at play: the risk of de-sensitising allergen sufferers to warning use through excessive and inappropriate use of 'may contain' wording. This refers not to allergenic ingredients, but to the chance of a tiny amount of allergen slipping into a product because there are sometimes nuts, soy or eggs used in the factory.

There is no clear instruction for precautionary labelling in case of cross-contamination in EU directive, but in these litigious times food manufacturers prefer to cover their backs and use 'may contain' to shift the responsibility to the consumer.

If they use these two words on every product, however – even those for which controls are so tight that no allergen is going to slip through even if it is wearing a wig and a false moustache – the effect will be to narrow further the pool of products sufferers can eat unnecessarily.

More than that, it may give the impression that 'may contain' exists to protect the manufacturer rather than the consumer – whereas in fact, the probability of allergens slipping will be far higher in some cases than in others. Ignoring the 'may contain' label on one product may be fine. On another it could be catastrophic.

Where next?

The UK's Food Standards Agency is set to conduct a survey of sample chocolate and biscuit-type products this year to determine the extent of use and the nature/wording of 'may contains' labelling as well as providing quantitative measurements of milk, peanut and hazelnut allergens. These data will be used to determine how closely the advisory labelling correlated with actual levels of allergens present in the foods.

This will certainly help. Also helpful will be the establishment of action or threshold levels for peanuts, milk and eggs, expected in 2012 in the UK following extensive research. The Food and Drink Federation has published some sensible guidelines, too, in which it proposes shifting from the hazard-based approach to a more consistent risk-based approach

whereby manufacturers carefully assess the risk of cross-contamination with allergens and only use 'may contains' terms where this risk cannot be controlled.

Once in place these initiatives will help. They will help make the grocery store a less daunting place for allergy sufferers and their parents or carers – and the dinner table a less dangerous place. In the meantime, correct and safe food allergen labelling sits on a knife edge. There's no space for complacency, either by manufacturers or by consumers.

China bans flour bleaching agents

By Jane Byrne , 02-Mar-2011 Bakery & Snacks.Com

The ministry of health, in a statement on its website, said benzoyl peroxide (BPO) and calcium peroxide are no longer required for incorporation into flour given the fact the country's processing techniques and wheat planting had improved, reports official news agency Xinhua.

Flour is mostly used to make noodles, dumplings and steamed buns in China, especially in the north. Manufacturers are no longer allowed to produce the two food agents or use them in flour production beginning May 1, 2011. However, flour and related products containing the additives are allowed to be sold until the shelf life of such products expires. The move follows a public consultation on the use of such additives in foods, with calls for BPO to be outlawed in the wake of the 2008 melamine contamination incidents.

Approval for the use of BPO in flour production was given in 1986. Under current Chinese food additive regulations, the maximum volume of the additive which can be used in one kilogram of flour is 0.06 grams. In April last year, Xinhua reported that pulverised lime was being added to bleaching agents used in Chinese flour in a bid to cut production costs and boost profits.

Bleaching agents, usually made from cornstarch, are added to flour to shorten the time needed for whitening. Substituting cheaper and heavier lime for cornstarch cuts the cost of producing the bleaching agent, which is sold by weight. And yesterday saw Su Zhi, director of health inspection and supervision bureau under the Ministry of Health, reveal that Chinese police have arrested 23 people for allegedly producing, marketing or using illegal food additives in 2010.

EFSA rejects 'heart cheese' health claim

Richard Clarke, Functional Ingredients

Mar. 7, 2011

The dossier was submitted by Estonia-based Piimandusühistu E-Piim under the Article 13.5 channel of the European Union's Nutrition & Health Claims Regulation. The company produces Harmony, a brand of Edam-style cheese called Sūdamejuust – or 'Heart Cheese' in English – that contains the probiotic bacteria *Lactobacillus plantarum* TENSIA.

Piimandusühistu E-Piim applied for the claim: "Regular consumption (at least three weeks) of 50g/day Sūdamejuust of Harmony brand comprising probiotic *Lactobacillus plantarum* TENSIA helps to maintain the cardio-vascular system/heart health through reduction of blood pressure." The company submitted four unpublished studies to back its application. All, however, were considered inadequate by EFSA's Panel on Dietetic Products, Nutrition and Allergies to prove the claim.

In its opinion, EFSA said: "In weighing the evidence, the panel took into account that the only randomized, placebo-controlled human intervention study provided did not show an effect of consumption of *L. plantarum* TENSIA in Edam-type cheese on blood pressure. The panel concludes that a cause and effect relationship has not been established between the consumption of *Lactobacillus plantarum* TENSIA in the semi-hard Edam-type 'heart cheese' of Harmony and maintenance of normal blood pressure."

FSA survey reveals what consumers don't know about food

By Mike Stones, 08-Mar-2011 Food Navigator.Com

Based on more than 3,000 face-to-face interviews with randomly-selected adults across the UK between March and August 2010, the survey also revealed that less than one-in-10 (9 per cent) correctly identified the maximum adult daily intake of salt was 6g.

Saturated fat

More positively, the survey found that most respondents rated a variety of factors as important for a healthy lifestyle: 99% said eating fruit and vegetables was very or fairly important. 94% said that eating less salt was important and 92% said that limiting foods high in saturated fat was important.

Andrew Wadge, FSA chief scientist, said: “Food and You was designed to help us understand what influences people’s behaviour in relation to food and to chart whether people follow government advice. Subsequent waves will enable us to assess food behaviour changes over time, which will be extremely useful to the Agency as we think about the areas of our work that we need to prioritise.”

The next Food and You survey will take place in 2012. Meanwhile, the survey also revealed that most respondents claimed to follow recommended practices in relation to cleaning, cross-contamination, chilling and cooking food. For example, 84% of respondents claimed that they always wash their hands before preparing food.

Raw meat

But despite FSA advice not to wash raw meat and poultry, 41% said that they always washed raw meat and poultry while 42% wash raw fish and seafood. Only 46% of people were able to correctly identify the temperature of a fridge as ranging between 0 and 5°C.

Uncertainty also surrounded the best way to judge whether food was safe to eat. 72 per cent of respondents said they often used smell while 56 per cent said they used visual appraisal to judge if food was safe to eat. The recommended method of checking the use-by date was identified by only a quarter of people.

The survey was carried out by research agency TNS-BMRB, the Policy Studies Institute (PSI) and the University of Westminster carried out the first wave of Food and You on behalf of the Agency. Respondents’ judgments about the types and proportions of foods needed for a healthy balanced diet were based on the FSA’s eatwell plate - a pictorial representation of a healthy balanced diet.

It was commissioned in 2009, before the responsibility for nutrition policy moved from the FSA to the Department of Health in England and to the Assembly Government in Wales. No one from the Department of Health, which now carries responsibility for the report, was able to comment on the survey.

Fighting to get caramel color ingredient off Prop 65 list

On Jan. 7, 2011, based on a technical report from the National Toxicology Program (NTP), the California Office of Environmental Health Hazard Assessment (OEHHA) listed 4-methylimidazole (4-MEI) as a carcinogen. A group of plaintiffs—the California League of Food Processors, the American Beverage Association (ABA), Grocery Manufacturers Association, and the National Coffee Association—have since filed a lawsuit against the OEHHA for its wrongful listing of 4-MEI under Prop 65. In the new ePerspective post, ABA’s Senior Vice President of Science Policy Maureen Storey delves into the NPT report and other studies to offer her perspective that this ubiquitous food ingredient, often used in caramel colors, is not carcinogenic. And by doing so, she questions the rationale behind how public policy is set. She asks: Should the public be concerned when a regulatory agency declares a potential health risk when the animal data are conflicting and there are no human data?

IFT Newsletter March 9, 2011

Reformulate, but forget food safety at your peril...

By Ben Bouckley, 08-Mar-2011 Food Navigator.Com

Evangelia Komitopoulou, head of food safety at food research organisation Leatherhead told FoodManufacture.co.uk that new product development (NPD) takes from a few days (for flavour variants) to one month (using existing processes) or several months for something new.

It's a bug's life...

But given that salt and sugar, for instance, are vital food preservatives that reduce water activity (lower values will decrease water available for microorganisms to grow), Komitopoulou warned that lowering levels raises potential safety issue, which if only compensated for at the end a given project risks jeopardising its success.

“Examples ... would involve the reduction of salt at levels below 3.5% in meat or fish products with prolonged storage at chilled conditions, as this would allow for the growth of *Cl. Botulinum*,” she said. “Total sugar levels below circa. 65% in jam or preserves could allow for the growth of osmophilic yeasts or moulds. Replacement of acetic acid by, for example, citric or lactic acid in mayonnaises or pickles would reduce the level of preservation, as the latter acids are much less active as antimicrobials.”

Delicate balancing act

With formulation a delicate balancing act, Dr Wayne Morley, Leatherhead head of food innovation, also warned that reducing the ‘fat phase’ in a given product risks increasing water levels in some cases – with associated salt and sugar that could compromise a brand’s health credentials.

Komitopoulou said that product formulation teams are increasingly turning to free or bespoke predictive modelling tools, to get preliminary indications of the safety and microbiological stability of new products, as well as ‘spiking’ them and using real time ‘product challenge testing’ to assess safety.

She added that one method used to curb microbial growth involves increasing the acidity of foods: this depends on the acids used to deliver specific levels, water activity and the type and level of sugars/salts used. “For example, growth of *Campylobacter* spp is observed under pH (4.9-9.0) and water activities of 0.98-0.99aw [water activity]. *Salmonellae* are able to grow in water activities as low as 0.94aw and pH conditions of pH 3.8-9.5,” Komitopoulou said.

Although low pH (highly acidic) products such as mayonnaises and pickles do not generally present food hazard issues, she added, microorganisms such as lactics, yeasts and moulds can still cause spoilage.

Modified atmosphere packaging

In tandem with formulation expertise, modified processing techniques can also extend product shelf life, said Komitopoulou: “Such techniques include drying, modified atmosphere packaging (MAP) and nitrogen packing of ingredients such as unsaturated fish oils, or other ingredients that have an easily oxidisable oil: [such as] rice, coffee powder.” She added that MAP combined with low temperatures is being used to extend the shelf life of cured hams and other meat products, as well as part-baked breads (the latter stored in ambient conditions), cut vegetables and fruit.

Food Science & Technology News

Cold-active enzyme may reduce production costs: Fruit juice study

By Nathan Gray, 01-Mar-2011 Food Navigator.Com

The study, published in *Innovative Food Science and Emerging Technologies*, suggests that it is possible to produce pectinolytic enzymes, which break down plant cell walls, for fruit juice clarification using the cheaper raw pectin rich substrates, at low temperatures.

Researchers from the Department of Microbiology at Osmania University, India, identified a yeast isolate (*Saccharomyces* sp.) which has good growth and enzyme production at low temperatures. They said that the clarification of fruit juices at low temperature by cold active polygalacturonase (PGU) enzymes and low cost fruit wastes as substrates is cost effective, and reduces the risk of spoilage from high processing temperatures.

“This isolate could be exploited for cold-active polygalacturonase (PGU) production using fruit wastes as substrates ... Cold active PGU enzyme production at 25°C was good with cheap raw pectin substrates like orange peel, apple peel and mango peel ... which are wastes from fruit processing industry,” said the authors, led by Gopal Reddy from Osmania University. “This is commercially very important as the use of cheaper raw materials reduces the production costs significantly,” they added.

Clarification

Pectinolytic enzymes (or pectinases) are enzymes that break down pectins in the primary cell walls of plant tissues. The enzymes have widespread applications in the food industry – where they are mainly used for the clarification of fruit juices, wines, coffee and tea fermentations, and the extraction of essential oils.

Reddy and colleagues explained that commercial pectinases of fungal origin are generally a mixture of enzymes including polygalacturonases (PGU), pectin lyases and pectin esterases; however they noted that esterases are “undesirable” in food and beverage manufacturing as they also produce methanol as end product.

Yeasts are also known to produce pectinases, especially polygalacturonases. The authors explained that pectinases produced by yeasts are preferred as commercial production strains because the yeast isolates are generally recognised as safe (GRAS) for food production, and also have shorter fermentation cycles. The fermentation cycle of yeasts is between 18 and 24 hours, whereas those of molds and fungus are over 48 hours.

Reddy and co-workers said that cold-active enzymes “are attractive for usage in [the] fruit juice industry as colder conditions hamper spoilage and favour milder conditions that avoid changes in organoleptic and nutritional properties.” They said that in particular cold-active polygalacturonases are very useful for fruit juice clarification. The new study screened the activity of yeasts with cold-active pectinolytic enzymes, and the best isolate was studied for growth and production of polygalacturonase (PGU) at low temperatures.

Cold production

The Indian scientists screened isolates from pectin rich spoiled fruits and vegetables (cold stored), and cold soils. Six yeast isolates with high pectin hydrolysis were identified from the screening process and tested for PGU production and activity at room temperature (25°C) and at 50°C. One yeast isolate – later identified as *Saccharomyces* sp. – was found to have good growth at both 25°C and 50°C, and was found to efficiently produce cold-active PGU enzymes at room temperature.

Reddy and colleagues explained that the cold-active PGU produced by *Saccharomyces* sp in the presence of ‘fruit wastes’ could have applications in fruit juice clarification, as the cold –active enzymes allow for milder conditions that would prevent spoilage. The enzyme in turn could be used in fruit juice clarification under cold or milder conditions which is cost effective at large scale application. “This is a significant observation as the enzyme can be produced commercially at room temperature and used ... under cold and milder conditions,” said the authors.

Salt, Sugar and Fat—Oh My!

By Joanna Cosgrove

Published March 7, 2011 Nutraceuticals World

Although fast food chains like McDonalds and Burger King have augmented their kids meal menus to include healthier fare, researchers at the University of Oregon's Lundquist College of Business found that kids as young as age three already have a penchant for salty, sweet and fatty foods, and they had little difficulty identifying which name brand fast food and soda products delivered the goods.

A group of preschoolers aged three to five were involved in two separate experiments. In the first experiment, 67 children (31 boys, 36 girls) and their mothers were recruited from preschool classes in a large city. The mothers completed a 21-item survey to report on their taste preferences of their children. The children responded to their perceived tastiness of 11 natural and 11 flavor-added foods. Photos of the foods were presented without labeling or packaging. Natural foods included apples, bananas, plain milk, fruit salad, water, green beans and tomatoes (strawberries and watermelon were the top picks); flavor-added foods included such things as cheese puffs, corn chips, watermelon hard candy, jellybeans, banana soft candy, ketchup, colas and chocolate milk (strawberry ice cream and jellybeans scored the highest).

Researchers found strong agreement in that both parental and children's perceptions matched: parents noted the desire for foods high in sugar, fat and salt, while their children showed preference for flavor-added foods, which contained these ingredients.

In the second experiment, researchers compared preschoolers' palate preferences with their emerging awareness of brands of fast foods and sugar-sweetened beverages. Participating were 108 children (54 boys, 54 girls) from five urban pre-schools. Each child was shown 36 randomly sorted cards—12 related to each of two popular fast-food chains, six to each of the two leading cola companies and six depicting irrelevant products. All children were able to correctly place some of the product cards with the correct companies, indicating their differing levels of brand recognition.

The results, the researcher wrote, "suggest that fast food and soda brand knowledge is linked to the development of a preference for sugar, fat and salt in food." The relationships, they added, appeared to reflect the children's emotional experiences in a way that said the brand name products delivered their developed taste preferences.

Researcher T. Bettina Cornwell, a professor of marketing in the University of Oregon Lundquist College of Business, postulated that it may well be that when parents repeatedly serve certain foods, their children acquire a taste for them and soon recognized what brands deliver that taste. Earlier research has shown, she said, that children given red peppers on 10 different occasions will acquire a taste for red peppers and that logic extends to other foods. Children served French fries will, in turn, develop a preference for French fries.

In a world where salt, sugar and fat have been repeatedly linked to obesity, waiting for children to begin school to learn how to make wise food choices is a poor decision, said Ms Cornwall. Children are even turning to condiments to add these flavors—and with them calories—to be sure that the foods they eat match their taste preferences.

"Our findings present a public policy message," Ms. Cornwell said. "If we want to pursue intervention, we probably need to start earlier."

Parents, she said, need to seriously consider the types of foods they expose their young children to at home and in restaurants. "Repeated exposure builds taste preferences."

Ms. Cornwell went on to add that fighting childhood obesity should begin at home. Families should first focus on reducing the consumption of low-nutrient "junk" foods and replacing them with increased servings of healthy foods. Such an approach, the researchers noted in their conclusion, moves away from issues of weight and dieting—instead targeting the development of tastes preferences.

Cyclodextrin complex may boost garlic oil stability: Study

By Nathan Gray, 22-Feb-2011 Food Navigator.Com

The new study, published in Food Chemistry, shows that the solubility and stability of garlic oil can be increased by up to 6.5 fold by inclusion in a beta-cyclodextrin complex. The authors said the inclusion complex also led to a controlled, temperature dependent release of garlic oil from cyclodextrin.

“Garlic oil, rich in organosulfur compounds, has a variety of antimicrobial and antioxidant activities, however, its volatility and low physicochemical stability limit its application,” said the researchers, led by senior author Dr Chengtao Wang from the Beijing Higher Institution Engineering Research Center of Food Additives and Ingredients, China.

But Dr Wang and colleagues explained that the use of cyclodextrin to form an inclusion complex with garlic oil reduces the problems associated with volatility, stability, and solubility, meaning the compound may have uses in the food industry.

Cyclodextrin

Cyclodextrins are non-toxic cyclic oligosaccharides that are widely used in the food industry as food additives, and for stabilization of flavours and the elimination of undesired tastes. The authors said that the inclusion complexes of ‘guest’ compounds with cyclodextrins (CDs) may enhance stability, improve the aqueous solubility, protect against oxidation, light-induced decomposition, and heat-induced changes, and mask or reduce unwanted physiological effects, and reduce volatility of the ‘guest’ compound.

Wang and his colleagues explained that CDs have the ability to form inclusion complexes with a wide variety of organic compounds, noting that the most common CDs used in formulation are alpha- beta- and gamma- cyclodextrin.

“Among the CDs, beta-CD is widely used since its cavity size is suitable for common guests with molecular weights between 200 and 800 g/mol and also due to its availability and reasonable price,” said the authors. “To the best of our knowledge, there are, so far, few reports on the inclusion complex of garlic oil and beta-CD in the scientific literature,” they added. The new study investigated the stability, solubility, and release characterization of an inclusion complex of garlic oil and beta-cyclodextrin.

Study details

Garlic oil (containing three major constituents – 35 per cent diallyl disulfide (DADS), 42 per cent of diallyl trisulfide (DATS), and 16 per cent of diallyl sulfide) was prepared with beta-CD using co-precipitation methods. Wang and co workers said the water solubility of garlic oil (GO) was significantly improved. “Compared with the solubility of garlic oil in deionized water in the absence of beta-CD, there is a 6.5-fold increase in the presence of beta-CD,” said the authors.

Temperature was reported to have a “pronounced effect” on the release rate of garlic oil from the complex. The authors observed that the complex was “very stable, and no garlic oil release from the complex was observed” at room temperature. “An obvious increase for the release rate of GO was observed when temperature increased,” they said.

In vitro testing showed the release profile to be characterized by an initial fast release phase, followed by a delayed release which reaches the plateau level of 100 per cent, said the authors. “The results of this study clearly demonstrated that garlic oil could be efficiently complexed with beta-CD to form an inclusion complex,” said Wang and co- workers.

Scientists developing ‘rechargeable’ antimicrobial layer for food processing surfaces

By Rory Harrington, 24-Feb-2011

Food Production Daily.Com

A team from the University of Massachusetts Amherst is developing a new method for modifying polymer and stainless steel processing surfaces by adding a nano-scale layer of antimicrobial compound to common surface in food processing plants – such as gaskets, conveyor belts and work tables.

“This layer replenishes its anti-microbial qualities with each repeated bleach rinse,” head researcher Julie Goddard told FoodProductionDaily.com. “So at the end of the day in a meat-packing plant, for example, when employees clean their

equipment, the regular bleach rinse will re-charge the surface's anti-microbial activity. They will not need to add any more steps."

Preliminary research had shown the technology realises a greater than 5-log reduction in gram positive and negative organisms such as *Listeria monocytogenes* and *E.coli*, she added.

The team is seeking to incorporate unique chemical structures called N-halamines onto a wide range of plastics and stainless steel surfaces. These can complex with chlorine after being rinsed in bleach and are able to regain antimicrobial activity repeatedly after subsequent rinsing. The treatment does not affect the strength of tables or trays.

Goddard recently received a four-year, US\$488,000 grant from the Department of Agriculture's Agriculture and Food Research Initiative to develop the technology.

Testing

The scientist said they are attempting to maximise the layer's durability by using covalent linkages to ensure the bonds holding the antimicrobial agent on the surface of the food contact material are strong. "As part of this project, we will demonstrate stability using a number of rigorous tests including stability against mechanical abrasion, like scrubbing with a cleaning brush, and chemical extractions like cleaning solutions," said Goddard.

She added the goal of the project was to demonstrate the applicability and robustness of the technique so that equipment and materials manufacturers could use their results to design and sell new materials. In this way the team believes the new method would cost industry less than incorporating anti-microbial into equipment, such as an entire conveyor belt construction.

At present the technique is effective at the square-inch scale in the laboratory with the major challenge to scale up the technology for commercial food processing applications. The technology is already being applied in hospital textiles whose anti-microbial properties are replenished each time they're laundered in bleach, said the group. Goddard stressed it was not a panacea for in-plant cleaning, but rather another hygiene tool that could be both affordable and effective. "It's not meant to replace thorough cleaning, which should always be in place, but it's meant to add power to the process and a further layer of low-cost protection against contamination," she said.



Microencapsulation may stabilize lycopene color properties: Study

By Nathan Gray, 25-Feb-2011 Food Navigator

The new study, published in the *Journal of Food Process Engineering*, evaluates the coloring stability of free lycopene in comparison with a microencapsulated lycopene, using the pre-extrusion coloring of a rice flour extrudate as a model for testing stability. The authors found that microencapsulation was found to have better color retention when used in the extrusion model, and also led to a twofold increase in storage stability.

"Lycopene microcapsules as pre-extrusion coloring ... were reported to be much more stable than free lycopene, under all the conditions of extrusion processing," said the researchers. "This suggests that microencapsulated lycopene is more stable under the extrusion processing as well as during storage," they said.

Color capsules

Natural colors are a diverse group of colorants, with a wide range of solubility and stability properties. Choudhari and colleagues said that lycopene is one of the nutritionally important carotenoids, and its presence in the diet may reduce the risk of cardiovascular disease, cancer and other diseases associated with aging. They noted that in addition to its potential nutraceutical properties, lycopene is also a natural coloring, giving it a "dual advantage in processed foods".

However, lycopene has poor stability, which currently precludes it from many of its possible applications in food formulations. “Microencapsulation aims to totally entrap the pigment particles in a protective network, which isolates and stabilizes the pigment,” explained Choudhari and co-workers.

Their previous research had suggested that lycopene stability might be improved via a spray drying microencapsulation process. “In our earlier work, we developed a technique for microencapsulation of lycopene ... the microcapsules had a sevenfold increase in its stability,” said the authors.

Study details

The new research evaluated the stability of the microencapsulated lycopene compared to free lycopene, for the pre-extrusion coloring of a rice flour extrudate. The effect of extrusion conditions on the retention of lycopene during extrusion of rice flour was chosen as a model to test the stability of lycopene. The experiments were carried out by extrusion of rice flour containing 1 percent lycopene microcapsules or free lycopene equivalent to that in the microcapsules.

The authors reported that the microencapsulated lycopene gave better retention of color in the extrudates than the free lycopene in all tests of stability, and under all extrusion conditions tested. Storage stability of the microencapsulated lycopene was also observed to increase twofold compared to free lycopene over a period of 96 hours.

Choudhari and colleagues said the color retention in the pre-extrudates may be further improved through the use of appropriate packaging, and the use of optimum processing conditions, but this requires further investigation.

