# PFNDAI Bulletin (June 2012)


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

**22, Bhulabhai Desai Road ,Mumbai -400026( India)**

**Tel: +91 022 23538858**

**Email: pfndai@pfndai.org**

**Website: http://www.pfndai.com**

# Editorial

**One** of the things that grew along with the economic growth in India was advertising. Earlier much of the advertising was in print media and some in TV also. There used to be just Doordarshan when people used to wait for their favourite programme to begin like one based on Bollywood film songs. There used to be at least 10 minutes of advertisements just before the programme. There also used to be ads in cinema houses just before the movie started. People used to enjoy them and these were considered with a bit of tolerance and mild amusement.

Over the years advertisements grew not only in numbers but in their innovative aggression into people's lives. You see now ads everywhere and even where one does not expect to see. Morning paper used to be a pleasure to see the headlines. Even when one walked on the street or railway platform the newspapers used to be lined up and one could get the glimpse of headlines. Now that pleasure is almost gone with half or full page cover advertisements will completely blank out headlines. Even with half page ads it is difficult to hold up the paper with that half page dangling and dipping into your coffee.

It used to be a half hour news that we used to enjoy on TV but now it only about 20 minutes or so with last 7 to 10 minutes of either ads or previews of forthcoming news or talk features. It really takes out the pleasure of watching TV with so many ads. Even the HD channels of TV initially promised no ads and slowly they introduced some and now they are almost same as regular channels. Even internets have started ads some so brazen that suddenly when you are surfing suddenly a whole page of ad comes on and disturbs you. Food industry although has its share of ads and in this growing competition in market companies are trying to outdo each others. Even when there are certain guidelines regarding advertisements some companies are bold enough to test the boundaries.

The most problems are there with nutraceuticals and dietary supplements where they promise all kinds of miracle cure if one consumes their products. Some of the companies exercise caution, but others are reckless. Sometimes one wonders whether the marketing department ever consults the scientists in the company before they release the ads. There are all kinds of claims made about the product some are yet to be proven and others may not work only when inadequate amounts of active substance is present.

Earlier MRTP (Monopolies & Restrictive Trade Practices) Act could be used by anyone who felt that ads were incorrect and exaggerated. Since it has been repealed one has to go to ASCI (Advertising Standards Council of India) which still has to take adequate care of problems in food ads. FSSAI has given advertising guidelines but as long as regulations are not there it will not deter the culprits.

Although there have been some problems in the past, food industry has avoided serious difficulties. With nutraceuticals and functional claims there is a likelihood of misuse, so unless authority takes proper steps there is a possibility of serious problem shaping up and when it does it will be difficult to stop it.

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

# Coming Events

**29 November – 1 December 2012**
### BioFach India
International Organic Trade Fair
Palace Grounds, Bangalore
Indo-German Chamber of Commerce
Tel: 011-47168830
Email: priya@indo-german.com
Web: www.biofach-india.com

**01-04 December 2012**
### Agrotech 20121
Trade Fair Dept., CII (Northern Region)
Mobile: 09970834888
Web: www.agrotech-india.com

**07-10 December 2012**
### Pack Plus 2012
Print packaging Com Pvt. Ltd.
Tel: 022-27812093
Email: info@packplus.in
Web: www.packplus.in

**13-15 December 2012**
### AIFPA Food Show 2012
IARI Exhibition Ground, PUSA, N. Delhi
Tel: 011-26510860 Mobile: 09971324487
Email: saurabh.c@aifpa.net, harender@aifpa.net
Web: www.aifpafoodshow.net

**10-11 January 2013**
### 1st International Conference on Innovations in Food Processing, Value Chain Management & Food Safety
NIFTEM (National Inst of Food Tech Entrepreneurship & Management
NIFTEM Campus, Sonepat, Haryana (Near Delhi)
Tel: 0130-2281000/2219759-64, Email: ifpvs2013@gmail.com
Web: www.niftem.ac.in

**11 December 2012**
### EU Nutrition & Health Claims Regulation
Benefiting from the Present – Succeeding for the Future
Brussels, Belgium
Tel: +32 (0) 2 218 14 70
Web: www.eas.eu
Email: workshop@eas.eu

**6-7 March 2013**
### Nutracon
Anaheim, California, USA
New Hope Natural Media
Tel: 866-458 4935
Email: conferences@newhope.com
Web: www.nutraconference.com

More Events on Pg 32

# Sensory Analysis of Food Products

**By Prof. Jagadish Pai**

Foods and products are complex mixtures a large number of substances most of them natural with innumerable variations due to variety, growing and harvesting conditions as well as preparation and storage methods. To cite example of mango and products, the taste and aroma of mango will not only depend on the type of mango like Alphonso, Totapuri, Langda, Dashehari etc. but also due to where the Alphonso may have been grown, weather conditions during growth, maturity and ripening, extent of ripening and storage etc. Further, if pulp or juice or chutney is prepared, the processing conditions will also affect the final taste and flavour of the product.

It is very difficult to analyse the taste and flavour even when there are sophisticated instruments are available now. When these were not available, traditional organoleptic testing was carried out by experts on such products who would depend on their senses to evaluate the taste, aroma, colour etc. of foods. There are tea tasters and wine tasters who are still sought after because their keen senses of taste and smell and who could easily distinguish a great tea blend or wine from the ordinary ones. Such experts are rare and unaffordable for most companies. For most food products consumed by common consumers, such experts may not be needed. However, some sort of segregation based on quality parameters like taste, aroma, colour, texture, appearance etc. are needed so consumers will prefer to buy these products.

**Why use sensory evaluation?**

Sensory evaluation can be used to:

- Compare similarities/differences in a range of dishes/products;
- Evaluate a range of existing dishes/food products;
- Analyse food samples for improvements;
- Gauge responses to a dish/product, e.g. Acceptable v unacceptable;
- Explore specific characteristics of an ingredient or dish/food product;
- Check whether a final dish/food product meets its original specification;
- Provide objective and subjective feedback data to enable informed decisions to be made.

## Difference Between Instrumental & Sensory Analyses

Some of these properties could be evaluated by instruments. Colour for example can be measured by various colorimeters and spectrophotometers. Colour is made up of mixing of basic colours so you get a vast number of various shades. There are instruments that can simulate human eye and measure colours in similar manner. Smell, odour, fragrance or aroma is not so simple, as it is made up of hundreds of different volatile substances of different structures.

Although the information obtained by instrumental analysis is somewhat different from the way human senses evaluate food, the advantage of instruments is that they give highly reproducible results. Whereas the human sensory evaluation is affected by various factors including age, gender, individual sensitivity, environment, health of the individual etc. However, food is ultimately accepted or rejected due to its sensory impact on the consumer so there is a need for sensory evaluation in any product development.

Since colour and appearance are the first sensations when consumers see the product colour of the product as the eyes see it can be used to evaluate it. When the fruit is very attractive by sight the consumer comes closer and takes a whiff of it to see how it smells as its ripeness can be sensed by smelling it. Fried foods also can be evaluated by smelling for presence of rancidity in the product.

Fruits can also be touched to know if they are soft. Ripening also has that effect. Sometimes artificially ripened fruits may still be hard. Touch can be used to evaluate the freshness of bread. Fresh bread is soft whereas stale bread is hard, so consumers squeeze it. Various properties of food are sensed including hardness, crispness, smooth or rough texture, stickiness or powdery feeling can all be sensed by our mouth.

Taste is one of the most important sense which will make consumer finally accept or reject the food. It is the combination of four basic tastes sweet, salty, sour and bitter, the right combination of which makes it acceptable.

Even other properties of foods including hearing are important. When potato wafers are broken the crunchy sound is very appealing. When crispy food is put in mouth the crunchy sound is very enjoyable. Even the temperature is critical in many foods like ice cream, coffee or tea, dosa or vada. Chocolate at warm temperature melts and is not appealing while a hot chocolate brownie is more enjoyable.

Thus such evaluation can be rapidly and cost effectively performed using human panellists who will taste them and will give their evaluation.

## Setting-up Sensory Evaluation

As there are natural variation in sensitivity to different food properties like smell, taste etc. it is very important that proper care must be taken in selecting the panellists and train them and give them adequate instructions to obtain reproducible and comparable results. Younger people have more taste buds and greater sensitivity but older people can concentrate better, so a mix of two is good. Smokers and people suffering from cold have lower sensitivity. Also eating highly spicy foods, taking drinks with lingering aftertaste, sucking candies or chewing gums also must be avoided at least 30 min before test. Even strong perfumes and cosmetics can interfere.

If the panellists are highly trained then just five panel members are adequate for flavour profile but for statistical analysis 20 to 30 and in hedonic tests with untrained panellists at least 30 to 50 should participate. Normally the panellists receive some training the extent depends of final objective. To evaluate differences in product development or in selection of raw material highly trained panellists are used while for market survey or acceptability of product minimally trained consumers are adequate. These panellists are guided by a panel leader who must be familiar with testing methods and statistical analysis.

The environment of testing should be clean and without smells so panellists will only smell foods. Lighting and temperature should be comfortable. Sometimes coloured lamps are used so the colour of the food will not affect the judgement of odour and taste. Odour and taste may cause fatigue. To avoid that, in between odour tests a small break is taken to breathe in fresh air. In case of taste test lukewarm water may be used for rinsing mouth.

## Sensory Training

Panellists may be trained in simple exercises in recognising tests for four basic tastes, odour recognition tests, aroma perception, and exercises with other senses.

There are four basic tastes: sweet, salty, sour and bitter. There are taste buds that are situated at different places on tongue and when substances having these tastes come in contact with these taste buds, a neuro-signal is sent to the brain which senses the taste. The sweet is sensed easily at the tip of the tongue, salty at the tip and edge, sour at the edge and bitter at the back. Taste buds for bitter are also deep so bitter sensation lasts longer.

### Taste

Aqueous solutions of sugar (sucrose), salt (NaCl), citric acid and caffeine in various concentration are prepared and presented to trainee for acclimatising them to sweet, salty, sour and bitter tastes respectively. Taste must move the

liquid around so it touched all parts of tongue since taste buds are situated at different areas. Care also must be taken not to swallow the samples as when there is a large number of samples person may feel sick after many samples. Different people have different sensitivity although ability to sense and recognise the tastes could be developed and sharpened by practice to some extent.

## Odour

Nose has several important functions. It filters and warms the air that we breathe. It also helps in smelling substances. We sense odour at the top of the inside of nose called regio olfactoria. When we sniff air swirls in upper passages coming in contact with this region before it enters lungs via throat. Substance having smell has molecules in air which enter nose along with air and makes contact with these areas. Not all volatile substances will have smell. Some substances can be sensed at extremely small concentration while others are needed at much higher level.

Since there are many odours it is difficult to classify them. Also our odour memory can improve only by practice. Most difficult odours to recognise are familiar ones as we do not pay enough attention to them but ones which are strange we can remember.

We get odour fatigue when we smell similar odours one after the other e.g. only sweet or fruity or cooling odours. However, if we switch to another type we can recover from fatigue. Thus to avoid fatigue by sweet odours of vanillin we can switch to fruity odour of lemon oil or vice versa. We can also use cooling odour of peppermint oil similarly. Cold or stuffy nose makes analysis of odours difficult. Menthol crystals or inhalation stick helps.

Beginners may not be able to analyse a composition of odorants or aroma consisting of several odour compounds. Ten people may describe it in ten different ways. A trained person may perceive them as having different odour components and might be able to describe them in the sequence of their perception.

Presentation of common odorants is given for beginners. Single odorants and essential oils have been used for odour recognition test as in the table.

**Odour Recognition Test**

| Sample No.: | Odour Description: | Odour Recognition: |
|---|---|---|
| 1 (Aldehyde C-18) | sweet, nutty | coconut flakes |
| 2 (Citral) | fruity | lemon |
| 3 (Anethole) | cough syrup | liquorice |
| 4 (Diacetyl) | sweet fatty | butter |
| 5 (Benzaldehyde) | baking flavouring | almonds |
| 6 (Eucalyptus oil) | cooling | cough drops |
| 7 (Eugenol) | dentist | clove |
| 8 (Mandarin oil) | fresh, fruity | orange peel |

Some odourants may be strong smelling so they are diluted with absolute ethanol. Samples may also be dissolved in octyl phthalates which makes the odours last longer. Smelling strips have also been used made of filter paper, which are

dipped into bottles with small opening. Smelling strips after dipping may be held to allow alcohol vaporisation before smelling.

Some ground spices develop stronger odour when diluted say with sugar as in cinnamon sugar or vanillin sugar. Some odorants have a strong pungent component that disturbs recognition of odour. Here aqueous solutions may be prepared in beakers.

A composition consists of different substances that make up aroma or flavour composition e.g. fruit aroma or flavour. Any natural flavour or aroma is composed of several components the combined effect is perceived as flavour or fragrance or aroma. Flavour is commonly considered to be a combination of taste and smell.

The aroma of a product can be perceived by both smelling and tasting e.g. coffee aroma. Nose has opening from front as well as from back via throat. Substances are more strongly perceived by tasting than by smelling since when in mouth they become warmed and odourous substances evaporate and enter from back of nose while eating so both sense and taste sensations are perceived. As swallowing many samples is problematic for tasters, 'slurping' has been developed by coffee and tea tasters. This carries the aroma-filled air to nose via throat. Wine tasters are less noisy but with wine in mouth they use chewing motion while gently inhaling air. As wine aroma is more volatile vigorous slurping is not necessary.

### Aroma Recognition Tests

This is done in two steps: by smelling and tasting samples. As samples are better recognised by tasting smelling is done first to get only odour. To avoid differences in appearance e.g. colour, it may be masked by coloured light or using coloured beakers. Undiluted natural product with well-blended flavour show high aroma or flavour harmony and we do not smell single lactone or ester but a complex fruit aroma. By diluting with water this aroma harmony is destroyed and we are able to perceive single components. It also helps analyse off-flavours such as rancidity which is masked by sweetness in cookies or by spices in sausages.

### Other Senses

While tasting foods, we sense temperature (hot, cold), pain (sharp, biting, pungent), tactile (chalky, soft, thick, sticky), and auditory (crisp, crackly), colour/appearance etc. These properties of food are quite important in the overall sensory evaluation. Lukewarm tea or coffee and warm ice cream will not be acceptable. Spicy food is appealing because of its pungency. Some foods are preferred because they are soft e.g. bread while some of the chocolates or candies with sticky feeling is preferable. Wafers or chips or crackers are rejected when they are soft and not crisp.

Colour is the first sense which attracts us to foods e.g. red apple or golden mango. Beverages and ice creams as well as candies are coloured attractively for this reason. Even the shape and size are important. Broken pieces of cookies, chips are not attractive. A beautiful cake or pastry will already get high marks even before eating. In an expensive restaurant, chefs arrange food in fancy manner to increase the appeal and people are ready to pay extra for that.

When analysing foods these other qualities and properties must be taken into account while presenting the food. These properties must also be familiarised by trainees as they become part of evaluation. In fact flavour of food is total impression of all the above sensory properties experienced simultaneously.

### Threshold

The substances in food must be at certain minimum concentration in order to be perceived. If it is at lesser concentration, it may not be sensed at all. This is the threshold concentration and this varies will individuals. At very low concentration it may not be sensed at all but at certain higher concentration it could be sensed but may not be

recognised. For example, if we offer extremely low sugar solutions, we may not be able to distinguish it from water. At certain higher concentration we might be able to distinguish it from water but may not perceive it as sweet and at still higher concentration we perceive its sweetness and can tell if sweetness increases with still higher concentration. Finally after a particular high concentration any further increase may not correspond with greater sweetness.

Physiological effect occurs in thresholds. Women are more sensitive to sweet and salty while men are more sensitive to sour. Sensitivity for sweet and sour decreases with age.

### Difference Tests

These are analytical methods wherein panel members try to see if there a difference between two samples. The differences may be minute so tests are difficult and require high sensitivity which could be acquired by training. There are three main difference tests namely, Paired Difference Test, Triangle Test and Due-Trio Test.

Here also very small differences are difficult to recognise but could be practiced. Beginners may be able to tell say 30% difference (e.g. 1% and 1.3% NaCl solutions). With training a difference of 10% could be recognised (e.g. 1% & 1.1% NaCl solutions).

### Paired Difference Test:

Several samples are given to each panellist. Each pair consists of control sample (e.g. apple juice) and analytical sample (e.g. apple juice with added sugar). Pairs differing only in concentrations of added sugar for example (A= low & B = higher) may also be presented. Question may be asked e.g. “which is sweeter”. One may try to analyse more fruity, more rancid etc. also but only one question is posed in these tests.

Position of the analytical or more concentrated sample in each pair is arranged randomly to avoid guessing. Normally four pairs are given arranged differently making a set and panellist is asked to identify.

It is commonly assumed that adding sugar makes a fruit juice only sweeter and adding salt to vegetable soup saltier. However, this is not always the case. When small amounts are added they may only be recognised by very sensitive people, while fruit juices may be perceived by others as being less sour, more fruity or well blended or soups may taste milder, less raw etc.

### Triangle Test

This is the most commonly used difference test. Three samples are given, two of them being identical and one different. The question asked is which the odd sample is. Either control or analytical sample is presented in duplicate. Additional questions may be asked about the degree of difference or which is better etc. In developing products, such test may be used with questions like which sample is more aromatic or refreshing or minty etc. So not only whether panellists can tell the difference but if there is a noticeable difference they get additional information from the tests.

### Duo – Trio Test

This is a cross between the paired (duo) and triangle (trio) test. The subject is given one sample and then separately two more samples and the question is asked which among the two samples is identical to the initial sample. This test is sometimes used for samples with sharp or burning taste (pepper) or for a lingering aftertaste. So it might take some retasting of samples is needed.

## Ranking Tests

While difference tests use only two samples at a time, when you have several samples the ranking tests are carried out to save time and efforts. This is quite useful when there are several commercial samples and one is trying to find out which is the best or while developing several combinations of flavour one wants to narrow down to one or two possible final preparations. In the latter event samples may have increasing intensity of sweetness, aroma etc. This may also be useful in evaluating several other sensory properties including colour, texture etc.

Samples used here are different brands of chocolates or soft drinks or biscuits etc. having similar flavour. Ranking in order of increasing preference is best done with consumers or untrained persons during test marketing. Trained panellists normally do not provide representative results for consumers.

## Flavour Profile

As flavours are composed of different substances that give different taste and odour sensations as well as other senses which are important in the totality of the food product acceptance and also since experts can pick out these different sensations it is possible to analyse the total flavour as components of different sensations are then scoring each one separately. With beer, for example, the tingly feeling of carbon dioxide is the first perceived component. The next component may be mouthfulness followed by a shortlasting bitterness.

In coffees the first aroma is perceived and then the bitterness. Ice cream first gives cooling sensation. Thereafter we notice whether melting is smooth or whether any ice crystals are perceived giving rough or sandy feeling. Finally the sweetness and then aroma (vanilla or chocolate) is perceived. Thus each of these sensations can be analysed and quantified by panellists and then compared with different products. That gives an idea about the differences among different products as well as when developing a product one can get an idea about which property needs to be improved.

## Flavour or Odour Harmony

This is desirable as the total flavour with respect to smell should be round and no single component should be predominant. When the harmony is perfect it is very difficult to even notice the components that make the total flavour. When aroma components may include highly volatile as well as less volatile components in order to get the simultaneous impact they must all make an impact at once. To slow down volatiles fixative compounds are used whereas boosters are used to volatilise others. Hence when a well-rounded flavour is perceived it is very difficult to notice individual components. When such flavours are analysed usually dilution is used to break the harmony so different notes could be sensed.

## In Conclusion

Sensory evaluation is used to improve sensory quality and characteristics of their product, to ensure consistency in different batches, to understand the consumer preferences, how their product performs against competing brands, and whether consumers can detect differences between different brands or changes made in formulations. This is a science that measures the responses of people to products perceived by senses including sight, smell, taste, touch and hearing. It is used to understand similarities and differences among products. Sensory resources are cost effective and give precise information rapidly. They serve as a bridge between technical and consumer worlds.

# Research in Health & Nutrition

## Keep eating your carrots despite beta-carotene study

May 7, 2012 by Hank Schultz in New Hope 360

A study released last week found that too much beta-carotene might be bad for you. Should we be surprised? I mean, too much of anything can be bad for you, right?

Beta-carotene is the vitamin A precursor and most familiar member of the carotenoid family that's found in carrots and many other foods. Beta-carotene when ingested gives rise in the body to vitamin A (retinoic acid), which activates hundreds of genes and is critical for eye and skin health, metabolism and immune function. The vitamin A added to foods and supplements is usually a synthesized form of this end product. But the researchers found beta-carotene can give rise to other compounds, too, and not all of them are helpful.

The study, conducted at Ohio State University, found that some of the molecules derived from beta-carotene actually block the function of vitamin A. So paradoxically, taking in too much beta-carotene can result in too little vitamin A, the researchers found.

In the metabolic pathway that gives rise to vitamin A, an enzyme snips the beta-carotene molecule neatly in half, thereby creating two vitamin A molecules. But, in a process that is still not fully understood, different enzymes can break the beta-carotene molecule up into asymmetric parts and some of these resulting substances produced the paradoxical effects in the OSU test.

## Beta-carotene in cancer trial

The study helps provide a possible explanation for the results of a trial conducted in the early '90s in Finland, in which subjects at high risk for lung cancer—heavy smokers and asbestos workers—were given massive doses of beta-carotene as a cancer prophylactic. The test was suspended when the beta-carotene group started developing cancer at higher rates than the control group. Headlines at the time ran something along the lines of: Can beta-carotene cause cancer?

"Those trials are still sending shockwaves 20 years later to the scientific community," said Earl Harrison, Dean's Distinguished Professor of Human Nutrition at Ohio State and lead author of the study. "What we found provides a plausible explanation of why larger amounts of beta-carotene might have led to unexpected effects in these trials."

But the OSU study also points to a question that surrounds a lot of nutrition research, namely, applying a pharmaceutical double-blind, placebo-controlled model to study how substances in the diet affect health. In this approach, a very high dosage is often used to provoke a discrete reaction in the body. But the helpful molecules found in functional foods and dietary supplements often affect a broad array of reactions, and do so in a gentler, more holistic way than the take-no-prisoners mode of drugs. And the dosages used in the drug test approach often go far beyond what could be found in the diet or even in dietary supplements. The OSU beta-carotene study, for example, simulated dosages that greatly exceed what even Bugs Bunny could get in a day.

## Dosages determine toxicity

So, while it is interesting and important that the OSU researchers identified these nefarious beta-carotene metabolites and shed some light on how they might work to block vitamin A, it's not a big surprise to find that an overdose could cause problems (the OSU study, by the way, examined the actions of the beta-carotene molecules in Petri dishes).

Similar issues have been noted in resveratrol research, in which that polyphenol starts to act as pro-oxidant (as opposed to antioxidant) at high dosages. This is unlike the way in which most pharamaceuticals work. They tend to do what they do at higher rates with higher dosages, until you reach toxicity. As medieval physician Paracelsus famously noted, the dosage determines the toxicity. Vitamin A is toxic at high doses. Water is, too.

I have not seen reporters in the mainstream media pick up on this study to dump on supplements and functional foods that feature beta-carotene, as so often is the case. The OSU researchers weren't suggesting people forego eating foods high in beta-carotene. So go ahead and enjoy your vitamin A supplements (within reason) and eat as many carrots as you like. You can't eat your way to beta-carotene toxicity, even if you are Bugs Bunny.

❁❁❁

**New protein study could shake up sports nutrition market**

Todd Runestad, Functional Ingredients 2012-04-26

A study out this week could add a new player to the protein market that's long been dominated by whey. At the Experimental Biology meeting in San Diego on Monday, Blake Rasmussen, PhD, of the University of Texas Medical Branch, presented findings that show a blend of protein sources—50 percent casein, 25 percent whey, 25 percent soy—was superior to whey alone for prolonging muscle building and recovery after exercise.

"Whey protein has been given considerable notice as the gold standard ingredient after exercise to enhance muscle growth," Rasmussen said. "The main problem with whey is it's fast digesting—the anabolic response in muscle is only about an hour. We wanted to prolong the anabolic response with other protein sources. We found muscle protein synthesis is elevated for a longer amount of time with a protein blend versus whey protein."

The combination of protein blends was determined in Rasmussen's previous preclinical work with rats. Soy, whey and casein protein are all absorbed at different rates during digestion. Whey protein is referred to as a "fast" protein because it is rapidly absorbed, between 30 and 60 minutes, Rasmussen said. Soy is an intermediate protein, taking between 60 and 120 minutes to digest. And casein is a slow protein, requiring between three and five hours to digest.

"The combination gives you a quick increase in protein synthesis, and it gets sustained," said Rasmussen. "It's a prolonged delivery to muscle that the muscles use for recovery."

The double-blind, randomized clinical trial followed 19 young adults before and after ingestion of about 19 grams of protein from the blend or about 17.5 grams of whey protein alone.

"Your muscles don't recover in 30 minutes. It takes at least 24 to 48 hours for your muscles to recover after a resistance exercise," said Greg Paul, global marketing director for sports nutrition and weight management at Solae, a soy supplier that sponsored the study.

**Not just for athletes anymore?**

It was only five years ago when research showed that protein should be an important part of sports nutrition products. Before then, the game was typically provided by the likes of Gatorade-style drinks: with fast carbs and electrolytes such as potassium and sodium.

Whey became the go-to protein source in beverages because it quickly fed muscles. Whey also appears better than soy for producing muscle synthesis because of the presence in whey of the amino acid leucine, which has been shown to uniquely act as a stimulatory signal for muscle protein synthesis. But for athletes and weekend warriors alike, using a blend of protein sources that absorb in the body over time means muscles are being fed until the next meal.

The addition of soy is also important because of soy's particular properties including as an antioxidant and as an anti-inflammatory, which are both key attributes in muscle building beyond anabolic effects. And this could lead to the next great demographic for protein products: the elderly. "Protein blends are useful for sports nutrition," said Rasmussen, "but also for those interested in aging and maintaining muscle mass as we age. This could potentially be a great intervention for aging."

To date, products targeting elderly nutrition with protein-centric value propositions are few and far between. The trend of aging baby boomers, coupled with research demonstrating the value of protein blends in maintaining muscle mass, ought to be of interest to marketers and product developers.

❁❁❁

## Wolfing Down Your Food Doubles Diabetes Risk

May 8, 2012 Food Product Design

FLORENCE, Italy—Following mom's advice to chew food slowly may just be secret to lowering your risk for type 2 diabetes, according to new research presented at the joint International Congress of Endocrinology and European Congress of Endocrinology. The findings suggest people who wolf their food down are two and a half times more likely to suffer from type 2 diabetes than those who take their time.

Researchers from the Lithuanian University of Health Sciences compared 234 newly diagnosed type 2 diabetes patients to 468 people who were free from the disease. Cases and controls (ratio 1:2) were matched by gender and age (±5 years). The participants filled out an in-depth questionnaire designed to collect information on possible diabetes risk factors in which they rated their eating speed compared to others. Body measurements were also taken according to World Health Organization recommendations.

After adjusting for other risk factors, the researchers found a more than twofold increase in the risk of type 2 diabetes associated with faster eating habits. They also found the cases had a higher body mass index and significantly lower education level compared to the controls.

"The prevalence of type 2 diabetes is increasing globally and becoming a world pandemic. It appears to involve interaction between susceptible genetic backgrounds and environmental factors. It's important to identify modifiable risk factors that may help people reduce their chances of developing the disease," the researchers said.

The team previously found that drinking four or more cups of coffee a day significantly decreased risk of type 2 diabetes, while smoking and eating more than five eggs a week increased the risk.

❁❁❁

## Study Reveals Why Kids Choose Unhealthy Snacks

May 8, 2012 Food Product Design

CINCINNATI—When it comes to understanding why some kids choose snack foods over healthier options like fruit, attitudes, relationships, intentions and personal behaviour control all factor into the answer, according to a new study published in the journal *International Quarterly of Community Health Education*.

Researchers at the University of Cincinnati investigated factors that could help predict children's snack choices. The study focused on 167 fourth-and-fifth-grade elementary schoolchildren in the Midwest over a 24-hour reporting period. Participants were asked to report all snack foods and drinks that they had eaten in a 24-hour period. The information was then entered into the USDA National Nutrient Database to calculate the consumption of high-calorie snacks as well as calories from fruits and vegetables.

They found snacking represented a large part of the children's daily calorie intake. Overall, the group reported consuming an average of approximately 300 calories from high-calorie, low-nutrition foods, such as chips, candy and cookies—nearly 17% of their daily caloric needs. They reported eating only 45 calories from fruits and vegetables combined.

The survey examined a number of behaviours in relation to snacking, such as whether the children thought that choosing lower-calorie snacks was a good idea, whether they were confident in knowing how to choose lower calorie snacks, and if they felt any social pressure from parents, teachers or friends in choosing lower calorie snack foods. The study found that intentions (stemming from attitude, social connections and behavioural control) predicted the children's direction toward healthy or unhealthy snacking.

The study found some significant differences in snack choices among gender and ethnicity. Girls reported eating more high-calorie snacks (348.3 calories) than boys (238.8 calories). Black children reported consuming the least high-calorie snacks (221.6 calories), compared with Hispanic children (297.6 calories), Caucasian children (282.3 calories) and Asian children (280.8 calories). The Hispanic and Asian children also reported consuming more of the healthier fruit and vegetable snacks than the Caucasian and black children.

According to the researchers, part of the increases in childhood snacking could stem from the growing number of children who skip breakfast. Higher calorie snacks such as chips and cookies are less filling, making it easier to over consume compared with higher-fibre fruits and vegetables.

❁❁❁

## Curcumin May Help Fight Advanced Bowel Cancer

May 7, 2012 Food Product Design

LEICESTER, United Kingdom—Researchers at the Cancer Research UK and National Institute for Health Research Experimental Cancer Medicine Centre (ECMC) launched a study to investigate whether curcumin, a compound found in turmeric, is effective in enhancing the effect of chemotherapy on advanced stages of bowel cancer.

Earlier studies have shown that curcumin can enhance the ability of chemotherapy to kill bowel cancer cells in the lab. Patients with advanced bowel cancer are usually given a treatment called FOLFOX, which combines three chemotherapy drugs; however, 40% to 60% of patients don't respond and, of those who do, side effects such as severe tingling or nerve pain can limit the number of cycles patients can have. The 2-year clinical trial will involve 40 patients each from Leicester Royal Infirmary and Leicester General Hospital; 75% will be given curcumin tablets for seven days, before being treated with FOLFOX and the remainder will receive FOLFOX only.

"The prospect that curcumin might increase the sensitivity of cancer cells to chemotherapy is exciting because it could mean giving lower doses, so patients have fewer side effects and can keep having treatment for longer," the researchers said.

❁❁❁

## Soy Isoflavones, Cacao Flavonoids Cut CVD Risk in Diabetics

May 4, 2012 Food Product Design

NORWICH, United Kingdom—Postmenopausal women with type 2 diabetes may reduce their risk of cardiovascular disease (CVD) by increasing the amount of dietary cacao flavonoids and soy isoflavones, according to a study published in the journal *Diabetes Care*.

Researchers at Norwich Medical School conducted a parallel-design, placebo-controlled trial with type 2 diabetic patients who were randomly selected to consume 27 g/day (split dose) flavonoid-enriched chocolate (containing 850 mg flavan-3-ols [90 mg epicatechin] and 100 mg isoflavones [aglycone equivalents)]/day) or matched placebo for one year.

At follow-up, the women receiving the intervention therapy had significant improvements in biomarkers of cardiovascular disease risk compared to those taking the inactive ingredients. Those receiving the flavonoids

experienced a significant reduction in estimated peripheral insulin resistance and an improvement in insulin sensitivity. The women also had reduced their total cholesterol:HDL-cholesterol ratio and LDL-cholesterol levels.

❁❁❁

## Diet Rich in Omega-3s Significantly Lowers Alzheimer's Risk

May 4, 2012 Food Product Design

NEW YORK—Consuming foods that contain omega-3 fatty acids, found naturally in leafy green vegetables, vegetable oils, nuts, chicken and fish, may help reduce the risk of Alzheimer's disease and memory problems, according to a new study published in the journal *Neurology*. The findings suggest omega-3s lower blood levels of the protein beta-amyloid that is associated with cognitive decline.

Because it is difficult to measure the level of beta-amyloid deposits in the brain in the type of study, researchers at Columbia University Medical Centre opted to measure levels of beta-amyloid in the blood, which, to a certain degree, relates to the level in the brain. For the study, 1,219 people older than age 65, free of dementia, provided information about their diet for an average of 1.2 years before their blood was tested for the beta-amyloid. Researchers looked specifically at 10 nutrients, including saturated fatty acids, omega-3 and omega-6 polyunsaturated fatty acids, mono-unsaturated fatty acid, vitamin E, vitamin C, beta-carotene, vitamin B12, folate and vitamin D.

They found the more omega-3 fatty acids a person took in, the lower their blood beta-amyloid levels. Consuming 1 gram of omega-3 per day (equal to approximately half a fillet of salmon per week) more than the average omega-3 consumed by people in the study is associated with 20% to 30% lower blood beta-amyloid levels.

❁❁❁

## 'Hedonic Hunger' Triggers Overeating, Weight Gain

May 3, 2012 Food Product Design

CHEVY CHASE, Md.—New research published in the Journal of Clinical Endocrinology & Metabolism has found "hedonic hunger" or the desire to eat for taste and pleasure, triggers endogenous reward signals in the brain that can prompt a person to eat more of the pleasurable food—a phenomenon ultimately affects body mass and may be a factor in the continuing rise of obesity.

Researchers at the University of Naples suggest endogenous substances regulating reward mechanisms like the hormone ghrelin and chemical compounds, such as 2-arachidonoylglycerol (2-AG), are involved.

For the study, the researchers assessed eight satiated healthy adults, aged 21 to 33 years, feeding them each their personal favorite food and, later, a less-palatable food of equal caloric and nutrient value. Participants' 2-AG and ghrelin levels were measured periodically. Plasma levels of ghrelin and 2-AG increased during hedonic eating, with the favourite foods, but not with non-hedonic eating. This increase suggests an activation of the chemical reward system, which overrides the body's signal that enough has been eaten to restore energy.

"Hedonic hunger may powerfully stimulate overeating in an environment where highly palatable foods are omnipresent, and contribute to the surge in obesity," they said. "Understanding the physiological mechanisms underlying this eating behaviour may shed some light on the obesity epidemic. Further research should confirm and extend our results to patients with obesity or with other eating disorders in order to better understand the phenomenon of hedonic eating."

❁❁❁

## Toasting Red Wine's Anti-Aging Effect

May 3, 2012 Food Product Design

BOSTON—No more whining about it, researchers have found more evidence that the red wine compound resveratrol may prolong lifespan and health-span by boosting the activity of mitochondria, the cell's energy supplier, according to a new study published in the journal *Cell Metabolism*. The findings support previous evidence that the compound benefits obesity, heart health, cancer and more.

Over the last decade, researchers at Harvard and the Massachusetts Institute of Technology have published a body of research describing how resveratrol improves energy production and overall health in cells by activating a class of genes called sirtuins that are integral to mitochondrial function. The cell's power supplier, mitochondria are essential not just for longevity but for overall health. They studied sirtuins in yeast, worms, flies and mice. For the first three organisms they were able to thoroughly knock out SIRT1 and show that cells lacking the gene don't respond to resveratrol; however, no one had been able to demonstrate the effect in mice, which die at birth without the SIRT1 gene.

The researchers spent three years engineering a new mouse model lacking SIRT1. They found when mice were given low doses of resveratrol after SIRT1 was disabled, there was no discernable improvement in mitochondrial function. In contrast, the mice with normal SIRT1 function given resveratrol showed dramatic increases in energy.

"Resveratrol is a dirty molecule, so when you give very, very high doses, many things could be happening," they said. "It's standard when you study molecules that you use the lowest dose that gives you an effect because of the risk of hitting other things if you use too much. But for the downstream benefits on energy, you still need SIRT1. Our paper shows that SIRT1 is front and centre for any dose of resveratrol."

❁❁❁

## JAMA: Probiotics Can Ward Off Antibiotic Diarrhea

Nutraceuticals World May 11, 2012

According to a new study published in the *Journal of American Medical Association*, probiotics can curtail the diarrhea that affects one-quarter to one-third of patients as a side effect of taking a course of antibiotics. Study researchers reviewed 63 randomized controlled trials (RCTs) that totalled nearly 12,000 patients and their use of probiotics (*Lactobacillus, Bifidobacterium, Saccharomyces, Streptococcus, Enterococcus*, and/or *Bacillus*) for the prevention or treatment of antibiotic-associated diarrhea (AAD) as it related to the treatment of a spectrum of conditions spanning from ear infections to sepsis. They found 42% were less likely to get diarrhea from their antibiotic drugs if they were also taking a probiotic.

In an article published by Reuters, one of the researchers - Sydne Newberry from the RAND Corporation in Santa Monica, CA – said, "Antibiotics in doing their work actually kill off a lot of the normal flora that are supposed to exist in our gut, so things kind of go haywire. More than likely, what they do is they start to actually restore the normal bacteria in the gut, in the intestines."

In terms of dosage information, the researcher conceded that most of the studies were small and didn't include a report on the side effects associated with probiotics. They did, however, conclude that the supplements seemed safe.

❁❁❁

## Eating Eggs For Breakfast Keeps Hunger At Bay

May 15, 2012 Food Product Design

BATON ROUGE, La.—Breakfast is the most important meal of the day, and people who eat eggs for breakfast are more likely to feel full during the day compared to those opt for a bowl of cereal, according to new research presented during the 19th European Congress on Obesity in Lyon, France.

Researchers at the Pennington Biomedical Research Centre recruited 20 overweight or obese, but otherwise healthy individuals, to participate in the study to compare the satiating effect of eggs to a ready-to-eat cereal breakfast matched for energy density and macronutrient composition, but with differing protein quality.

Participants were tested under supervision for one week, with a two week gap period between crossover groups, who then swapped diets. A structured buffet lunch was provided on days 1 and 7 of each test week to evaluate how hungry participants were following their respective breakfasts. Researchers found individuals given the egg breakfast felt fuller before lunch and their lunchtime food intake on days 1 and 7 was lower when compared to the cereal breakfast. Researchers also found participants had lower concentrations of the hunger-stimulating hormone acylated ghrelin and increased PYY3-36, a hormone that signals satiety secreted by the intestines, during the three-hour period after breakfast.

"This study shows that diets with higher protein quality may enhance satiety, leading to better compliance and success of a weight loss diet," said lead researcher Nikhil Dhurandhar, Ph.D., professor at Pennington Biomedical. He added consuming normal amounts of a high-quality protein, such as that from eggs, alleviates concerns about diets high in protein consumption affecting liver and/or kidney functions.

❁❁❁

## Whole Fruit Offers Fewer Calories, More Fibre Than Juice

May 14, 2012 Food Product Design

SEATTLE—Kids love fruit juice, but eating the whole fruit instead will lower caloric intake plus give them a fiber boost. Researchers from University of Washington Centre for Public Health Nutrition used data from the National Health and Nutrition Examination Survey to examine the nutritional and economic consequences of replacing fruit juice with whole, frozen and canned fruit. Here's what they found:

- Replacing juice with fresh fruit (e.g., replacing apple juice with fresh apple) resulted in a 56 calorie drop.
- Substituting juice with the top three most commonly consumed fruits (banana, apple and orange) resulted in a 25% to 32% increase in fibre. While substituting juice with lower-cost canned or frozen fruit substantially raised fibre intake, but resulted in minimal reductions in energy (19 calorie reduction).
- Potassium and calcium were slightly reduced and vitamin C was significantly reduced. Despite this, the percentage of children consuming recommended amounts of vitamin C remained very high.

On the downside, the study found that replacing juice with comparable fresh fruit increased cost by 13%. But, replacing juice with lower-cost canned or frozen fruit increased costs by only 1.5%. Substituting juice with the three most commonly consumed fruits resulted in an increase in cost of 4%.

❁❁❁

## Five Steps to Obesity Prevention

May 11, 2012 Food Product Design

WASHINGTON—It's going to take a collective, society-wide effort to stop obesity, according to a report from the Institute of Medicine. "Obesity is both an individual and societal concern, and it will take action from all of us—individuals, communities, and the nation as a whole—to achieve a healthier society," said IOM President Harvey V. Fineberg.

For the report, "Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation," the committee assessed more than 800 obesity prevention recommendations to identify those that could work together most effectively, reinforce one another's impact, and accelerate obesity prevention.

In the end, five goals for preventing obesity were determined: integrate physical activity into people's daily lives; make healthy food and beverage options available everywhere; transform marketing and messages about nutrition and activity; make schools a gateway to healthy weights; and galvanize employers and healthcare professionals to support healthy lifestyles.

"As the trends show, people have a very tough time achieving healthy weights when inactive lifestyles are the norm and inexpensive, high-calorie foods and drinks are readily available 24 hours a day," said committee chair Dan Glickman, executive director of congressional programs, Aspen Institute, Washington, D.C., and former secretary, U.S. Department of Agriculture. "Individuals and groups can't solve this complex problem alone, and that's why we recommend changes that can work together at the societal level and reinforce one another's impact to speed our progress."

The report is being released in conjunction with the new "Weight of the Nation" initiative, which includes an HBO documentary series presented in collaboration with IOM. The initiative seeks to spur individuals and groups to get involved in local efforts to promote healthy eating and activity.

❁❁❁

## Formulating Thermogenic Products

Nutraceuticals World May 15, 2012

To combat the slowdown in metabolism associated with weight loss and promote continued weight loss, or help to maintain achieved weight loss, there is growing interest in finding ways to increase thermogenesis.

As the name implies, thermogenesis is the process of generating heat (or “thermo”). Body heat is produced by burning body fat in the mitochondria (energy factories) in your cells. The heat energy given off by this metabolic process is essential to help maintain body temperature. Speeding up a relatively sluggish metabolism by consuming additional thermogenic micronutrients and phytonutrients that help optimize metabolism can be a key way to combat body weight that creeps back after weight loss. The table below lists several key factors that may help support thermogenesis and healthy metabolic function.

Clinical trials have supported an increase of energy expenditure of about 4%-5% following the consumption of caffeine, green tea catechins, and capsaicin. Other ingredients mentioned in the table above have been reported to be of potential benefit in increasing energy expenditure or promoting more optimal metabolism in weight maintenance, but do not have strong support as of yet from clinical trials, but may be beneficial.

While any of these ingredients can be incorporated into a custom nutrient premix, blending them is a science involving the consideration of many factors such as interactions, bioavailability, potency, quality and shelf-life. Partnering with an experienced food technologist adept at creating custom nutrient premixes can alleviate many formulation challenges.

## Dietary Ingredients Suggested to Promote Optimal Metabolism and Thermogenesis

| | | |
|---|---|---|
| Caffeine * | Alpha-Lipoic Acid | B Vitamin Complex |
| Green Tea (EGCG) * | Chromium | Cinnamon |
| Capsaicin* | Acetyl-L-Carnitine | Coenzyme Q10 |
| Guarana | Black Pepper Extract (Piperine) | Turmeric |
| Yerba Mate | D-Ribose | |

** Source from: Hursel R and Westerterp-Plantenga MS. 2010. International Journal of Obesity 34:659-669.*

❁❁❁

## Health Benefits of Vitamin D Dependent on Type Taken

Science Daily (May 31, 2012) — New research funded by the Biotechnology and Biological Sciences Research Council (BBSRC) has shown that vitamin D3 supplements could provide more benefit than the close relative vitamin D2. The findings published in the June edition of the *American Journal of Clinical Nutrition* could potentially lead to changes in the food industry when it comes to fortification.

Vitamin D is important for bone and muscle health and there is concern that we don't get enough of the 'sunshine' vitamin through exposure to sunlight or through diet. As a result, some foods are fortified with vitamin D. Fortification is usually with vitamin D2, as this is not derived from animals. However this new research, carried out by scientists from the University of Surrey, suggests that vitamin D3 is the more beneficial of the two types of vitamin D in raising the vitamin D levels in our blood when given as a supplement.

The research clearly showed that vitamin D3, the type of vitamin D found in foods including eggs and oily fish, is more effectively converted by the body into the hormone responsible for health benefits in humans.

Dr Laura Tripkovic, who led the study, explains: "We know that vitamin D is vital in helping to keep us fit and healthy, but what has not been clear is the difference between the two types of vitamin D. It used to be thought that both were equally beneficial, however our analysis highlights that our bodies may react differently to both types and that vitamin D3 could actually be better for us."

The researchers analysed the results of 10 separate studies, involving over 1,000 people in total, comparing the health benefits of vitamin D2 and D3, and found "a clear favouring" of vitamin D3 supplements raising vitamin D serum levels in humans.

The researchers are now conducting a further study to see if the same results are found when using lower doses of vitamin D2 and vitamin D3 added to foods, rather than given as stand-alone supplements. Dr Tripkovic and her team will look at over 300 people to find out if vitamin D3 is better, and if so why this is the case. They will also look at how gender, ethnicity and genetic make-up may play a role in how our bodies use both types of vitamin D.

❁❁❁

## Eat Healthily -- Your Kids Are Watching

Science Daily (May 30, 2012) — If lower-income mothers want kids with healthy diets, it's best to adopt healthy eating habits themselves and encourage their children to eat good foods rather than use force, rewards or punishments, says a Michigan State University study.

The study, which appears in a recent issue of the *American Journal of Clinical Nutrition*, is one of a few that focuses on the eating habits of low-income families. The results demonstrate that the mothers who led by example and persuaded, rather than ordered, their kids to eat their vegetables had kids with healthier diets, said Sharon Hoerr, MSU professor of food science and human nutrition.

"Mothers should stop forcing or restricting their kids' eating," she said. "They'd be better off providing a healthy food environment, adopting balanced eating habits themselves and covertly controlling their children's diet quality by not bringing less healthy foods into the house." Overtly restricting certain foods from a child when others are eating them at mealtimes can lead to unhealthy eating, she added.

Additional parental tips include maintaining regular meal and snack times, offering smaller portions of healthy foods and allowing the children to decide how much they will eat. And what about kids who'd rather play with their food or consume only junk food?

"With picky eaters, it's best to coax and encourage them to eat rather than yell at them," Hoerr said. "Other ways to get them interested in having a balanced diet is to take them to the grocery store or garden, and help them select new foods to taste as well as allow them to help cook at home." In continuing this research, Hoerr hopes to develop home-based and interactive educational materials for parents who want to encourage healthful eating.

❁❁❁

## Older Adults May Need More Vitamin D to Prevent Mobility Difficulties, Study Suggests

Science Daily (May 29, 2012) — Older adults who don't get enough vitamin D -- either from diet, supplements or sun exposure -- may be at increased risk of developing mobility limitations and disability, according to new research from Wake Forest Baptist Medical Centre.

"This is one of the first studies to look at the association of vitamin D and the onset of new mobility limitations or disability in older adults," said lead author Denise Houston, Ph.D., R.D., a nutrition epidemiologist in the Wake Forest Baptist Department of Geriatrics and Gerontology. Houston researches vitamin D and its effects on physical function.

The study, published online this month in the *Journal of Gerontology: Medical Sciences,* analyzed the association between vitamin D and onset of mobility limitation and disability over six years of follow-up using data from the National Institute on Aging's Health, Aging, and Body Composition (Health ABC) study. Mobility limitation and disability are defined as any difficulty or inability to walk several blocks or climb a flight of stairs, respectively.

Of the 3,075 community-dwelling black and white men and women aged 70-79 who were enrolled, data from 2,099 participants was used for this study. Eligible participants reported no difficulty walking one-fourth mile, climbing 10 steps, or performing basic, daily living activities, and were free of life-threatening illness. Vitamin D levels were measured in the blood at the beginning of the study. Occurrence of mobility limitation and disability during follow-up was assessed during annual clinic visits alternating with telephone interviews every six months over six years.

"We observed about a 30 percent increased risk of mobility limitations for those older adults who had low levels of vitamin D, and almost a two-fold higher risk of mobility disability," Houston said.

Houston said vitamin D plays an important role in muscle function, so it is plausible that low levels of the vitamin could result in the onset of decreased lower muscle strength and physical performance. Vitamin D may also indirectly affect physical function as low vitamin D levels have also been associated with diabetes, high blood pressure, cardiovascular disease and lung disease -- conditions that are frequent causes of decline in physical function. Houston said people get vitamin D when it is naturally produced in the skin by sun exposure, by eating foods with vitamin D, such as fortified milk, juice and cereals, and by taking vitamin D supplements.

"About one-third of older adults have low vitamin D levels," she said. "It's difficult to get enough vitamin D through diet alone and older adults, who may not spend much time outdoors, may need to take a vitamin D supplement."

Current recommendations call for people over age 70 to get 800 International Units of vitamin D daily in their diet or supplements. Houston pointed out that current dietary recommendations are based solely on vitamin D's effects on bone health. "Higher amounts of vitamin D may be needed for the preservation of muscle strength and physical function as well as other health conditions," she said. "However, clinical trials are needed to determine whether increasing vitamin D levels through diet or supplements has an effect on physical function."

❁❁❁

## Bananas Are as Beneficial as Sports Drinks, Study Suggests

Science Daily (May 29, 2012) — Bananas have long been a favourite source of energy for endurance and recreational athletes. Bananas are a rich source of potassium and other nutrients, and are easy for cyclists, runners or hikers to carry.

Research conducted at Appalachian State University's Human Performance Lab in the Kannapolis-based North Carolina Research Campus (NCRC) has revealed additional benefits. "We wanted to see which was more beneficial when consumed during intense cycling -- bananas or a carbohydrate sports drink," said Dr. David C. Nieman, director of the human performance lab and a member of the College of Health Sciences faculty at Appalachian.

"We found that not only was performance the same whether bananas or sports drinks were consumed, there were several advantages to consuming bananas," he said.

The bananas provided the cyclists with antioxidants not found in sports drinks as well as a greater nutritional boost, including fibre, potassium and Vitamin B6, the study showed. In addition, bananas have a healthier blend of sugars than sports drinks.

The study, funded by Dole Foods, has been published in the peer-reviewed online journal *PLoS ONE* published by the nonprofit Public Library of Science.

For the study, trained cyclists consumed either a cup of carbohydrate drink or half a banana every 15 minutes during a 75-kilometer simulated road race lasting 2.5 to 3 hours. Blood samples taken from the cyclists before and after the exercise were analyzed at the NCRC Metabolomics Laboratory for more than 100 metabolites -- molecules associated with metabolism.

"Bananas come prepackaged with fibre, nutrients and antioxidants," said Nieman, adding the research translates to any exercise. "The mode of exercise is not the issue. I think there are a lot of athletes who don't like the thought of drinking carbohydrate sports drinks, which are essentially flavoured sugar water," he said. "This type of research shows that you can have healthier carbohydrate sources before and after exercise that will support athletic performance just as well as a sports drink," Nieman said.

❁❁❁

## Confirming Link Between The Mediterranean Diet And Quality Of Life

Medical News Today: 31 May 2012

For years the Mediterranean diet has been associated with a lesser chance of illness and increased well-being. A new study has now linked it to mental and physical health too. The Mediterranean diet, which is characterised by the consumption of fruit, vegetables, pulses, fish, olive oil and nuts, has been proven to be beneficial to the health in terms of a lesser chance of chronic illness and a lower mortality rate.

A new study headed by the University of Las Palmas de Gran Canaria and the University of Navarra took the next step and analysed the influence of the Mediterranean diet on the quality of life of a sample of more than 11,000 university students over a period of four years.

"The progressive aging of the population in developed countries makes it even more interesting to find out those factors that can increase quality of life and the health of the population," as explained to SINC by Patricia Henríquez Sánchez, researcher at the centre in the Canary Islands and lead author of the study.

Dietary intake data was taken at the beginning of the study and self-perceived quality of life was measured after the four year monitoring period. In order to ascertain whether the Mediterranean diet was followed, consumption of vegetables, pulses, fruit, nuts, cereals and fish was positively valued whereas consumption of meat, dairy products and alcohol was negatively valued.

Published in the *European Journal of Clinical Nutrition*, the results reveal that those who stick more to the Mediterranean diet score higher on the quality of life questionnaire in terms of physical and mental well-being. This link is even stronger in terms of physical quality of life.

### The Mediterranean Pyramid

Henríquez states that "the Mediterranean diet is an important factor associated with better quality of life and can be considered as a healthy food model." Its food pyramid combines food to be eaten daily, weekly and occasionally.

Main meals should never lack three basic elements: cereals, fruit and vegetables and dairy products. Furthermore, it must include a daily intake of 1.5 and 2 litres of water. Olive oil constitutes the main source of fat for its nutritional quality and moderate consumption of wine and other fermented beverages is recommended.

Furthermore, fish, lean meat and eggs are sources of high quality animal protein. Fish and seafood are also sources of healthy fats. At the top of the pyramid are sugar, sweets, cakes, pastries and sweetened beverages that should be consumed occasionally and in small amounts.

❁❁❁

## Men's Diets Benefit From Good Communication Between Couples

Medical News Today: 28 May 2012

Eating a healthy balanced diet is vital for all-round good health and although women try to keep their husbands on a healthy food track, the majority of married men tend to binge on unhealthy foods when away from home.

Derek Griffith, assistant professor at the University of Michigan School of Public Health, explained: "The key to married men adopting a healthier diet is for couples to discuss and negotiate the new, healthier menu changes as a team."

After conducting focus groups with 83 African-American men, the researchers found that the majority of wives did not consult with their husbands when trying to help them eat a healthier balanced diet. According to the researchers, even though the healthier diet was often ordered by a physician, the men often disliked the food changes, but did not object to it in order to avoid an argument.

Rather than having a say in what they ate, the researchers found that men were more focused on maintaining a happy home. Griffith notes that couples only seemed to negotiate healthy food choices in order to benefit their children.

In addition, the researchers found that some men would binge on unhealthy foods at all-you-can-eat buffets in order to avoid eating the same bland meals at home. Griffith explained: "I think at dinner a lot of men are eating healthier, but they compensate for the dissatisfaction of not eating what they want by making unhealthier choices outside the home."

Wives play a vital role in what their husbands consume at home, say the researchers. Griffith concluded: "Doctors could suggest that men have a tactful conversation with their wives in a way that ensures the husbands aren't sleeping on the couch that night."

❁❁❁

**When You Eat Is As Important As What You Eat**

Medical News Today: 22 May 2012

When you eat may be just as significant as what you eat, say researchers at Salk Institute for Biological Studies.
The study is published in the Cell Press journal *Cell Metabolism*. The researchers put two groups of mice on a high-fat diet - one group were restricted to eating for 8 hours per day, while the other group could eat around the clock. The team found that although mice on the restricted eating schedule consumed the same amount of food as the other group of mice, they were protected against obesity and other metabolic illnesses. According to the researchers, this finding indicates that the health consequences of a poor diet may be partially due to a mismatch between our eating schedules and our body clocks.

Lead researcher of the study Satchidananda Panda of the Salk Institute for Biological Studies said "every organ has a clock." Panda explains that each organ in the body, such as the liver, and intestines, will work at peak efficiency for only a certain amount of time during the day, and the rest of the time they are - more or less - sleeping.

These metabolic cycles are vital for various processes, including the breakdown of cholesterol and production of glucose, and should be advanced to 'turn on' during food consumption and 'turn off' during break times or vice versa. The normal metabolic cycles can be disrupted when mice or individuals regularly eat throughout the day and night. Panda explained: "When we eat randomly, those genes aren't on completely or off completely."

For example, individuals will work less efficiently during the day if they did not sleep well during the night. The researchers found that mice on a time-restricted eating schedule suffered less liver damage, gained less weight, had reduced levels of inflammation, and showed improvements in their metabolic and physiological rhythms, in addition to other benefits.

In recent years our eating patterns have changed. According to Panda, this may be due to the fact that individuals have greater access to food and tend to stay up later at night. Results from the study indicate that restricted meal times might help individuals keep off the pounds and should be given more consideration in the fight against obesity. Panda said: "The focus has been on what people eat. We don't collect data on when people eat."

❁❁❁

**Low-Glycemic Breakfast Controls Blood Sugar**

April 30, 2012 Food Product Design

CHICAGO—Consuming a low-glycemic index (LGI) breakfast may help prevent a spike in blood sugar throughout the morning and after the next meal of the day, according to research presented last month at the Institute of Food Technologists' Wellness 12 meeting. The findings also suggest LGI foods can increase feelings of satiety and fullness and may make people less likely to overeat throughout the day.

The research, conducted by Richard Mattes, M.P.H., R.D., distinguished professor of foods and nutrition at Purdue University and published in the *Journal of Nutrition and Metabolism*, focused on the advantages of having almonds, a low glycemic index food, with the morning meal. Participants who ate a breakfast containing whole almonds experienced longer feelings of fullness and had lower blood glucose concentrations after breakfast and lunch, compared to those who did not have a low-glycemic breakfast.

When a low glycemic food is added to the diet, people spontaneously choose to eat less at other times throughout the day. Mattes added that while the calories need to be taken into consideration as part of a person's overall diet, almonds can be incorporated in moderate amounts without an effect on body weight.

❁❁❁

## Garlic Compound May Be Key to Fighting Campylobacter

May 1, 2012 Food Product Design

PULLMAN, Wash.—A compound found naturally in garlic has been found to be 100 times more effective than two popular antibiotics at fighting the *Campylobacter* bacterium, the most common source of food-borne illness in the United States, according to a new study published in the *Journal of Antimicrobial Chemotherapy*. The discovery may lead to new treatments for raw and processed meats and food preparation surfaces.

Most *Campylobacter* infections stem from eating raw or undercooked poultry or foods that have been cross-contaminated via surfaces or utensils used to prepare poultry. Researchers at Washington State University examined the ability of the garlic-derived compound, diallyl sulphide, to kill the bacterium when it is protected by a slimy biofilm that makes it 1,000 times more resistant to antibiotics than the free floating bacterial cell.

They found the compound can easily penetrate the protective biofilm and kill bacterial cells by combining with a sulphur-containing enzyme, subsequently changing the enzyme's function and effectively shutting down cell metabolism. They discovered diallyl sulphide was as effective as 100 times as much of the antibiotics erythromycin and ciprofloxacin and would often work in a fraction of the time.

The researchers noted while eating garlic is a generally healthy practice, it is unlikely to prevent *Campylobacter* -related food poisoning. However, "diallyl sulphide may be useful in reducing the levels of the *Campylobacter* in the environment and to clean industrial food-processing equipment, as the bacterium is found in a biofilm in both settings."

❁❁❁

## Eating Grapes Lowers Anxiety, Hypertension

April 30, 2012 Food Product Design

SAN DIEGO—Eating antioxidant-rich grapes and grape products may be an inexpensive and nutritious way to reduce anxiety and related hypertension, as well as cognitive impairments associated with anxiety, according to new research presented last week at the Experimental Biology 2012 annual meeting.

Researchers at the University of Houston investigated the role of oxidative stress in the combined occurrence of anxiety-cognitive impairment and hypertension, using a rat model of oxidative stress. They found that feeding the animals a grape-enriched diet for two weeks prevented the anxiety-like behaviour, learning and memory impairment, as well as the rise in blood pressure that was observed in the rats with induced oxidative stress but no grapes in their diet. The researchers attributed these benefits to the antioxidant effect of grapes.

"These results suggest promising potential for grapes in a very important area of health," said lead investigator Samina Salim, Ph.D. "We attribute the benefits of the grapes to their antioxidant activity and their ability to combat oxidative stress."

❁❁❁

## Dietary Vitamin E May Prevent Certain Cancers

April 27, 2012 Food Product Design

PISCATAWAY, N.J.—The question of whether vitamin E prevents or promotes cancer has been widely debated; however, new research published in the journal *Cancer Prevention Research* suggests two forms of vitamin E—gamma and delta-tocopherols—found in soybean, canola, corn oils and nuts may help prevent colon, lung, breast and prostate cancers.

Researchers at the Centre for Cancer Prevention Research, at Rutgers Mario School of Pharmacy, and the Cancer Institute of New Jersey examined animal studies conducted at Rutgers as well as human epidemiological studies that have examined the connection between vitamin E and cancer. Rutgers scientists conducting animal studies for colon, lung, breast and prostate cancer found the forms of vitamin E in vegetable oils—gamma and delta-tocopherols—prevent cancer formation and growth in animal models.

“When animals are exposed to cancer-causing substances, the group that was fed these tocopherols in their diet had fewer and smaller tumors," they said. “When cancer cells were injected into mice these tocopherols also slowed down the development of tumors."

In researching colon cancer, the researchers pointed to another recently published paper in Cancer Prevention Research indicating the delta-tocopherol form of vitamin E was more effective than other forms of vitamin E in suppressing the development of colon cancer in rats.

❁❁❁

**Eggs Improve Metabolic Syndrome, Boost Satiety**

April 27, 2012 Food Product Design

SAN DIEGO—New studies presented at Experimental Biology 2012 this week reveal eating the incredible edible egg not only provides need nutrients to power through the day, but also may help increase satiety and help improve high-density lipoprotein (HDL) cholesterol in patients who suffer from metabolic syndrome.

A University of Connecticut study suggests eating eggs may have favourable effects on HDL metabolism in men and women with metabolic syndrome. Participants in the study followed a carbohydrate-restricted diet with some individuals eating three whole eggs per day and others eating an equivalent amount of egg substitute. After 12 weeks, the group eating whole eggs experienced an improvement in HDL measures showing significantly greater increases in the number and size of HDL particles. HDL or "good" cholesterol scavenges for fat throughout the bloodstream and returns it to the liver, making it less likely that fatty deposits will build up in the blood vessels and lead to atherosclerosis.

In a separate study, University of Missouri researchers found teen girls reported greater feelings of satiety and experienced improved hormone responses related to hunger and satiety after consuming a higher-protein breakfast, containing about 35 grams of protein from egg or beef-based foods. Teen girls who consumed a high-protein breakfast also ate fewer snacks, especially those higher in fat, later in the day.

❁❁❁

**Resistant Starch May Lower Bowel Cancer Risk**

April 26, 2012 Food Product Design

ADELAIDE, Australia—Consumption of resistant starch leads to positive changes in the bowel and offer potential to help protect against bowel cancer, according to a new study in published in the *Journal of Nutrition*. These findings reinforce the fact that dietary fibre is beneficial for human health, but go further to show that fibre rich in resistant starch is even better.

Researchers at the Commonwealth Scientific and Industrial Research Organization’s (CSIRO) Food Futures Flagship said Western diets are typically low in fibre and have been linked with a higher incidence of bowel cancer. And while Australians eat more dietary fibre than many Western countries, bowel cancer is still the second most commonly reported cancer in Australia.

“We have been trying to find out why Australians aren’t showing a reduction in bowel cancer rates and we think the answer is that we don’t eat enough resistant starch, which is one of the major components of dietary fibre," said lead researcher Dr. David Topping. “We studied various sources of resistant starch, including corn and wheat, and the results suggest they could all protect against DNA damage in the colon, which is what can cause cancer."

For this study, the team genetically engineered wheat with higher levels of the resistant starch amylose. The wheat had the same positive effect as other resistant starch sources in mice fed high amounts of protein and fat.

“We have already had success in developing barley with high levels of resistant starch, and now our focus is on increasing the levels of resistant starch in commonly consumed grains like wheat. These grains could then be used in breads and cereals to make it easier for Australians to get enough resistant starch from their diet."

❁❁❁

**Blueberries, Strawberries Delay Cognitive Decline in Elderly**

April 26, 2012 Food Product Design

BOSTON—Older adults may want to incorporate more flavonoid-rich blueberries and strawberries into their diets to reduce their risk of cognitive decline, according to a new study published in the *Annals of Neurology*. The findings suggest consuming greater amounts of the flavonoid-rich berries may delay cognitive aging by up to 2.5 years.

Researchers at Brigham and Women's Hospital and Harvard Medical School investigated whether greater intake of berries could slow rates of cognitive decline. They used data from the Nurses' Health Study—a cohort of 121,700 female, registered nurses between the ages of 30 and 55 who completed health and lifestyle questionnaires beginning in 1976. Between 1995 and 2001, cognitive function was measured in 16,010 subjects over the age of 70 years, at 2-year intervals. Women included in the present study had a mean age of 74 and mean body mass index of 26.

Results show increased consumption of blueberries and strawberries appear to slow cognitive decline in older women. A greater intake of anthocyanidins and total flavonoids also was associated with reduced cognitive degeneration. Women who had higher berry intake delayed cognitive aging by up to 2.5 years.

"We provide the first epidemiologic evidence that berries may slow progression of cognitive decline in elderly women," said lead author Dr. Elizabeth Devore. "Our findings have significant public health implications as increasing berry intake is a fairly simple dietary modification to test cognition protection in older adults."

A study conducted at the University of Alabama at Birmingham last year found adding as little as one cup of raw blueberries to a daily diet may help prevent cell damage linked to cancer. The findings suggest the antioxidants, flavonoids and other vitamins in blueberries may help prevent the free radical damage associated with cancer.

❁❁❁

**Flavonoids May Block Blood Clots**

By Nathan Gray, Nutra Ingredients 10-May-2012

Consumption of the flavonoid rutin, either in foods or supplements could help to prevent the formation of blood clots, according to new research.

The study – published in the *Journal of Clinical Investigation* – reveals that the compound that is commonly found in fruits and vegetables in addition to being sold as a dietary supplement, could have promise in blocking the formation of blood clots in an animal model of clotting (thrombosis).

Led by Robert Flaumenhaft of Beth Israel Deaconess Medical Centre (BIDMC) at Harvard Medical School, the researchers identified the ‘popular flavonoid’ quercetin-3-rutinoside (rutin) as having possible benefits for the prevention and treatment of stroke and heart attack, as well as deep venous thrombosis (DVT) and pulmonary embolism.

"Rutin proved to be the most potently anti-thrombotic compound that we ever tested in this model," said Flaumenhaft. In particular, he revealed that rutin was shown to inhibit both platelet accumulation and fibrin generation during clot (thrombus) formation. "Clots occur in both arteries and in veins," he explained. "Clots in arteries are platelet-rich, while those in veins are fibrin-rich. This discovery suggests that a single agent can treat and prevent both types of clots."

Rutin is naturally found in many fruits, vegetables and teas including onions, apples and citrus fruits, rutin is also sold as an herbal supplement. The Harvard expert added that because the US Food and Drug Administration has already established that rutin is safe, the team are now 'poised' to test the idea in a clinical trial.

### Study details

The new study focused on protein disulfide isomerase (PDI) which is found in all cells. The researchers noted that previous work has shown that PDI is rapidly secreted from both platelets and endothelial cells during thrombosis – and that inhibition of PDI could block clotting in a mouse model. "This was a transformative and unanticipated finding because it identified, for the first time, that PDI is secreted from cells in a live animal and is a potential target for preventing thrombosis," said Flaumenhaft.

However, he noted that because intracellular PDI is necessary for the proper synthesis of proteins, researchers had to then identify a specific compound that could block the clot-causing extracellular PDI – without blocking PDI in cells. The team began by conducting a high-throughput screen of a wide array of compounds to identify PDI inhibitors. From more than 5,000 compounds that were screened, rutin emerged as the most potent agent.

"Rutin was essentially the champion compound," said Flaumenhaft. The team added that further study of the rutin molecule revealed that the same part of the molecule that provides the compound with its ability to inhibit PDI also prevents it from entering cells. "That finding explained how this compound can be both a potent inhibitor of PDI and a safe food supplement," said Flaumenhaft. "Our next questions were, 'Is this compound anti-thrombotic? Can it prevent blood clots?'" The team went on to test rutin in a mouse model of thrombosis – finding that it successfully retained its anti-clotting properties when it was metabolised following oral ingestion.

❁❁❁

## Is Vitamin D3 more effective than D2?

By Stephen Daniells, Nutra Ingredients 07-May-2012

Vitamin D3 is more effective at increasing blood levels of the sunshine vitamin than the D2 form, says the first-ever systematic review and meta-analysis comparing the effectiveness of the vitamin D forms.

Vitamin D refers to two biologically inactive precursors - D3, also known as cholecalciferol, and D2, also known as ergocalciferol. Both D3 and D2 precursors are transformed in the liver and kidneys into 25- hydroxyvitamin D (25(OH)D), the non-active 'storage' form, and 1,25-dihydroxyvitamin D (1,25(OH)2D), the biologically active form that is tightly controlled by the body.

Many researchers agree that many people are vitamin D deficient and need vitamin D supplements, but the form and recommended dose are still hotly debated. Several studies have reported that the D3 form of the vitamin is more potent that D2, with a study led by Robert Heaney, MD, from Creighton University in Nebraska reporting earlier this year that D3 was 87% more potent than D2.

However, a study led by Michael Holick, PhD, MD, from Boston University and published in the American Journal of Clinical Nutrition indicated that fortification of orange juice with either vitamin D2 or D3 produces the same increases in blood levels as consuming either vitamin via capsules.

According to new findings published in the American Journal of Clinical Nutrition, the majority of the evidence supports the hypothesis that D3 is more effective than D2. Analysis of data from seven randomized controlled trials indicated that "vitamin D3 had a significant and positive effect in the raising of serum 25(OH)D concentrations compared with the effect of vitamin D2", report researchers led by Laura Tripkovic from the University of Surrey, England.

"This meta-analysis indicates that vitamin D3 is more efficacious at raising serum 25(OH)D concentrations than is vitamin D2, and thus vitamin D3 could potentially become the preferred choice for supplementation," they wrote. "However,

additional research is required to examine the metabolic pathways involved in oral and intramuscular administration of vitamin D and the effects across age, sex, and ethnicity, which this review was unable to verify."

### Vitamin D forms

The difference between the vitamin D forms may be related to how each form is metabolized, said the researchers. "Evidence has been accumulating that specifically looks at the metabolism of vitamin D, especially that focuses on the hydroxylation steps at the liver and kidney that were required to convert the inert ergocalciferol and cholecalciferol to the active calcitriol (1,25-dihydroxyvitamin D).

"By centering on the differences in side chains between the 2 forms of vitamin D [ergocalciferol has an additional methyl group on carbon 24], there have been reports that this difference directly affects the rate of ergocalciferol conversion to serum 25(OH)D and also its affinity for vitamin D binding protein and VDR [vitamin D receptor], which are all critical steps involved in the activation of vitamin D."

### Effects

While our bodies do manufacture vitamin D on exposure to sunshine, the levels in some northern countries are so weak during the winter months that our body makes no vitamin D at all, meaning that dietary supplements and fortified foods are seen by many as the best way to boost intakes of vitamin D. Vitamin D deficiency in adults is reported to precipitate or exacerbate osteopenia, osteoporosis, muscle weakness, fractures, common cancers, autoimmune diseases, infectious diseases and cardiovascular diseases. There is also some evidence that the vitamin may reduce the incidence of several types of cancer and type-1 and -2 diabetes.

❁❁❁

## Plant-Animal Protein Blend Boosts Post-workout Muscles

Nutra Ingredients 03-May-2012

Blending dairy-derived whey and casein with soy protein can yield benefits in a post-workout setting, according to pioneering but unpublished research.

Presented this week at Experimental Biology 2012 in San Diego, the clinical study found a blend of 25% isolated soy protein, 25% isolated whey protein and 50% casein boosted overall anabolic performance more than whey protein isolate alone. "This study confirms that consuming a blend of proteins (soy, whey and casein) versus whey protein alone provides a prolonged delivery of amino acids to the muscles, making it optimal for consumption following resistance exercise," said senior researcher Dr Blake Rasmussen.

### "Critical for sports nutrition consumers…"

The professor, who is also the interim chair of the Department of Nutrition & Metabolism at the University of Texas Medical Branch, added: "The results of this study are critical for sports nutrition consumers and regularly active individuals." Anabolic performance in this context is measured by the capacity to build muscle after exercise. The blend was first used in a pre-clinical study and presented at Experimental Biology 2011.

### Fast, intermediate, slow

Dr Rasmussen and his team suggested the improved performance could be explained by the manner in which the different proteins were typically processed by the body. Whey is processed the most quickly, casein the slowest, with soy in between, leading to amino acids being delivered later to muscles.

Greg Paul, global marketing director for sports nutrition and weight management at soy supplier, Solae, said the study highlighted muscle functioning misconceptions. "Your muscles don't recover in 30 minutes," said Paul. "It takes at least 24-48 hours for your muscles to recover after a resistance exercise."

"This study showed that protein blends can provide amino acid delivery for up to five hours, meaning if you consume a product or protein shake with these blends, the prolonged effect will deliver essential amino acids to feed your muscles until your next meal."

Suzane Leser, nutrition manager for Lifestyle Ingredients at UK supplier, Volac, added: "Slow and fast proteins have their particular benefits, so it's important that consumers should have the choice to find the product that works for them in specific situations, both in terms of performance and taste. The protein blend used consisted of 75% dairy proteins so it's great to see dairy again recognised as the leading proteins in post exercise muscle recovery."

The double-blind, randomised clinical trial featured 19 young adults before and after ingestion of 19g of protein from the blend or 17.5g of whey protein.

❁❁❁

## Prebiotics May Reduce Severity of Colitis

By Nathan Gray, Nutra Ingredients 04-May-2012

Prebiotic supplements could help to reduce bacterial infection and inflammation so reducing the severity of colitis, according to new research.

The study – published in the Journal of Nutrition – reports that supplementation with galacto-oligosaccharide reduces the severity of colitis by boosting the body's immune system. The authors said the fibre supplement acts by enhancing the functions of natural killer cells, which in turn have greater bacteria fighting power and work to reduce inflammation more effectively.

Led by Jenifer Fenton, researchers from Michigan State University, USA, found that mice given the prebiotic had significant reductions in the severity of colitis in addition to greatly decreasing the risk of colon cancer. "There is something unique about certain types of fibres, such as GOS, and how they alter cells and influence the immune system to change disease risk, either for the good or bad," said Fenton. "Our overall goal is to identify either dietary patterns or diet components to reduce inflammation and cancer risk.

"In this case, we used prebiotics to stimulate changes in bacteria in the gut that may have a beneficial impact on the colon," she said, adding that the results suggest that the probiotic may be effective in reducing colitis severity "by priming the innate immune system."

### Study details

Fenton and her team fed mice with 5000 mg of GOS per kg of body weight per day for two weeks prior to infection and for four weeks post infection – a time period at which colitis severity peaks in this model. Mice fed GOS were found to have a 50% reduction in colitis. Fenton said the positive results were linked to the significant enhancement of natural killer cells, that are crucial in fighting off new infections in the body. "These data suggest that GOS reduces colitis by modulating the function and trafficking of NK cells."

❁❁❁

## Resveratrol-rich Grape Extract Shows Heart Health Benefits – Human Data

By Stephen Daniells, Nutra Ingredients 26-Apr-2012

One year of supplementation with a resveratrol-containing grape extract decreased markers of inflammation and boosted heart health, says a new human study from Spain.

The trial, claimed to be "the longest human trial reported thus far using a resveratrol-containing product", found that levels of C-reactive protein (CRP), a well-established marker of inflammation, fell by 26%, report researchers in the American Journal of Cardiology. The study was performed in people at high risk of cardiovascular disease (CVD) and the

participants were also receiving statins. However, people in the placebo group did not exhibit the same beneficial reductions in inflammatory markers.

“We describe for the first time that a dietary intervention with a specific grape nutraceutical containing resveratrol 8 mg significantly improved the inflammatory and fibrinolytic status of patients undergoing primary prevention of CVD,” wrote researchers, led by Juan Carlos Espin, PhD, from the Research Group on Quality, Safety, and Bioactivity of Plant Foods, CEBAS-CSIC, Murcia.

### Heart benefits

Resveratrol, a powerful polyphenol and anti-fungal chemical, is often touted as the bioactive compound in grapes and red wine, and has particularly been associated with the so-called 'French Paradox'. The phrase, coined in 1992 by Dr Serge Renaud from Bordeaux University, describes the low incidence of heart disease and obesity among the French, despite their relatively high-fat diet and levels of wine consumption. Other studies with only resveratrol have reported anti-cancer effects, anti-inflammatory effects, cardiovascular benefits, anti-diabetes potential, energy endurance enhancement, and protection against Alzheimer’s.

### Study details

The Spanish researchers recruited 75 people receiving statins as primary prevention of CVD to participate in their triple-blinded, randomized, parallel, dose-response, placebo-controlled, follow-up trial. Participants received either a resveratrol-rich grape supplement (resveratrol 8 mg), a conventional resveratrol-free grape supplement resveratrol, or placebo (maltodextrin) for six months, and then double the dose for the next six months.

Results showed a significant decrease in CRP levels in the resveratrol-rich grape supplement only, with no changes in the other two groups. In addition, other markers of inflammation decreased, including tumor necrosis factor-alpha (TNF-alpha, 19.8% decrease), and plasminogen activator inhibitor type 1 (PAI-1, 16.8% decrease). On the other hand, the resveratrol-rich grape supplement also increased levels of the anti-inflammatory interleukin-10 by 20%, while no such changes were observed in the other groups.

### Inflammation and heart disease

“In the present trial, the decrease of CRP in group [resveratrol-rich grape supplement] was correlated with decreases in TNF-alpha and PAI-1 values, which are also important markers in the onset of [cardiovascular] events,” wrote the researchers. “This is consistent with the known regulation of CRP by many inflammatory signals such as TNF-alpha, which alters vascular endothelium homeostasis, impairs fibrinolytic status by increasing PAI-1 levels, and induces plaque destabilization.” “Despite the beneficial effects observed, the sample size and follow-up (1 year) prevented conclusions related to prediction of future CV events in these patients,” they concluded.

❁❁❁

## Tomato Juice Shows Sports Nutrition Potential

By Stephen Daniells, Nutra Ingredients 07-May-2012

A daily glass of antioxidant-rich tomato juice may reduce markers of oxidative stress and damage after exhaustive exercise, suggests a new study.

Five weeks of drinking 150 ml per day of tomato juice was associated with a reduction in levels of 8-dihydro- 2’-deoxyguanosine (8-oxodG), a marker of oxidative DNA damage, in 15 untrained healthy subjects. Results published in the Nutrition Journal indicated that exercise increased 8-oxodG by between 42 and 84% during the control phase of the study, but tomato juice prevented any such increases.

“It might be hypothesized that long term intake of tomato juice may reduce oxidative stress levels in patients with enhanced level of oxidative stress, for example, patients with diabetes, cardiovascular diseases or inflammation,” reported scientists from Stockholm University in Sweden.

Oxygen-breathing organisms naturally produce reactive oxygen species (ROS), which play an important role in a range of functions, including cell signaling. However, over production of these ROS from smoking, pollution, sunlight, high intensity exercise, or simply aging, may overwhelm the body's antioxidant defences and lead to oxidative stress.

## Study details

The Stockholm-based researchers recruited 15 untrained healthy subjects to participate in their study. Participants were asked to perform a 20 min physical exercise at 80% of maximum pulse using an ergometer, and had their blood taken before and 60 minutes after the exercise. The subjects then consumed 150 ml of tomato juice providing 15 mg of lycopene every day for five weeks. They re-performed the exercise. This was followed by a five week 'washout' period and then five more weeks of tomato juice consumption.

Results showed the initial bout of exercise increased 8-oxodG levels by 42%, while no such increases were observed after the first five weeks of tomato juice consumption. After the five week washout period, exercise increased 8-oxodG levels by an average of 84%, said the Stockholm-based researchers. Five more weeks of tomato juice consumption again prevented any such increases in 8-oxodG levels.

## Bioactives

"It is important to mention that beside lycopene tomatoes also contain vitamin C, tocopherols and polyphenols," said the researchers. "It has been shown that among all antioxidants (in particular carotenoids) present in tomato juice, lycopene is the most abundant and stable during industrial food processing. "Vitamin C and tocopherols in fresh tomato are destroyed by heating during food processing. Not much is known about the polyphenols in tomato juice. "Therefore, we believe that the antioxidant activity of tomato juice is primarily due to its content of lycopene."

❁❁❁

# Food Science & Industry News

## Temperature of Food, Beverages Affects Intensity of Taste

May 15, 2012 Food Product Design

ST. CATHERINES, Ontario—Changes in the temperature of foods and beverages have an effect on the intensity of sour, bitter and astringent tastes but not sweetness, according to a new study published online in the *Chemosensory Perception* journal.

Researchers at Brock University found the same food or beverage can taste different depending on its temperature. And, in the 20% to 30% of the population known as “thermal" tasters, heating or cooling small areas of the tongue draws out a taste sensation without the presence of food or drink.

For the study, 74 participants divided into three groups—thermal tasters, super tasters and regular tasters—tasted sweet, sour, bitter and astringent solutions at both 5°C and 35°C during three separate sessions and rated the intensity of the tastes over a period of time.

For all three types of tasters, temperature influenced the maximum perceived intensity from astringent, bitter and sour solutions, but not from the sweet solutions. Specifically, astringency was more intense when the solution was warm, and the intensity of the flavour lasted longer with the warm solution than with the cold one. Bitterness was more intense with the cold solution, and the flavour intensity declined faster with the cold solution than with the warm one. Sourness was more intense with the warm solution, and the flavour intensity lasted longer with the warm solution than with the cold one. The researchers also found there was no difference in perceived sweetness between the cold and warm sugar solutions, but it took longer for the cold solution to reach its maximum flavour intensity.

“For some individuals, temperature alone can elicit taste sensations. These individuals seem to be more sensitive to tastes in general. What our work shows is that, in addition to these sensitive individuals, the temperature of a specific taste can affect how intense it tastes," the researchers said.

❁❁❁

## High Oleic Soybean Oil

May 14, 2012 Food Product Design

It can safely be said that every food manufacturer is aware of consumers' negative views toward *trans* fat. But, according to The United Soybean Board’s (USB) "2011 Consumer Attitudes about Nutrition" study, more than one-third of consumers consider *trans* and saturated fats to be nutritionally about equal—bad news for food products containing saturated fat. The good news is 67% of consumers recognize soybean oil as a healthy oil, and USB has been busy developing high oleic soybean oils with 75% oleic acid, zero grams of *trans* fat and 20% to 60% less saturated fat than conventional soybean oil. For the food manufacturer, high oleic soybean oils offer a host of functional benefits.

"High oleic oils provide nutritional and performance benefits," says Don Banks, president, Edible Oil Technology, Dallas, and consultant to USB. "By increasing total unsaturated fatty acids—particularly monounsaturated fatty acids—while lowering saturates, they support reduction of low-density lipoprotein while slightly increasing high-density lipoprotein. Saturates are lowered by reducing palmitic acid."

Further, soybean oil is the primary commercial source of alpha-tocopherol, or vitamin E, according to USB. This vitamin provides antioxidant defence against free-radical-induced cell damage and subsequent potential for risk of cancer, heart disease, cataracts, premature aging and arthritis. Soybean oil also contains exceptionally high quantities of gamma-tocopherol and delta-tocopherol that enhance the oil’s resistance to oxidation.

For food manufacturers and foodservice operators, the performance benefits of high oleic soybean oils are many. For one, the OSIs (Oil Stability Index) at 110oC for the high oleic soybean oils commonly exceed 25 hours, while commodity oils (such as soybean, corn, cottonseed, canola and sunflower) show values of 3 to 14 hours.

"This high-stability oil can replace *trans* in frying and baking," Banks says. "But its heat stability and oxidative stability make its uses nearly limitless. It has a neutral flavour, is close to colourless and has no aroma, so there is no interference with the characteristic flavours and aroma that each product develops as it is fried. The oil can also be used at 100% or as a blend."

If a formulation calls for the flavour characteristics of peanut or olive oil, for example, those can be blended with high oleic oil for stability. Two high oleic soybean oil varieties are available, according to USB, with reduced linolenic-acid content and a reduction in saturated fat (less than 12% and less than 7%, respectively, compared with 15% saturated fat in conventional soybean oil).

United Soybean Board, St. Louis, MO (soyconnection.com)
❁❁❁

## U.S. Cosmeceuticals Sales Approach $10 Billion

Nutraceuticals World May 3, 2012
Like many consumer packaged goods categories, cosmeceuticals sales suffered during the recession, but the going could have been tougher were it not for cosmeceuticals' "little luxury" appeal and bang-for-the-buck ability to deliver curative and preventative benefits on top of cosmetic ones, according to "Cosmeceuticals in the U.S.", a new research report from Packaged Facts. In fact, the appeal of cosmeceuticals is contributing to a market rebound amounting to 2% growth in 2010 and 4% growth in 2011. This upswing lifted U.S. retail sales of cosmeceuticals to $9.7 billion in 2011.

Younger generations have grown up immersed in marketing messages making them both appearance-oriented and aware of the importance preventive healthcare. As a result, according to Packaged Facts publisher David Sprinkle, new marketing prospects are opening up at the younger end of the age spectrum, even as aging Boomers open their wallets ever wider to stave off the cosmetic tolls of aging. According to a March 2012 survey by Packaged Facts, 28% of U.S. adults purchase anti-aging products, while 15% purchase antioxidant products. Of those purchasing anti-aging products, the greatest percentage (39%) make their purchases at drugstores.

Still, cosmeceuticals marketers may take nothing for granted. Given the new budget constraints, shoppers expect the cosmeceuticals they buy to perform, and the faster the better. Thus any product with a quantifiable "instant gratification" benefit—which has always been a powerful appeal in the colour cosmetics category—has an edge. In addition, with the upper end of the market rebounding the fastest, opportunities are greatest for premium mass market and specialty or prestige channel products, expressing pent-up post-recession demand.
❁❁❁

## Canned Foods May Be More 'Affordable and Convenient' Way to Get Key Nutrients

By Nathan Gray, Food Navigator 24-Apr-2012

When price, waste and preparation time are considered, canned foods 'almost always' offer a more affordable and convenient way to consume much needed-nutrients, according to the findings of a new survey.

The study – presented at a poster session at Experimental Biology 2012 – reports that despite the fact there is often a 'bias' to consume fresh foods for optimal nutrition, the consumption of fresh foods might not always be the best solution for all consumers. Funded by the Canned Food Alliance, researchers led by Dr. Cathy Kapica at Tufts University, USA, conducted a market-basket study comparing the cost of obtaining key nutrients from canned, fresh, frozen and dried varieties of common foods. The survey revealed that when all areas were considered "canned foods almost always offered a more affordable, convenient way to get needed-nutrients."

Kapica said that economic concerns have meant many households are challenged to meet dietary recommendations within shrinking budgetary constraints. "This research should assure families they are getting needed nutrition regardless of whether they choose canned, fresh, frozen or dried varieties," she said. "They can be confident in buying those foods that best meet their budgets, schedules, cooking abilities and taste preferences and still obtain important nutrients."

**Survey findings**

The market study involved buying, preparing and analyzing canned, fresh, frozen and dried corn, green beans, mushrooms, peas, pumpkin, spinach, tomatoes, pears, peaches, pinto beans and tuna fish. The foods were all cooked so that an accurate comparison could be made. They were analyzed to determine the cost of several key nutrients, including protein, fibre, potassium, vitamin A, vitamin C and folate.

The researchers said that survey revealed that it is, for example, nearly 60% more expensive to obtain dietary fiber from fresh tomatoes as from the same portion of canned tomatoes "Not only is the price of canned tomatoes lower than fresh for the same serving size, but fresh tomatoes take longer to prepare, adding to the real cost of fresh," said the researchers.

They said that looking at purchase price alone, fresh corn is less expensive than canned or frozen – however, when the cost of waste (most notably the cob) is factored in, as well as time to prepare, "canned corn offers the same amount of dietary fibre as fresh at a 25 percent savings."

❁❁❁

## Researchers Tout Potential of Probiotic Coating for Partially Baked Bread

By Oliver Nieburg, Bakery & Snacks 02-May-2012

A probiotic coating added to the surface of bread through microcapsules can produce functional bread with similar characteristics to common bread, according to a study.

The paper 'Viability of some probiotic coatings in bread and its effect on the crust mechanical properties' published in the journal Food Hydrocolloids by R. Altamirano-Fortoul et.al found that probiotic lactobacillus acidophilus can be applied as a coating to bread to produce added health benefits.

### Health boost

"Overall results show that L. acidophilus included in microcapsules can be incorporated to bread surface through edible coatings, leading to bread with similar characteristics to common bread, but with additional healthy benefits," said the study. "Edible coatings have been used as a vehicle for microorganism and the physical properties of the resulting bread confirmed the potential use of this procedure for obtaining healthier baked goods," it continued.

### Probiotic survival

Probiotic bacteria often do not survive during processing and storage, which is seen as a limitation for application in food. However, in the present study microencapsulated L. acidophilus survived and could protect microcapsules during baking and storage time.

### Method

The researchers added L. acidophilus to a starch-based coating and applied it to the surface of partially baked breads. Partially baked breads were chosen because of the potential for obtaining functional bread combing microencapsulation and coating technologies due to the short baking time. The researchers observed the survival of L. acidophilus after baking and after 24-hour storage. Fresh breads were sensory evaluated and the physical and chemical properties of bread crust were determined. Further studies are currently underway to confirm the probiotic effects of these breads.

❁❁❁

# Fat Rewards for Healthy Crisp Makers

By Rod Addy, Food Manufacture 09-May-2012

Crisp makers are hitting back at their unhealthy image with new varieties of crisp substituting traditional oils such as sunflower oil with alternatives that are much lower in saturated fats.
Two prominent examples on display at Food & Drink Expo, which was held from March 25–27 at Birmingham's NEC, were Just Crisps and Brown Bag Crisps. Just Crisps, an offshoot of Just Oil, which is based at Wade Lane Farm in Staffordshire, was showcasing new Jalapeno and unsalted flavours in 40g bags and 1kg catering packs. The products are fried in cold pressed extra virgin rapeseed oil, which has half the saturated fat level of even olive oil and contains omega-3 and omega-6 fatty acids. Just Crisps triple filters the oil to give it an extra light flavour.

## Significant growth

Anthony Froggatt, founder of Just Oil and Just Crisps, said he was selling the products at a premium for farm shops, delicatessens and small foodservice customers, rather than the major supermarkets. Just Crisps was established in May 2011, but had seen "significant growth" particularly in the past two months, said Froggatt. It would be difficult to generate large batches, he said, because the amount of rapeseed oil produced through the cold pressed method was small relative to the amount of rapeseed used. "Nobody else in the UK does rapeseed oil crisps to my knowledge. The biggest problem is we have to sell them at a premium. We only get about 300l [of oil] a tonne."

## Burts Potato Chips

Some crisp makers, such as Burts Potato Chips, fry crisps in high oleic sunflower oil, which is lower in saturated fat than standard sunflower oil. "You can get high oleic rapeseed oil too," said Froggatt. "We have not gone down that route yet, but we are looking at it."

Elsewhere, exhibitor Brown Bag Crisps, which was formed in 2010 and is based in Lovelace Road, Berkshire, displayed what it claimed to be the only UK crisps fried in olive oil. The full range incorporates lightly salted; sea salt and malt vinegar; mature cheddar, manchego & onion; and oak smoked chilli flavours in 40g and 120g bags and sea salt and black pepper flavour in 120g bags. Both products are currently sold mainly through the independent trade as well as local hotels and restaurants.

# Regulatory News

## WHO Publishes Guidelines on Marketing to Kids

May 10, 2012 Food Product Design

WASHINGTON—The World Health Organization (WHO) published a guidance to set recommendations on the marketing of food and non-alcoholic beverages to children. This guidance is following the adoption of the World Health Assembly (WHA) who set children's marketing recommendations in May 2010. Now, WHO has published technical support to Member States to help in implementing, monitoring and evaluating the recommendations. An Institute of Marketing (IOM) report, which identifies over 800 strategies to scale back obesity in children, includes industry-wide guidelines on which foods and beverages can be marketed towards children.

The recently introduced framework document was created for policy-makers who desire to apply the recommendations in their individual territories. The document includes definitions of the concept of "marketing towards children" and examples of marketing techniques, a step-by-step process for the policy development and policy implementation. The document specifically guides efforts by Member States in developing new policies or strengthening existing policies.

❁❁❁

## FDA says nanotechnology may need greater scrutiny

By Caroline Scott-Thomas, Food Navigator USA 23-Apr-2012

The Food and Drug Administration (FDA) has issued new draft guidance on the use of nanotechnology in food and cosmetic products, encouraging manufacturers to consult with the agency before taking products using the technology to market.

The FDA said that changes in a product's manufacturing process, including those using nanotechnology, could affect a food's safety or its regulatory status. Consulting with agency experts could help address these issues, it said.

FDA commissioner Margaret Hamburg said in a statement: "Understanding nanotechnology remains a top FDA priority. FDA is strengthening the scientific tools and methods for evaluating food products, cosmetics, drugs and medical devices. We are taking a prudent scientific approach to assess each product on its own merits and to not make broad, general assumptions about the safety of nanotechnology products."

The draft guidance said that nanomaterials are most commonly understood to be those that have been intentionally manipulated, manufactured or selected to have at least one dimension in the size range of approximately 1 to 100 nanometers. However, it added: "We believe it is appropriate to take into account the potential importance of material size and the evolving state of the science…In the specific instance of nanotechnology, a food substance manufactured for the purpose of creating very small particle sizes with new functional properties likely would not be covered by an existing GRAS determination for a related food substance manufactured without using nanotechnology."

In this case, when a food intentionally contains very small particles manufactured to have different functions from the same substance with a larger particle size, the agency said that there are likely to be questions regarding the evidence and general recognition of their safety. These questions are likely to warrant premarket review and approval by the FDA, it said.

❁❁❁

## Acrylamide on the Increase in Certain Baby Foods

By Nathan Gray, Food Navigator 18-Apr-2012

The levels of acrylamide is increasing in certain baby foods. However, on the whole levels of the potentially carcinogenic compound are falling in other products, according to a new report from the UK Food Standards Agency.

The report shows an upward trend in acrylamide levels in processed cereal-based baby foods (excluding rusks). However the Agency also found reductions in levels for many other products – including pre-cooked French fries, potato products for home cooking and bread. However the Food Standards Agency (FSA) said that for most products: "We found no evidence of trends."

Acrylamide and furan levels in a range of processed and packaged foods reported the FSA – which are the latest investigated levels of the process contaminants – are said to not increase concern about their risk. "As with previous years' data, the acrylamide and furan results from this UK survey have been sent to the European Food Safety Authority (EFSA) for collation with other Member States' survey data, trend analysis within the EU and, in the case of furan, a risk assessment," said the FSA.

An FSA spokesperson told FoodNavigator that levels of acrylamide and furan reported in the survey "do not increase concern about the risk to health … and the FSA has not changed its advice to consumers. This survey is part of FSA's rolling survey to measure acrylamide and furan in UK retails products, intended to establish clearer trends on occurrence," they explained, noting that monitoring and reporting would also follow the 2011 – 2013 period.

The FSA added that it is working with stakeholders, including the food industry, to increase knowledge and understanding of how to reduce acrylamide in food. "The food industry is also carrying out research to find ways of reducing the levels of acrylamide in food," said the FSA spokesperson, noting that European industry body FoodDrinkEurope has produced a document known as the 'toolkit'. The Agency added that international efforts are ongoing to help gather more data regarding furan reduction, "which we hope will lead to the development of future mitigation strategies, if required."

### Contaminant survey

The FSA survey reports the levels of the potentially carcinogenic substances over the period November 2010 - April 2011. The results are the fourth set in a rolling programme to measure the levels of the contaminants in a range of retail foods. A total of 248 food products were sampled – representing the ten food groups specified in European Commission Recommendation (EU) No. 2010/307 for the monitoring of acrylamide in food.

Of the 248 products analysed for acrylamide during the 2010-2011 survey, 13 products were found to contain acrylamide levels that exceeded the 'indicative value' (IV) for their food group. The FSA said that given the relatively small number of products sampled, and extent of these observed trends: "It is not possible at this stage to draw any definitive conclusions and therefore further investigation by the Agency may be required to try and establish if changes in manufacturing practice are having the desired effect."

❁❁❁

## Researchers Showcase 'Easy' GM Tracking Technology

By Nathan Gray, Food Navigator 30-Apr-2012

A new technology could help to monitor and track genetically modified crops in the food processing chain, say researchers.

The technology aims to monitor genetically modified (GM) crops, not only in the field but also during the food processing chain, said the researchers. Writing in BMC Biotechnology, they reveal that the technology can identify GM crops at concentrations as low as 0.1% using a combination of bioluminescent and isothermal amplification technologies – meaning the technique could be used to monitor for contamination with GM ingredients.

Under current EU regulations the threshold limit for ‘unavoidable presence’ of GM materials in crops is 0.9%. After this level, items containing approved GM products require labelling. The authors, led by Dr Guy Kiddle from Lumora – a spin-out company of the University of Cambridge, UK – assessed whether they could use a technique known as loop mediated isothermal amplification (LAMP) to amplify DNA at a constant temperature before using a new technique called bioluminescent real time reporter (BART) to identify GM-specific DNA in real time.

Kiddle said that LAMP-BART was able to detect as little as 0.1% GM contamination of maize, and compared to PCR, was more tolerant of contaminating polysaccharides – meaning that the DNA clean-up process did not need to be as thorough. "This method requires only basic equipment for DNA extraction and a constant temperature for DNA amplification and detection. Consequently LAMP-BART provides a 'field-ready' solution for monitoring GM crops and their interaction with wild plants or non-GM crops," he commented.

### Innovative technology

Lumora recently won the top prize for commercial innovation at the UK Biotechnology and Biological Sciences Research Council (BBSRC) innovation awards. The company won the award for the development of the BART system, which can be used to detect infectious organisms including bacteria and viruses using luciferase, the same enzyme which lights up fireflies.

The BART system triggers luciferase to produce light when it detects specific DNA or RNA sequences. By using DNA signals specific to GM crops, the researchers said the system can detect even very low levels of contamination. The authors said that the LAMP-BART system is "an effective and sensitive technique for GM detection with significant potential for quantification even at low levels of contamination and in samples derived from crops such as maize with a large genome size.”

They added that the resilience of the system to acidic polysaccharides makes it ‘well suited’ to rapid sample preparation techniques ... “and hence to both high throughput laboratory settings and to portable GM detection applications.”

❁❁❁

## Olympic Athletes at Risk from Popular Supplements

By Rick Pendrous, Food Manufacture 02-May-2012

Many athletes at this year's London Olympics could be at risk of disqualification because of their use of popular dietary supplements.

Unknown to many athletes, supplement use could either be illegal or raise levels of certain active ingredients in their bodies above permitted limits, according to the President of the US Institute of Food Technologists. Dr Roger Clemens, who is also Professor of Pharmacology and Pharmaceutical Sciences at the University of South Carolina School of Pharmacy, also called for tougher controls on what claims are allowed for supplements targeted at elite athletes and others. While many supplements are legal in different countries, such as the US, they can be illegal under International Olympic Committee rules, he warned.

### Fatal harm

Also, until supplement suppliers are forced to provide evidence for their labelling and web site claims, more athletes are likely to damage their health and cause fatal harm by taking short cuts to improved performance rather than using a combination of training and a good nutritional intake, Clemens added. Clemens was giving the annual Binsted Lecture, held as part of the Institute of Food Science & Technology's (IFST's) Spring Conference last month. His paper was titled: Nutrition's contribution to sport performance: realities and myths. The IFST's conference was on the subject of Nutrition for olympians: nutrition for all.

While controls on doping will be tight at this summer's Olympic games, many athletes will be taking supplements also known as "ergogenic aids" such as caffeine which, unknown to them can sometimes be in quantities that push the boundaries of legality. A number of supplements also have questionable benefits and could even cause long-term health damage, Clemens reported. He said there was a lack of published peer-reviewed scientific evidence for many of these supplements, from sports drinks and multivitamins to specialist muscle tissue development aids such as creatine. "We really need to advise our athletes what are in the dietary supplements," he added.

## Gets hurt

"My concern is that many of the things we see on labels and web sites are not substantiated or supported by the evidence or any evidence whatsoever," said Clemens. "They should be required to have the evidence to support it ... It's not likely the FDA [Food and Drug Administration] will take any action on [supplements] until somebody gets hurt."

He added: "We clearly need evidence-based positioning on products that are sold on the market today … hopefully there would be some harmonisation [around the world] ultimately." Clemens also predicted that over the next decade or so genetic profiling of athletes would become the norm in an attempt to match their fitness programmes and dietary nutrition to their DNA.

❁❁❁