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Editorial

When we were young and watching movies, our heroes were Kishore Kumar, Dilip Kumar, Sanjeev Kumar etc. who were not very slim. We never minded their slightly heavy physique. Although there were heroes like Dev Anand, Raj Kapur and Shammi Kapur who were fairly slim, we never minded the heavy set heroes. Similarly we were used to buxom heroines like Vyjayantimala. Probably the standards of attractive Indians were a little broader at that time.

Slowly the scenario changed with heroes like Amitabh Bachchan and Dharmendra came along with Sharmila Tagore and Shabana Azmi and there was a change in girth. Heroes and heroines were slimmer but still not that different from the common perceptions.

Today, however, things are quite different. Heroes like Hrithik Roshan, the Khans etc. have totally changed the definition of desirable physique with their six-pack abdomen and muscular arms and shoulders. Heroines like Kareena and Katrina have zero size figures that are quite difficult to achieve for common ladies.

Has this change taken place because we are seeing western movie stars and expect the same of our stars? Our stars are also extremely energetic and dance and hop around on screens that only an athlete can perform. They must take extremely good care of their bodies by daily workouts and controlled diets. Has this affected the audience at all?

There are many executives who are trying to find time for their physical workout at work or at home. It is difficult to have physical activity as earlier by walking or commuting instead of going by car as our roads are extremely dangerous to walk and our mass transit system is too crowded. Even when they say that going up the stairs walking rather than by elevator, when you are working on 20^{th} or 30^{th} floor, it would not be possible to do so.

However, looking at these actors will certainly make one try to slim down and lose a few tires around the midriff if not have the six packs. It is not only difficult because of our work environment but also because of such varieties of foods that are available that are quite tasty and fattening. So may be if they get something that is tasty and yet not very heavy on calories, it might be quite acceptable.

It is a challenge as the taste usually is imparted by substances that are not “good for you”. They are laden with calories and the things that are supposed to be good for you such as fibre have been difficult to chew. However, these challenges offer new opportunities.

There are soluble fibres which do not cause too much of chewiness problem as well as they do not increase the viscosity too much. There are sweeteners that do not contribute too many calories such as polyols and artificial sweeteners. Fats can be simulated using certain carbohydrates and fat content can be reduced. There are also snacks that have started appearing with many nutrients so one does not get ‘empty’ calories.

Many new substances have been discovered that have control over appetite, satiety etc. There are substances that would also have effect on uptake of calories by body and there are substances that would speed up the burning of calories. These of course need to be properly studied for their safety and effects on health. With newer knowledge people may be able to then look like their favourite film star flexing their muscles as they walk on roads.

With season’s greetings to all

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Functional Beverages: Thriving or Surviving?

By Rebecca Wright

A tough economy has been both a blessing and a curse for these products.

Most functional beverages and nutraceutical products are being viewed through the lens of a down economy, by experts, with most forecasting contractions in various sectors of the market. New product activity has slowed down greatly especially by major players.

Functional beverages in a down economy

In the April 2009 Mintel expect the market to decline by 0.1% in 2008, compared to the previously published more optimistic growth rate of 3.5% for the same year. In the 2008 report, Mintel noted that the functional beverage market was slightly more than $10 billion and had grown by 15% from the year 2003 to 2007. This segment is highly dependent on functional juice and juice drinks which accounted for 56% of the total market share in 2008 and had flat sales during the period 2003 to 2008. High prices of functional beverages as compared to that of regular beverages remained an obstacle in popular consumer acceptance of it.

In 2009 forecast, it has been stated that since most functional beverages are more expensive than beverages without any functional positioning, consumers are likely to reduce their demand in the present economic climate. Consumers these days have also begun to realize that most benefits claimed by many functional beverages can actually be found in less expensive regular beverages. For example, the trend of functional teas would reduce because of increasing competition from regular teas that are less expensive and also have the magic ingredient-antioxidants.

Research had also indicated that the enhanced water segment, that showed remarkable growth from 2003 to 2008, would suffer consumer criticism for its marketing messages that lacked authenticity like: no/low calorie thirst quenchers, when in reality most brands carried as much sugar as soda and fruit juice/juice drinks.

Functional beverages do interest consumers when it comes to providing additional health benefits as compared to regular beverages, but most of them suffer from common maladies, common to most non-alcoholic drinks, such as excessive amounts of sugar and the presence of artificial ingredients. This is one of the most important factors responsible for inhibiting their growth.

On a lighter note…

Health and convenience still remain two of the biggest “mega trends” facing food and beverage manufacturers and they continue to play a significant role in shaping product strategy. The economic recession may have resulted in preventing consumers from buying higher-priced specialty items, but in the short term functional foods save a lot of money that would otherwise be spent on nutritional supplements. Consumers in the past were primarily reactive i.e. they would treat health problems when they occur. Whereas, consumers today are proactive i.e. they seek overall wellness. Due to this grocery stores have been turned into hunting grounds for healthful functional foods to keep away illness and chronic conditions. As a result functional beverages are generally surviving and several are thriving.

In a report, “Failures in Functional Foods and Beverages,” the criteria necessary for creating a functional food had been given. The first thing that was suggested was to make a functional food product a beverage. Other than taste

and convenience, the one thing that can be done to raise a product's chances of success is to make it a beverage. The future of functional foods lies in beverages, where most success stories are found.

As compared to formats such as bread and cookies, beverages are considered more convenient and are perceived as 'healthy carriers' of health benefits in a way that confectionary is not. They also allow health to become an anytime option and a snack, unlike a functional meal.

As far as new opportunities are concerned, high interest lies in healthy carbonated beverages. Although the sales of carbonated soft drinks were declining, they still represented one of every two beverages purchased. This indicates that consumers like carbonation. They are just tired of empty calories and seek functionality.

However certain weaknesses need to be addressed, especially in relation to condition-specific products, which are believed to become increasingly relevant to consumers in the near future. Consumers need to gain intrinsic brand trust in these products. Where help with gut health is required, efficacious doses of prebiotics and probiotics need to be delivered.

The energy drink segment is another highlight in today's market. It remains one of the best areas for the development of functional beverages, especially when it comes to carbonated drinks. However, the controversy surrounding the content of caffeine and energy drinks combined with alcohol, has started building significantly. Health authorities, the government and the public have been calling on carbonated beverage manufacturers to answer to claims of causing obesity epidemic.

Sweet and simple

Outcries due to issues like obesity and artificial ingredients have forced several manufacturers to reformulate their products with the following features: low/no sugar/calories and natural.

FDA had awarded Reb-A (rebaudioside A), from the stevia plant, Generally Recognized As Safe (GRAS) status, that made way for many other beverage launches. The beverage not only lowers the calorie count of beverages but is also perceived as natural as it comes from the stevia plant.

A review in 2008 showed that food and drink claims classified as "natural"- including all natural, no additives/ preservatives, organic and whole grain, were most frequently featured on new products globally. It was observed that "natural" claims appeared on nearly one in four (23%) food and drink launches in 2008, which was a 9% increase from 2007.

Food and drink launches had increased number of 'natural' claims in 2008, but fortified 'plus' claims such as added vitamins or calcium- suffered the most. These claims reduced by 20% in 2008, with the claim appearing on only one out of twenty new product launches worldwide.

Now low-fat and low-calorie foods, which once stood for good nutrition and diet, are passé. Fortified products are also no more a favourite. Foods and drinks that are natural and pure are seen as healthy. People now look for holistic and genuine food that can be trusted. The increasing want for 'natural' had also prompted many beverage companies to revisit the old standby sweetener sugar and using it in replacement of high fructose corn syrup for introducing new beverages.

New Product Round-up

Companies are using newer fruits like bayberry (Chinese strawberry) and Goji berry have been used in new beverages as they are rich in antioxidants. Also beverages are sweetened with stevia extracts to give less than 50 calories per 250 ml. Some contain added vitamins like C and E. Vitaminsed water may be sweetened with stevia

and erythritol along with antioxidants from fruits like acai, blueberry and pomegranate. Some have used naturally sweetened flavours including pomegranate, apple pear and black & blue berry with stevia extract along with vitamins C, E and B complex.

Some traditional thirst quenching products have been tweaked and the new versions have added B vitamins and some with antioxidant vitamins E and C. There are some versions with ingredients like L-theanine along with carbohydrates to help improve mental focus. Some of the enhanced water segments have new flavours in addition to vitamins B, C and E. Along with traditional flavours like lemon and grape, new flavours like blueberry-pomegranate, kiwi-strawberry and peach-mango etc. have been introduced.

Children's market also saw functional beverages. One product was called nutritionally complete drink for children aged 1 to 13 years and contained immune-strengthening probiotics along with 25 vitamins and minerals, protein and antioxidants. Another product was based on fruit juices that were designed to benefit children of different growth stages and contained DHA, zinc, vitamin C and prebiotic fibre.

A new sports recovery drink was launched loaded with high amounts of protein along with vitamins and minerals. Other sports drinks also were launched one with emphasis on probiotics while other focused on electrolytes.

One product had tea-juice blend containing amino acid gamma-amino-butyric acid (GABA) to support brain focus, clarity, balance and stress reduction. Another low-calories beverage containing fruit had fibre, chromium and L-carnitine for weight management.

Some unique herbal waters were launched. One contained dragon fruit, hibiscus and isotonic minerals, another had ginger, black tea and ashwagandha extract while third had green tea, guarana and lemongrass. A large number of beverages were launched with interesting ingredients including yerba mate, ginseng, gingko biloba, whey protein isolate, tender coconut water, epigallocatechin gallate from green tea, hibiscus flower or extract, rose hips, anise seed, spearmint leaf, lemon balm, blue agave nectar, eucalyptus, jasmine flower, linden leaf, acerola, camu camu, cupuacu, graviola and acai fruits among other things.

Condensed from an article from Nutraceuticals World July 2009 by Sonia Khudanpur

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Assessment of Contaminant Intake from the Diet

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National authorities have the responsibility to ensure that toxic chemicals such as pesticides, heavy metals, mycotoxins and other contaminants are not present in food at concentrations that may affect the health of consumers. While monitoring for compliance with regulatory standards is essential for consumer protection and promote trade, governments are obliged to assess public health risks arising from the presence of toxic chemicals in food by estimating the actual dietary intake of contaminants for comparison with their corresponding toxicological reference intakes such as the Acceptable Daily Intake (ADI) or Provisional Tolerable Weekly Intake (PTWI).

The estimation of the actual diet intake of contaminants is essential for risk assessment and can also be used in determining whether there may be a relationship between observed adverse effects in humans and exposure to a particular contaminant. Contaminant exposure assessments are critical for making appropriate decisions in the regulation of chemicals and food safety. The Agreement on the application of Sanitary and Phyto Sanitary measures (SPS) of the World Trade Organization requires that health and safety requirements related to food must be based on sound scientific risk assessment.

Risk assessments are performed in a four step process: hazard identification, hazard characterization, exposure assessment and risk characterization. The last step makes use of the information collected in the first three steps. Exposure assessment, as part of risk assessment is defined as the qualitative and / or quantitative evaluation of the likely intake of biological, chemical or physical agents via food as well as exposure from other sources. Many methods can be used to estimate the intake of chemicals from food and the choice will depend on what information is available and how accurate and detailed estimates have to be done.

Household surveys

Food available at the household level may be estimated by budget surveys and by consumption surveys. The first type of survey gives information on the purchase of food in terms of expenditure and is used for economic policy. In household consumption surveys the amounts of food and drinks brought into the house hold are also recorded. In several this type of survey do not provide information on how food is handled within the household or on actual consumption by its members. Data on the quantity and / or expenditure on food may be collected by record keeping, by interviews or by both methods. There could be differences in sampling procedures, food grouping, conversion to nutrients, and period, frequency and technique of data collection.

Individual dietary surveys

This type of survey provides information on average food and nutrient intake and their distribution over various well defined groups of individuals. These data reflect actual consumption to some extent. To collect dietary intake data at an individual level, several methods can be used. Briefly, the methods can be record and recall methods. Recall methods reflect past consumption, varying from intake over the previous day (24 hour recall) to usual food intake (diet history or food frequency).

Total diet study

FAO / WHO recommends the use of total diet studies for estimating dietary exposure of the population to contaminants.

In total diet studies, representative samples of widely consumed foods are collected and analysed for the contaminants of interest. The provision of population intakes estimated using total diet study results depends on the extent to which the foods analysed represent important dietary sources of the chemical.

The following approaches are considered in total diet studies. i) market basket ii) individual food items and iii) duplicate portion.

The market basket approach is based on the dietary intake of a defined population group. All food items that are part of the average diet are purchased, prepared according to standard household procedures and aggregated into a number of food groups. Each food group is analysed for a number of contaminants.

The risk analysis paradigm identifies risk assessment as a key component and pivotal to this is exposure assessment. The principle focus of TDS is chronic exposure assessment and this is defined for a food as the product of the concentration of a chemical of concern in a food times, the consumption of that food. Dietary exposure as therefore obtained by summing each of these exposures for the foods across a diet.

The data obtained in TDS can provide general assurances that the food supply is safe from certain chemical hazards. In addition, TDS results can be an indicator of environmental contamination by chemicals and can help in the development of priorities for possible risk management interventions by identifying what foods or food groups are the main sources of dietary exposure.

TDS can also be used to assess the effectiveness of the measures previously put in place to reduce the exposure of the population to the chemical hazards or to address a nutrient deficiency. This can include measures taken that were not directly related to the food supply.

WHO recognizes TDS as the most cost effective way to assure people they are not exposed to unsafe levels of toxic chemicals through food. As world trade in food and food commodities increases importing countries need to be able to assure their consumers that the foods they are consuming are safe.

Food consumption data sources

Data representing individual food intake data are preferable. These are obtained from Food Frequency Questionnaire (FFQ), 24-hour dietary recall, dietary history and food records. Qualitative food consumption data are not useful for TDS.

Sampling in a Total Diet Study

Prior to embarking on TDS it is necessary to identify the most important foods that are consumed by general population as well as foods relevant to population sub groups and those of specific concern regarding contaminant content, Sampling should be region and nationwide, sampling should be as representative as possible.

Sample preparation in Total Diet Study

The food items are prepared “ready for consumption” or “table ready” Water used for cooking usually deionized water. However water procured from the same location should be analysed for contaminants & appropriate quantity of contaminants in water that is required for cooking should be added while calculating total of particular contaminant intakes. No salt is added in cooking.

Intake estimate

Dietary intakes of a contaminant are estimated by measuring the level of a particular contaminant in food and multiplying by the amount of food consumed by a specific age group.

Food consumption pattern in India

The National Nutrition Monitoring Bureau (NNMB) setup in 1972 as an integral part of National Institute of Nutrition, periodically collects data on dietary intake based on multi clustered samples from ten selected states from different regions of India. The staple is cereal based either rice or wheat or in combination with other minor millets. Legumes are a major source of protein. Intake of milk, milk products and other animal products has increased for the populations. The NNMB rural survey has reported on intakes of all other food items also in the ten states.

An average Rural Indian gets 90% of calories from basic commodities like rice, wheat, pulses etc. and only 10% from secondary and tertiary processed foods.

Andhra Pradesh Total Diet Study

A total diet study was conducted in Andhra Pradesh state in South India. In order to carry out the study twenty two types belonging to seven food categories were selected for the study. The choice was made on the basis of most commonly consumed foods in Andhra Pradesh as per National Nutrition Monitoring Bureau 2004-06. A stratified random sampling design was used to cover the entire state of Andhra Pradesh.

Four samples of each food were collected from each district. Almost a total samples numbering 503 were taken up for analysis of contaminants. Since water is a component of food, water samples were also collected. The contaminants namely fluoride, heavy metals (Lead, Cadmium) mycotoxins and pesticides were analysed in food samples that were high risk for the presence of a particular contaminant. The food samples were processed as they are consumed that is “table ready” state before they were analysed.

The dietary intake of each food item for each age group was taken from NNMB dietary intake data. The estimated intakes for contaminants were calculated for a range of age groups, sedentary man and pregnant women. These estimated values were compared to the ADI.

Water appeared to be highest contributor of fluoride. All the samples were contaminated with pesticides. Mycotoxins were present in all the samples of chillies, most of the sorghum and milk samples toxic metals namely lead and cadmium were analyzed in all twenty two food items that were selected and water samples. Among the food items sorghum samples showed highest concentration of lead whereas amaranth had highest levels of cadmium. Among all the food items, cereals were the maximum contributor to toxic metals consumption.

The estimated dietary intake levels of contaminants reported in this study were compared with ADI or PTWI (Provisional Tolerable Weekly Intake) for a particular contaminant. The estimated intake levels of contaminants reported in this study in all age groups, sedentary workers and pregnant women were uniformly much lower than ADI or PTWI of a particular contaminant. At highest levels of food consumption, contaminants like Aldrin, Cadmium and lead are exceeding the safe limits.

This study is first of its kind reported in a state of India and would serve as model prototype to plan for such studies all over India. So that National data will be available. The limitation of this study is that the food intake estimates are based on consumption pattern in rural area and not urban. Since India is a country with diverse culture, eating habits and practices, it is difficult to interpret the findings from national perspective, nevertheless total diet studies are useful tool for assessing exposure to contaminants. Total diet study also must include nutrients intakes if possible.

Although not statistically based total diet studies yield data useful in assessing intake of contaminant through food. Total diet study results are used mainly for identifying trends in concentrations of pesticide residues, contaminants and nutrients in the food supply and population intakes. However, in total diet studies only certain numbers of foods among thousands of foods are taken for analysis. Hence it is a difficult to extrapolate or pin point only a particular food as incriminating item. Nevertheless, concentration data on the foods sampled can be used as reference point in intake assessment.

Toal Diet Studies have been carried out since the early sixties in many countries. USFDA total diet study is conducted on a yearly basis since 1961. Initially, the purpose was to estimate average intakes or background exposures of the population to pesticide residues and levels of radioactive contamination in food from atmospheric nuclear testing. The original purpose in the UK was also to estimate nutrients. At present regular total diet studies are carried out in many countries such as the USA, Australia, Newziland and Spain. The purpose of TDS conducted

by these countries is to estimate the exposure of the general population to a wide range of chemical contaminants, pesticide residues, food additives and nutrients.

At present the following countries have conducted TDS are Australia, Cameroon, Canada, China, Czech, Finland, France, Gautemala, Indonesia, Ireland, Japan, Kuwait, Lebanon, Netherlands, New zealand, Papua new guinea, Spain, Sweden, UK and USA. The latest New zealand TDS report has declared that the food their country's food supply is as good as any in the world. Similar observation has been made by the Australian Total Diet Study.

Conclusions

Intake assessments are useful to develop a general indication of potential high exposures and thereby help in prioritisation, although may be imprecise under certain circumstances. In order to have harmonised database, information should be collected on natural variability of foods, due to difference between cultivars, effects of ripeness, geographical origin, agro climatic conditions, time of harvest, storage conditions etc. To be able to evaluate changes over time, the selection of appropriate analytical methods should be evaluated periodically and validated. In some countries food consumption data does not give information on sex, age, body weight and other states like pregnancy. Information on consumption of secondary processed food is not available. This is important for estimation of risk due to food additives. For food chemical that have a high variability in concentration in individual food items, assessment of acute exposure can be most accurately done by probabilistic methods which are seen as potentially most accurate. However, these methods for estimation of exposure require further refinement including a quantitative measure of uncertainty. Ultimately the quality of the intake assessments not only depend on the quality of the data collected but also on the integration of foods used for initial screening, precise estimations and accurate calculations. Taking all these aspects into consideration will enable in the optimisation of use of a tiered approach and selection of "fit-for-purpose" methods so that peak intake and chronic intakes that are likely to be different may delineated for subsequent use in risk characterisation.

The Enzyme Market

By Rebecca Wright

Consumers' increasing infatuation with digestive health has given prominence to nutritional enzymes. Also, enzymes used for joint health and gluten intolerance are also becoming popular as consumers learn about their role in human nutrition.

Recent Growth Figures

In natural category, digestive aids and enzymes have grown to $94 million at the rate of over 8% last year, while conventional category was worth $172.5 million showing 23.5% increase. Within this class, Miscellaneous Enzyme Products & Digestive Formulas were $25 million (growth 1.5%) for natural and $43 million (5.5%) for conventional channel respectively.

Enzymes and digestive formulations have come a long way since 1920s. The research on new enzymes has been very limited and a challenge to develop new applications is to find convenient delivery methods for consumers to consume it with every meal.

Digestive Health Dominates

Digestive health category in both natural and conventional channel is spurred by growth of fibre and laxative products ($78 million) and probiotics ($120 million) with enzymes close behind ($69 million). To take advantage of popularity of all categories companies are merging all three (fibre, pre/probiotics and enzymes) delivering the ideal formulation. One product combines high potency enzymes with 500 million cultures of specially coated probiotics.

Driving the growth in this category is the awareness created by mass market advertising along with education. Support for digestive health is still the largest enzyme market and it continues to grow as people become aware of benefits that digestive supplements provide. Also increasing number is realising that select enzymes added can target more specific digestive challenges. Specific niches within digestive health category are becoming popular. The segment is expanding beyond providing lactase for lactose intolerance e.g. deficiencies of key enzymes for complete breakdown of gluten are the subject of ongoing research and development.

Digestive enzyme supplements continue to be a fairly small segment of nutritional supplement market in general. Their use as digestive aids has to compete with antacids. Although their benefit goes beyond their use as safer choice for relief of occasional indigestion, awareness about how they work and what consumers should look for on label when purchasing them is still very limited.

As more consumers are complaining of occasional or chronic digestive problems and are looking for non-pharmaceutical ways to address those complaints, door for market for digestive enzyme supplements are opening for substantial growth. Their use will expand also because of their growing versatility. Presently formulations are largely marketed as encapsulated or tableted products; however, novel delivery systems are appearing with better protection of enzyme activity is being developed.

Use of enzymes for non-digestive applications like supporting cardiovascular, joint or tissue health are growing as well. These 'systemic' applications are becoming better known and understood for their benefits.

Expanding Markets

While enzymes are well established in dietary supplements, their use in functional foods and beverages has not been wide. Companies are developing technology of protecting enzyme activity and their use in these foods and beverages will grow in near future. Capsules and tablets provide the best means for protecting their activity throughout the GI tract, however, new methods of coating such as microencapsulation will open market substantially to new applications in conventional foods and beverages.

Another area of new product development will be application to enhance digestion and bioavailability of specific food components. As we learn more about active components in food and the factors affecting their availability, increasing their availability will be more important. This is well accepted in sports nutrition market where custom enzyme blends are used to provide better bioavailability of the protein needed to maintain and build muscle tissue. There is an increasing understanding of involvement of specific micronutrients in facilitating optimal athletic performance, thus a good market for custom enzyme formulations to maximise nutrient delivery.

Enzymes are also being used in systemic applications with formulations for non-digestive functions becoming more popular. For some time this market was small but now with more people learning how some enzymes can help improve cardiovascular and tissue health, it is set to grow. Enzymes are especially effective or soft tissue recovery with clinical trials supporting that application. Microencapsulation of enzymes allows for convenient delivery system as many people have trouble swallowing capsules. These enzymes can be sprinkled on foods and due to microencapsulation their stability is protected and taste of food is not altered.

As knowledge of enzyme supplementation expands, their benefits in other areas will grow. Formulations for joint, cardiovascular and sports medications are already incorporating enzymes as primary ingredients. Their use will grow substantially as more people want to stay active in their senior years.

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Natural Product Protection

By Renée Gan

Consumers prefer natural ingredients in foods and absence of chemical-sounding ones. The trends like “pure and simple”, “cleaner labelling” and “less is more”, food scientists have task to develop products without the old preservation systems.

Tying up free radicals

Fat oxidation is a big issue with processed foods. Free radicals formed initially will combine with oxygen to autoxidation causing rancidity. Antioxidants inhibit the formation of free radicals or hinder further autoxidation process working as free-radical scavenger. Synthetic antioxidants like BHA and BHT are very effective but not natural so demand for natural antioxidants is rising. In addition, synergists scavenge free radicals or metal chelators inhibit formation of free radicals.

A natural against oxidation

Plant-based antioxidants like essential oils, tocopherols and extracts have shown ability to stand up with the synthetics when it comes to antioxidants and preservatives. Rosemary extract is one such example becoming important natural antioxidants containing phenolics compounds that binds free radicals. It has shown effectiveness similar to BHA and BHT in commercial applications replacing synthetic antioxidants in meat applications. Carnosic acid is an active component for rosemary activity. At 100 ppm carnosic acid provided same oxidative inhibition as did combination of BHA and BHT used in pepperoni, while 50 ppm protected colour stability in fresh pork sausages.

Applications of rosemary extract in poultry fat also have been successful without flavour alteration and in precooked meat products in avoiding warmed-over flavour. Screening various botanical and spice extracts for over 20 years have shown that rosemary is the most efficient and sustainable product with respect to antioxidant power, abundance of raw material and cost-effectiveness.

Spicing up the bac attack

USDA is evaluating bactericidal properties of various essential oils and active compounds of plant extracts. Carvacrol, essential oil and active component of oregano, had bactericidal effect on *E. coli* O157:H7 and *Salmonella enterica*. Besides oregano, other promising spices were thyme, cinnamon, clove, lemongrass and allspice. Method of application being edible films made with purees of apple and tomato. However, one problem in such applications being that concentrations needed to kill pathogens could adversely affect sensory properties of foods.

The popular bagged-salads appeared in recent food-safety issue could utilise similar technology. Vapour action of natural antimicrobials have been studied. Many components of natural extracts are effective in vapour phase and can offer benefits in leafy greens. Tomato-puree films laced with oregano oil, allspice oil (eugenol) and garlic oil (sulphides) showed effectiveness against E. coli, S. enterica and Listeria monocytogenes. Although tests were carried out in lab with petri dish not spinach, this could provide protection in actual products.

Natural ‘cures’

For natural salami and sausage, alternatives to synthetic nitrates are useful. Spinach and celery inherently contain high amounts of nitrate and could contribute to control of bacterial growth and may offer alternative ‘naturally cured’ processed meats. As the nitrate present in celery powder used in ‘natural cure’ contains about 40 to 80 ppm

compared to added nitrite in conventional curing being about 150 ppm, consumers cannot expect the same protection in natural meat products and must handle them more carefully especially with temperature abuse. Natural vinegar, lactate and lemon powder have also shown bactericidal ability. These help by increasing lag phase by several days but again temperature plays a major role. Major meat processors use high-pressure pasteurisation to improve preservation of naturally cured products and this provides added protection.

Fermented protection

Bacterial fermentates are also becoming popular as natural preservatives and include nisin, natamycin and several cultured products like cultured sugar, cultured skim milk etc. In applications, developers should know which microbes (gram + or - , mould, yeast etc.) need control. Natamycin is antimycotic and prohibit fungal growth in area around it. It is most stable around neutral pH while stability will reduce at high and low pH. Although stable to heat, UV will degrade natamycin. Literature reports minimum of 7 ppm being needed on surface of cheese or food, recent innovations have shown patented forms of natamycin to be significantly more effective. Higher concentrations are needed for yeast inhibition.

Cultured sugar preservation offers protection against bacteria, yeast and moulds with clean label allowing alternative to benzoate and sorbate. Studies have shown effectiveness in soups, entrees and pasta, refrigerated deli salads & dips including salsa & sour cream, shelf stable sauces & dressings and bakery products. They have been shown to be quite effective against most pathogens including *Listeria, E. coli, Salmonella and Staphyloccus*. Besides preservation and food safety, they are also useful in flavour enhancement, colour protection, thickening, creaminess and smoothness in many applications.

As natural preservation becomes more popular, product developers must act to ensure that it is not at the expense of food safety. They should be aware of differences in mechanisms and efficacies compared to conventional proven product protection.

Natural History

Natural food products are becoming more popular with consumers. When developing them it is important to understand federal perspectives and whether it is governed by USDA or FDA and how the food is processed.

In 1982, the Food Safety and Inspection Service (FSIS) of the USDA published Policy Memo providing guidance to make natural claims on label to include a brief statement that the product is “a natural food because it contains no artificial ingredients and is minimally processed. This statement needs to appear contiguous to, or linked to, the term ‘natural’ on the label.” It also allowed for FSIS to approve or deny claims based on their context. The guidance has been updated from time to time. Sodium lactate and natural flavourings from oleoresins and sugar were added in 2005 as acceptable in products with natural claims. But after an uproar FSIS removed sodium lactate from guidance. Companies submit their labels for consideration, and each label is judged on a case-by-case basis.

FDA has made a decision to not formally define “natural” and relies on 1988 guidance wherein no artificial or synthetic ingredient can be added to product that would not generally be expected to be in the food. Also, even when ingredient source is natural, if intended use is different (e.g. turmeric added for colour and not for flavour), the food still cannot be called natural.

Condensed from Food Product Design 06/17/2010

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News about Food & Nutrition

FAO Wants Tea-Producing Countries to Drink More Tea

ROME—A new report from the Food and Agriculture Organization of the United Nations (FAO) urges tea-producing countries to increase income from the crop by marketing the drink more heavily at home and publicizing the health benefits of the beverage abroad. FAO also warned against increasing the size of tea plantations which would damage prices in the long run. According to the report, the export market in green tea will grow more quickly over the next 10 years than that of black tea, where the markets in major importing countries are unlikely to expand further as they are already nearly saturated.

“Scope for expansion in consumption in traditional import markets like the United Kingdom and Russia is quite limited but in the countries where tea is produced the per capita consumption is much lower and so there is a lot more market potential,” said Kaison Chang, Secretary of FAO’s Inter-Governmental Group on Tea, the only international tea authority.

Consumers in tea-producing countries drink just a tenth of the amount of tea than those in mature import markets, representing a major opportunity for tea-growers if the right marketing strategies are employed.

The FAO Composite Price for tea, the indicative world price for black tea, increased by 13 percent in 2009, pushing prices to record levels last year due to drought in some of the major tea-producing regions of Asia and Africa. Prices have stabilized as weather patterns return to normal. The effect of this price increase on the consumer in developed countries was just 5 percent in 2009 because of intense competition in the beverages market.

In developing countries retail tea prices rose 12 percent during the same period. World black tea exports are projected to grow by 1.8 percent between now and 2019. Green tea exports are expected to grow as much as 5.5 percent per year. China is the world’s largest tea exporter, followed by Kenya, Sri Lanka and India. “Tea can be an important contributing factor to a nation’s food security,” said Chang. “In Kenya for example, receipts from tea exports covers the country’s entire food import bill.”

Earnings from tea exports account for about 35 percent of total agricultural export receipts in Kenya and constituted 50 percent of agricultural export revenue in the next largest tea producer, Sri Lanka, covering around 60 percent of food imports.

The increase in the FAO Tea Composite Price in 2009 translated to a 7-percent increase in export earnings at the global level, significantly affecting rural incomes and household food security in tea producing countries, FAO said. Black tea accounted for 65 percent of total tea production over the past five years, 67 percent of consumption and 80 percent of trade. The acceptance of the health benefits of green tea over the past few years in developed countries has helped exports.

Food Product Design 06/29/2010

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Agriculture's Next Revolution -- Perennial Grain -- Within Sight, Say Washington State University Scientists

Earth-friendly perennial grain crops, which grow with less fertilizer, herbicide, fuel, and erosion than grains planted annually, could be available in two decades, according to researchers writing in the current issue of the journal *Science*.

Perennial grains would be one of the largest innovations in the 10,000 year history of agriculture, and could arrive even sooner with the right breeding programs, said John Reganold, Washington State University (WSU) Regents professor of soil science and lead author of the paper with Jerry Glover, a WSU-trained soil scientist now at the Land Institute in Salina, Kansas. "It really depends on the breakthroughs," said Reganold. "The more people involved in this, the more it cuts down the time."

Published in Science's influential policy forum, the paper is a call to action as half the world's growing population lives off marginal land at risk of being degraded by annual grain production. Perennial grains, say the paper's authors, expand farmers' ability to sustain the ecological underpinnings of their crops. "People talk about food security," said Reganold. "That's only half the issue. We need to talk about both food and ecosystem security."

Perennial grains, say the authors, have longer growing seasons than annual crops and deeper roots that let the plants take greater advantage of precipitation. Their larger roots, which can reach ten to 12 feet down, reduce erosion, build soil and sequester carbon from the atmosphere. They require fewer passes of farm equipment and less herbicide, key features in less developed regions.

By contrast, annual grains can lose five times as much water as perennial crops and 35 times as much nitrate, a valuable plant nutrient that can migrate from fields to pollute drinking water and create "dead zones" in surface waters. "Developing perennial versions of our major grain crops would address many of the environmental limitations of annuals while helping to feed an increasingly hungry planet," said Reganold.

Perennial grain research is underway in Argentina, Australia, China, India, Sweden and the United States. Washington State University has more than a decade of work on perennial wheat led by Stephen Jones, director WSU's Mount Vernon Research Center. Jones is also a contributor to the Science paper, which has more than two dozen authors, mostly plant breeders and geneticists.

Soytech eNews June 25, 2010

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Alaska Waste Opens New Plant to Turn Used Oils into Biodiesel

The Anchorage area's private trash hauler is making a multimillion-dollar investment to transform food grease into fuel for its fleet of garbage trucks. Alaska Waste unveiled its new $3 million biodiesel plant in South Anchorage on Thursday. The company is collecting waste fryer oil from 240 local restaurants, groceries, hotels and hospitals from Girdwood to Wasilla. Last week, the plant churned out its first batches of biodiesel.

Executives said the fuel is being tested and gradually will be used by the company's truck fleet, blended with varying amounts of petroleum-based diesel. The advantage of biodiesel is that it creates much less greenhouse gas emissions than regular diesel, said Jeff Riley, Alaska Waste's chief operating officer.

Before Alaska Waste joined the biodiesel bandwagon, most of the greasy goo produced in the Anchorage area had been barged to the Lower 48 to be converted for other uses, or was tossed into local trash bins and landfills. However, a handful of people in Southcentral Alaska also collect used veggie oil for use in their vehicles and home heating.

These home brewers were worried at first, but it doesn't look like Alaska Waste will drain the supply of oil in town, said Will Taygan, a Peters Creek resident who owns Arctic Vegeworks. "(Alaska Waste) has targeted more large-scale waste-oil producers," he said. Home brewers still have a more than adequate supply from smaller restaurants.

Biodiesel was a big fad a few years ago when gasoline was fetching record prices, but Taygan said the fad ended when petroleum prices declined. "Everyone who was (brewing it) five years ago is still doing it, but the other folks have quieted down," he said.

Riley, of Alaska Waste, said the company built the plant to capitalize on a useful product, reduce air pollution and keep grease out of the landfill. In the future, he said, Alaska Waste might team up with local fuel distributors to enable Anchorage residents to purchase some of the biodiesel.

The roughly 3,000-square-foot plant occupies a large dirt lot behind the company headquarters off Dowling Road on Rosewood Street, just south of the city's recycling center. Last year, Alaska Waste began installing storage tanks at local commercial kitchens. The tanks store used fryer oil until the company's small tanker trucks arrive to pick it up.

"It's a win-win situation," said Greg Todd, the franchise owner for Dairy Queen Grill and Chill, whichhas five restaurants in the Anchorage area. He said it saves restaurant employees time and effort handling the waste, and the tanks are much less "nasty" than trying to put the oil in a trash bin or in a steel drum for collection.

Other suppliers include the Fred Meyer, Safeway and New Sagaya grocery stores, McDonald's, Carl's Jr., Walmart, the Lucky Wishbone and the Peanut Farm. Alaska Mill Feed & Garden Center collected used fryer oil from local restaurants and sent it to customers in the Lower 48 until last year. That's when Alaska Waste bought the company's equipment and took over the supply route. Mark Goodman, a manager at Mill Feed, said he is pleased with how things worked out because the new plant allows the waste oil to be put to a good use in Alaska.

The biodiesel plant was finished in April, and it didn't need any government funding, according to Riley. He said the project's financial support came from JL Properties, a large real estate firm in Anchorage that partially owns Alaska Waste.

Soytech eNews June 21, 2010

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Concepts for Coconut Water

ERLANGER, Ky.—**WILD Flavors, Inc.** has expanded into the coconut water trend through the research and development of flavors that test well in coconut water applications. Flavors developed and tested for acceptance in coconut waters include tropical fruits such as mango, passion fruit, acai berry, strawberry guava, lime citrus, tropical pineapple, and pomegranate berry. In addition, WILD has developed a unique "young green coconut flavor" that makes coconut water taste like it is fresh from the tree.

WILD has also developed concepts that contain coconut water and have added flavors, colors, sweeteners, juices, teas, and/or health and wellness ingredients. These concepts include a Coconut Water-Sports Drink with added electrolytes (sodium and potassium) and vitamin C; a Coconut Water-Green Tea with green tea, green tea polyphenols, and vitamin C; and a Coconut Water-White Tea with white tea, white tea polyphenols, and vitamin C.

According to WILD, the market is particularly grabbing the interest of athletes due to high levels of potassium and electrolytes, as well as addressing the needs of regular exercisers and consumers looking for new, natural, great-tasting beverages.

Food Product Design June 16, 2010

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Functional Advantages Driving Whey Proteins Market

SAN JOSE, Calif.—The U.S. whey proteins market is anticipated to reach 472.3 million pounds by 2015, driven largely by functional advantages of whey proteins and surging demand from nutrition industry, according to a new report from Global Industry Analysts, Inc. Developments in technology of whey processing and investments in R&D are other major driving forces for the growth of the whey proteins market.

The report, “Whey Proteins: A US & European Market Report”, provides a comprehensive review of market trends, competitive scenario, product introductions/innovations and recent industry activity. The report analyzes the U.S. market data and analytics in terms of volume and value sales by the following segments—WPC-34, WPC-80 and WPI. It also analyzes European market data in terms of volume sales for whey proteins.

According to the report, whey protein market momentum is primarily being driven by the functional advantages of whey proteins, isolates and concentrates. The growing nutrition industry, which includes sports nutrition, dietary supplements, functional foods and clinical nutrition, is the principal driving force for the market growth. Moreover, high-end whey protein isolates (WPI), whey protein concentrates (WPC) and whey protein hydrolysates (WPH) are exhibiting substantial growth rates, owing to the rising demand from nutrition and health segments. With an enhanced focus on technological and functional properties, WPI, WPC and WPH are anticipated to widen their field and scope of application.

Food Product Design June 8, 2010

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India: Farmers Push Comeback of 'Cereal of the Poor'

English IPS News -- KARNATAKA, INDIA -- June 18, 2010 -- Eshwarappa Banakar has been a farmer most of his adult life, but these days he has also turned banker - banker of seeds, that is, and especially of millet strains. Yet while his is Karnataka's first seed bank to be set up by an individual farmer, it is only one of the signs of the millet's creeping comeback in the agricultural sector of this southern Indian state.

The welcome trend is partly due to the efforts of Sahaja Samrudha (Bountiful Nature), an organization working toward reviving the cultivation of traditional millets in Karnataka's dryland tracts. Banakar, for instance, acquired his seeds from the group, which maintains a network of farmers and encourages on- farm conservation of traditional seed varieties.

Explains Krishna Prasad, founder and director of Sahaja Samrudha: "The focus of the conservation is to prevent the extinction of these valuable crops, and this can be achieved only by reintroducing them into the farming systems where it has disappeared."

Millets are staples of the traditional Karnataka diet, and are served usually as roti or as millet rice. They are considered rich sources of minerals, amino acids, and fibre. Chamarajanagara district farmer Rajashekara Murthy even asserts, "The nutritive value of the native 'ragi' (finger millet) varieties is so high that one 'ragi ball' suffices to sustain a worker for the entire day."

The cultivation of millets, however, has been on the decline for the last three decades. One major reason for this has been the focus on the more profitable cash crops such as sugarcane, potato, sunflower, cotton, and other cereals like rice and wheat. Millets at one point were also branded as "cereal of the poor," a negative connotation that could have only contributed to its diminishing popularity in the rural areas and to the non-existent demand for it among urban people.

Murthy points a finger as well at the Public Distribution System (PDS), saying, "The introduction of rice - supplied at subsidised prices through the PDS - has replaced 'ragi' as main staple."

"I remember my childhood when we depended only on millets for our meals," Banakar, the seed banker, also says. "But (we) later changed to growing commercial crops."

Conserving millets, though, is strategic in terms of their nutritional contribution and their role in local agro-ecosystems, says Sahaja Samrudha's Prasad. Experts in fact say that millets, which are low-water consuming crops, make perfect sense as crops for the small and marginal farmers in most of southern India's semi-arid zones.

"Indian agriculture is mainly dependent on rainfall, as 70 percent of our net cultivated area is under dryland agriculture," notes agronomy professor Dr N Deva Kumar of the University of Agricultural Sciences in Bangalore. "In order to feed (our) increasing population, there is continued pressure on drylands to produce more." Millets, Kumar says, are best suited for "low rainfall (300 to 800 mm) situations" and "are free from pest and disease attack". Thus, he says, it will "play a major role in combating the situation of climate change, which results in increased temperature, reduced rainfall, reduced crop productivity, etcetera."

Banakar, who has so far collected for his seed bank 25 varieties of sorghum, 30 of finger millet, and 10 of foxtail millet, besides a few varieties of kodo millet, proso millet, and pearl millet, realises that now. The resident of Haveri district in this Indian state recalls that when his family was growing commercial crops, "every time there was a drought or a flood, we incurred losses."

"It was the prevailing drought-like situation for a few years that finally woke me up to the fact that we can't get anywhere with only high-input cash crops," says Madegowda, a farmer who has taken to conserving about 26 varieties of finger millet on his farm in Mysore district.

"Drought, apart from bringing down yields, also dried up my crop, which created scarcity of fodder," he says. "Then I realised the value of 'ragi', which gives me food as well as fodder for my cattle. Purchasing fodder is very expensive from the market."

Koppal district farmer Shekammavani Huchhappa says that millets can withstand not only drought but heavy rain. Encouraged by Sahaja Samrudha, she has been growing the seven kinds of millets - finger, kodo, foxtail, little millet, proso, barnyard, and pearl - while following different modes of crop diversification.

Puttaraju, another farmer in Chamarajnagar district, also in Karnataka, cultivates a combination of different millets, pulses, and oilseeds even as he grows finger millet as a main crop. He says this ensures him of a harvest come rain or shine. The method, he adds, will also increase returns from the land in terms of nutrient availability, water holding capacity, and soil fertility, in addition to pest and disease control.

Mixed cropping of millet with other grains or legumes is an important practice in traditional cropping system. Locally called 'akadi' in south Karnataka, it is receiving renewed interest along with the return of millets as crops in local farms.

Author: Anitha Reddy; from Soya Tech eNews June 19, 2010

REGULATORY NEWS

‘Natural’ Marketing Claims Rising

CHICAGO—The marketing of new products using natural claims, such as “like grandma made,” and using “from the cupboard” ingredients is taking off alongside rising interest in “home made” and “homestyle,” while momentum in “natural” and “preservative-free” is continuing to gather pace, according to new data by Innova Market Insights.

Innova Market Insights tracked 987 new products using either the word “simple,” “simplest” or “simplicity” in 2009 compared to 467 in 2008. Use of the word “pure,” “purity” or “purely” grew from 3,013 in 2008 to 5,705 in 2009. The researcher tracked 2,137 new U.S. products positioned as “natural” or “preservative free” in the first four months of 2010 (January 2010 to April 2010), up slightly from the 2,052 products tracked in the corresponding period in 2009, but dramatically from the 1,155 recorded in 2008.

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AMA Pushes for Accurate Reporting of Fats on Labels

The American Medical Association (AMA) adopted a number of new public health policies, including asking the U.S. Food and Drug Administration (FDA) to adopt more accurate labeling of *trans* and saturated fats, during its annual meeting June 14.

Current FDA nutrition labeling requirements allow *trans* or saturated fat content to be reported as zero if the food product contains less than 0.5 grams of *trans* or saturated fats per serving. Under this current nutrition labeling, an individual consuming just one serving of a product labeled “*trans* fat free” or “zero *trans* fat” could in reality be consuming as much as 25 percent of his or her recommended daily allowance of *trans* fats.

“Reducing or eliminating the consumption of *trans* fats leads to good overall health and a lower risk for heart disease, but it’s difficult to make dietary changes if food labels are unclear,” said AMA Board Member Edward L. Langston, MD. “To help facilitate clear, concise, and uniform labeling, the AMA urges the FDA to use more precise processes to measure the fat content in foods and include the most accurate nutritional information on food labels.”

Food Product Design June 16, 2010

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Consumer Education Boosts Food Safety

MANHATTAN, Kan.—Food safety is everyone’s responsibility—from the producer to the processor to the consumer—said Kansas State University meat scientist James Marsden who believes there is a need to better educate consumers about proper food handling and cooking in order to minimize the risk of foodborne illness.

“Ideally, food manufacturers should reduce the risk of foodborne pathogens, even in raw foods to minimize consumer risk,” he said. “Consumers can certainly reduce that risk further by following safe food-handling practices and proper cooking.”

Marsden, who worked in the meat processing industry for many years prior to academia, provided five suggestions for how consumer education could be improved:

● Food-safety messages for consumers should be concise, consistent and mindful of reasonable consumer behaviors.
● Safe food handling labels should be updated to be product specific and to provide more details. For example, a label for ground beef could include more detail about preventing cross contamination and a recommended minimum cooking temperature.
● Because food safety is rarely taught in schools, government and industry food safety education should target younger consumers using Internet-based messages, taking advantage of YouTube, Facebook and other sites frequented by teens and young adults.
● Advertisements with food-safety messages should be programmed on the Food Network, using celebrity chefs and familiar actors.
● Food-safety messages should be included with product information for appliances and cookware, targeting consumers of all ages.

“For raw meat and poultry products, the solution lies with safe foods produced using non-thermal pasteurization technologies, such as UV/Advanced Oxidation technologies and antimicrobial spray treatments, combined with safe preparation and proper cooking,” he said. “Consumer education can and should play an important role in that solution.”

Food Product Design June 17, 2010

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Industry Unveils Product Recall Recommendations

WASHINGTON—The Grocery Manufacturers Association (GMA), Food Marketing Institute (FMI) and GS1 US issued a joint industry report identifying opportunities and methods for improving product recall management practices across multiple dimensions.

The report, “Recall Execution Effectiveness: Collaborative Approaches to Improving Consumer Safety and Confidence”, was conducted by Deloitte Consulting LLP on behalf of GMA, FMI and GS1 US and makes recommendations in three main areas—communication and collaboration; processes, organization and metrics; and technology.

Among the report’s recommendations is a call for more collaboration among trading partners to enable early identification of possible problems by sharing and investigating consumer complaints, a spike in which could be symptomatic of a problem. The report also suggests investigating the root cause of recalls to further assess prevention measures that can reduce or limit the need for recalls.

When it comes to recall processes, organizations and metrics, using standardized industry tools and processes whenever possible will enhance recall efficiency, according to the report. Investment in employee recall execution training at both the corporate and the store level was also identified as an opportunity for improvement. Finally, the report identifies technology as the means of supporting its communication and process-oriented recommendations.

Food Product Design June 4, 2010

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MEPs Reject Bid To Delete Nutrient Profiles from Health Claims Regulation

An audacious attempt to remove nutrient profiles from the European Union's Nutrition & Health Claims Regulation has failed — by the narrowest possible margin. MEPs voted 309 in favour and 309 against a proposal to delete the controversial profiles, with a tie meaning the motion was defeated.

Nutrient profiles were introduced to the Nutrition & Health Claims Regulation as a means of preventing foods high in salt, sugar and saturated fat from being marketed with claims that could make consumers think they were healthy. But the concept has proven notoriously difficult to drive through, with member states and even different European Commission departments struggling to agree on how the profiles should be defined.

The vote on nutrient profiles took place on 16 June during a debate on the Food Information to Consumers proposal, a piece of legislation that will eventually contain new EU-wide labelling laws.

German MEP Renate Sommer, who has opposed nutrient profiles from the start, introduced an amendment to delete Article 4 from the Nutrition & Health Claims Regulation, the article which includes a requirement for profiles, via the insertion of a new article into the Food Information proposal — a procedure permitted under EU rules. However, her failure to win enough support for the amendment means the Commission and member states must now make another attempt to reach an agreement on profiles.

During the debate MEPs also decided a number of matters directly relevant to the Food Information proposal. They agreed that placing nutritional information on the front of pack should be mandatory — but voted down an attempt to introduce a 'traffic light' system that would require products to be labelled red, amber or green according to how healthy they are.

This angered UK-based pressure group the Children's Food Campaign. Chairman Mike Rayner said: "With over half of Europeans and more than 60% of people in the UK now overweight, this outcome is a massive blow for consumers. Traffic light labels have been found to help parents make healthier food choices for their children, so their rejection is yet another setback in the fight against childhood obesity."

MEPs also voted in favour of deleting a clause in the Food Information proposal that would give member state governments the freedom to introduce national labelling schemes — in addition to the EU's basic requirements — within their own borders.

CIAA, the Brussels-based European food industry trade body, welcomed this. "We believe this would have confused consumers and further fragmented the EU single market creating additional burdens for industry operating across several markets," it said. "Today's outcome sends a positive message that we need harmonized rules across the EU."

Meanwhile, MEPs rejected moves to introduce a minimum font size for mandatory on-pack information, voting instead for guidelines on legibility. This was another outcome welcomed by the industry, which had feared such a stipulation would leave little room on packs for marketing messages.

Functional Ingredients story by Richard Clarke June 22, 2010

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Plant Sterols Cleared for Use in Canada

DECATUR, Ill.—**ADM** announced that Health Canada has issued a ruling that will allow ADM’s CardioAid® plant sterols to be added to foods.

"Health-conscious consumers are seeking heart-healthy foods that may help lower cholesterol naturally when consumed as part of a diet low in saturated fat and cholesterol," said Scott Horton, ADM's product manager for CardioAid plant sterols. "Manufacturers in Canada will soon be able to incorporate the benefits of CardioAid plant sterols into everyday foods and beverages without affecting taste."

Health Canada has confirmed that plant sterols may be added to the following foods: mayonnaise, margarine, calorie-reduced margarine, yogurt and yogurt drinks, vegetable and fruit juices, salad dressing and unstandardized salad dressings and spreads.

Health Canada has also issued guidance concerning the use of health claims regarding the cholesterol lowering effect of plant sterols. The following statement may be used for foods meeting the qualifying criteria: "[serving size from Nutrition Facts table in metric and common household measures] of [naming the product] provides X% of the daily amount of plant sterols shown to help reduce/lower cholesterol in adults."

Health Canada has indicated that one or both of following statements may be used adjacent to the primary statement (above):
• "Plant sterols help reduce [or help lower] cholesterol."
• "High cholesterol is a risk factor for heart disease."

Food Product Design June 17, 2010

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Trans Fats Are Gone -- and Many Foods Didn't Get Worse as Feared, Report Says

Scientists finally have some good news about fat in our foods. Contrary to fears, most food manufacturers and restaurants did not just swap one bad ingredient for another when they trimmed artery-clogging trans fats from products and menus, an analysis finds. Even the french fry, a longtime dietary scourge, got a healthier remake. But there's still room for improvement, particularly for some items sold in supermarkets, which replaced heart-damaging Trans fat with its unhealthy cousin, saturated fat.

A Harvard researcher and a consumer advocacy group examined 83 foods that had a makeover since 2006. That year the U.S. federal government began requiring food labels to list the amount of trans fat in packaged products and New York City became the first of several cities to phase them out in restaurants.

Trans-fats are created when hydrogen is added to liquid oils to harden them for baking or to extend shelf life. With Trans fat under attack, food makers and restaurants tinkered with various cooking oil and fat substitutes, trying not to compromise taste and texture. But how healthy are the reincarnations? Harvard researcher Dr. Dariush Mozaffarian and the Center for Science in the Public Interest checked grocery products and restaurant chow for fat content. Items studied included margarine, junk food, baked goods and fast food from five popular chains.

The researchers did not do their own chemical testing, but instead used Food and Drug Administration databases, nutrition labels and industry brochures to determine trans fat and saturated fat levels. Results were published in a letter in Thursday's *New England Journal of Medicine*.

Nearly all of the foods analyzed were free or mostly free of Trans-fat. And many companies and restaurants did not spike their saturated fat content when they cut Trans fat. 65 per cent of supermarket products and 90 per cent of restaurant fare contained saturated fat levels that were lower, unchanged or only slightly higher than before. "Companies almost always can reformulate their food to have a healthier balance of fats," said CSPI executive director Michael Jacobson. The researchers declined to provide details about the winners and sinners because they said they plan to publish the full results later. But they gave three examples:

- Large order of McDonald's French fries: Trans-fat dropped from 7 1/4 grams to zero; saturated fat went from 5 grams to 3 grams.
- Gorton's Crunchy Golden Fish Sticks: 3 grams of trans-fat per serving to zero; saturated fat unchanged at 4 grams. The package lists six sticks per serving.
- An Entenmann's Rich Frosted Donut: 5 grams of trans-fat to zero; saturated fat more than doubled from 5 grams to 13 grams.

Just because trans-fat is gone from gluttonous foods doesn't mean they're healthy, said Dr. David Heber, who heads the UCLA Center for Human Nutrition. "Trans fat or not, a doughnut is still a doughnut. Even Homer Simpson will back me up on that," said Heber, who had no connection with the research. The American Heart Association recommends that people limit trans-fats to less than 2 grams per day and less than 16 grams of saturated fat, based on a 2,000 calorie diet.

Author: Alicia Chang from Soya Tech eNews May 27, 2010

Research in Nutrition & Health

Coffee, Tea Reduce Heart Disease Death

UTRECHT, the Netherlands—High tea consumption was associated with a reduced risk of coronary heart disease (CHD) mortality in a recent study (Arterioscler Thromb Vasc Biol. 2010 Jun 18). Researchers from the University Medical Center Utrecht, Utrecht, the Netherlands; and the National Institute for Public Health and the Environment, Bilthoven, the Netherlands, also found a slight risk reduction for CHD mortality with moderate coffee consumption.

Coffee and tea consumption were assessed with a validated food-frequency questionnaire, and 37,514 participants were observed for 13 years for the occurrence of cardiovascular morbidity and mortality. Tea was inversely associated with CHD mortality, and subjects who drank 6 cups per day had the lowest risk for heart trouble.

Although not significant, researchers found those who drank 2.1 to 3 cups of coffee per day had the lowest risk for CHD mortality. Those who drank more or less had an increased risk. Neither coffee nor tea was associated with stroke and all-cause mortality.

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Some Gums Solve Gluten-free Challenges

ANKARA, Turkey—Researchers found that xanthan or a xanthan-guar gum blend can overcome some of the structural challenges of gluten-free formulation. Using a variety of gum types, including xanthan, guar, locust bean, κ-carrageenan and a xanthan–guar blend, the researchers from the Department of Food Engineering, Middle East Technical University, studied the effects of the various gums on the macro-structure of gluten-free rice cakes baked in conventional and infrared–microwave (IR–MW) combination ovens. A rice cake containing no gum was used as control. Results showed that the addition of gum affected the pore area fraction, as well as the number of pores on the rice cakes. The highest pore area fraction was obtained in cakes containing xanthan and xanthan–guar blend. Cakes baked in an IR–MW combination oven had higher porosity than those baked in a conventional oven. Micro-structure of gluten-free rice cakes was also analyzed. Conventionally baked cakes showed more starch granule deformations. Both granular starch residues and deformed starch structure were observed in cakes baked in IR–MW combination ovens.

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Folate Aids Spinal Cord Healing

WASHINGTON—Folate promoted healing in damaged rat spinal cord tissue by triggering a change in DNA, according to a laboratory study funded by the National Institutes of Health (NIH). The researchers showed that the healing effects of the vitamin increased with the dosage, until regrowth of the damaged tissue reached a maximum level. After this threshold was reached, regrowth declined progressively with increasing doses until it reached the level seen in the absence of the vitamin.

Specifically, folate stimulated a process known as DNA methylation, a natural biochemical process in which chemical compounds known as methyl groups are attached to DNA. The study results suggest a greater understanding of the chemical sequences associated with folate metabolism and DNA methylation may lead to new techniques to promote healing of damaged spinal cords and other nervous system injuries.

"Interestingly, the more folate we gave, the more regrowth we saw, eventually achieving almost a tenfold increase in axonal regeneration," said Bermans J. Iskandar, of the University of Wisconsin-Madison. Beyond the peak dose of 80 micrograms per kilogram of body weight, the effect decreased but without causing toxicity or nerve damage.

To understand how folate helps repair damaged axons, the researchers undertook additional observations. They found that injured nerve tissue began producing surface receptors for folate. Folate fits into the receptors, like a key fits into a lock, and then is absorbed into the nerve cell. After folate was absorbed into injured nervous system tissue, the nerve cells began producing enzymes that attach methyl groups to DNA. Chemically blocking folate from binding to the nerve cells, or blocking the methylation enzymes, hindered the nerve healing process. "Injuring the spinal cord seems to enhance its ability to receive folate in its cells," Dr. Iskandar said.

The researchers also tested the methylation of spinal cord DNA at various doses of folate and found that, like the regrowth of axons, DNA methylation peaked at a dose of 80 micrograms folate per kilogram of body weight. The research is at an early stage and additional studies are needed to determine what role folate might play in the treatment of human beings with spinal cord injury.

The research was supported by the NIH's Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institute of Diabetes Digestive and Kidney Diseases, National Institute of Dental and Craniofacial Research, and National Institute of Neurological Disorders and Stroke. The findings were published in the Journal of Clinical Investigation.

The addition of methyl groups to alter the functioning of DNA is part of the relatively new field of epigenetics—changing the functioning of DNA without changing the composition of genes. Initially, the only known way a gene's functioning changed was through mutation, a chemical change to the gene itself.

Nearly 11,000 Americans experience a spinal cord injury each year, according to the Centers for Disease Control and Prevention. The effects of spinal cord injury vary with the extent of the injury, with severe injuries resulting in complete paralysis below the injury site.

Folate, a B vitamin, occurs naturally in leafy green vegetables and other foods. The synthetic form, folic acid, is used to supplement cereal grains in the United States. The vitamin is important for the formation of the brain and spinal cord in the early embryo. The U. S. Public Health Service recommends that all women of childbearing age consume 400 mg of folic acid each day to reduce their risk of having a child with a neural tube defect, a birth defect of the brain and spinal cord.

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Resveratrol Fights Eye Angiogenesis

ST. LOUIS—Resveratrol may inhibit angiogenesis in the eye, helping to preserve vision in adults with eye diseases such as diabetic retinopathy and certain types of age-related macular degeneration (AMD), according to a new trial (*Am J Pathol*. July 2010;177:481-492. DOI: 10.2353/ajpath.2010.090836). Researchers from Washington University in St. Louis studied mice that develop abnormal angiogenesis in the retina after laser treatment, and found when the mice were given resveratrol, the abnormal blood vessels began to disappear. The research team determined resveratrol activated eukaryotic elongation factor-2 kinase (eEF2), inhibiting the proliferation and migration of vascular endothelial cells. Interestingly, the effect is different than that seen in previous studies, in which resveratrol exerted effects on the sirtuin family of proteins, helping to ameliorate and decelerate the aging process.

In a statement from Washington University, Rajendra S. Apte, M.D., Ph.D., the study's senior investigator, noted the oral administration of resveratrol may make it ideal for treating different retinal conditions, which are currently addressed with eye injections. "We have identified a novel pathway that could become a new target for therapies,"

Apte said. "This could potentially be a preventive therapy in high-risk patients. And because it worked on existing, abnormal blood vessels in the animals, it may be a therapy that can be started after angiogenesis already is causing damage."

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Baby Products 'Contain Too Much Sugar'

A number of products aimed at babies and young children contain too much sugar, according to new research. A study undertaken at the University of Calgary and funded by the Centre for Science in the Public Interest Canada highlighted that more than half of the products studied, including pureed dinners, toddler entrees, fruit snacks, cereal bars, yogurt, snack bars and desserts, were of poor nutritional quality.

It was also found that 40 per cent of the products listed sugar, or a variant of it, in the first four ingredients on the nutritional label, while 19 per cent listed it as the first or second ingredient. "In a childhood obesity epidemic, you have to wonder why food manufacturers would be promoting highly-sugared foods to young children," Charlene Elliott, an associate professor of communications studies, told the Calgary Herald. "Certainly, babies do not demand salt or sugar in their foods."

Recent research conducted as part of the US's Morbidity and Mortality Weekly Report highlighted that nine out of every ten adults consume too much salt.

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Cloned Cows Produce Omega 3 Milk

Omega 3 fatty acids rank high among the best-selling supplement and functional food additives. Though omega 3 is currently found in fortified dairy products such as yogurt and milk, it’s added during the product’s manufacturing process. Chinese researchers at Inner Mongolian University in Hohhot, China, recently announced that after nearly 15 years of research they have created the world’s first genetically modified cow capable of producing milk high in omega 3 fatty acids.

Guang-Peng Li, PhD, professor with the Center for Laboratory Animals at Inner Mongalian University and chief of the research program, said the cow is nearly one year old and healthy. The cow is one of two embryo-cloned and genetically modified dairy cows that were born in June last year. Both cows had been fed a normal diet of cow feed however only one of the two cows was found to have an omega 3 fatty acid level 10 times higher than a normal cow. The researchers delayed announcing their mind-bending lab development because it took substantial time to verify the cows’ effective genetic traces.

When asked to quantify the amount of omega 3 present in the cow’s milk, Dr. Li said that because the cow was still so young, it takes 14-15 months for a cow to become sexually mature, and another nine months to produce milk. “We collected a little piece of ear tissue and detected the fat-1 expression, and the data showed that omega-3 content in the transgenic cow was 10 times more than in the controls,” he said. “We expect the cow to be able to produce milk with high omega 3 content next year,” commented Dr. Li.

Dr. Li told *Nutraceuticals World* that he and his fellow researchers were inspired to pursue the area of genetically modified cow's milk after the success researchers had creating a genetically modified pig that was high in omega 3 fatty acids in 2006. "Omega 3 is beneficial to human health and has much potential in China," he said. "Success of the transgenic omego 3 in the pig by Dr. Prather [Dr. Randall Prather, professor of reproductive biotechnology, University of Missouri-Columbia] and his colleagues give us a clue to try to modify a cow to produce this product, which may be better in cow than in pig, I think."

The program involved the participation of a team of experts from China and the U.S., including the Lai Liangxue of the Chinese Academy of Sciences and Yifan Dai of the University of Pittsburgh.

Dr. Li's fascination with the field evolved out of related research in embryo biotechnology that began in 1996, with a special emphasis on cloning. "We did produce the world's secondary embryonic cloned piglet, born in 1998, [and] got the first oocyte germinal vesicle transferred rabbits and mice," he said. "I have studied cattle cloning for over ten years, over 100 cloned dairy and beef cattle have been produced in both U.S. (Utah/Idaho) and China."

His first transgenic study was in 2001 and focused on rabbits. He eventually turned to investigate transgenic cattle in 2007. He explained that transgenic dairy cattle are similar to normal cattle "in both healthy status and morphology." The difference lies in "the exact insertion of the fat-1 in the genome," which is currently under investigation.

Looking ahead, he said the long-term goals of his research are to "try to get a number of fat-1 transgenic cattle expressing high level omega 3," to produce healthy cattle products for human consumption. In the meantime, two cloned cows with the "fish oil gene" were born in March. Dr. Li said he and his colleagues are in the process of verifying and monitoring their ongoing health status.

By Joanna Cosgrove Nutraceutical World June 17, 2010

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DHA, ARA Promote Immune Health

Infants fed formula supplemented with DHA and ARA during the first year of life demonstrates improved immune outcomes, including improved respiratory health, according to a new study published in the June 2010 issue of ***The Journal of Pediatrics***. The health benefit was shown for the first three years of life, according to researchers at the Retina Foundation of the Southwest.

A routine cow's milk formula supplemented with DHA and ARA (Enfamil® LIPIL®) or the same formula with no DHA or ARA (now discontinued Enfamil with Iron) was fed to infants within the first week of life through 12 months in randomized, double blind studies. Results of the study revealed infants fed the supplemented formula experienced improved immune health relative to the infants fed the unsupplemented formula. In this study, immune health was assessed looking at a variety of clinical outcomes related to respiratory and skin health based on a review of infants' medical charts. Improvements were demonstrated in most of the outcomes assessed in the study.

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Diet with High Levels of Trans Fats Leads to Significant Liver Disease, Research Shows

A diet with high levels of fructose, sucrose, and of trans fats not only increases obesity, but also leads to significant fatty liver disease with scar tissue, a new study has found. "We've developed a mouse model that is very close to

human disease, allowing us to better understand the process involved in the development and progression of obesity-related fatty liver disease," Rohit Kohli, a gastroenterologist at Cincinnati Children's Hospital Medical Center and the study's main author.

The study also includes preliminary data on a simple blood test for a biomarker that differentiates the stages of disease in this model. Physicians currently monitor the progression of fatty liver disease by taking liver biopsies, which are invasive procedures. The study, which was conducted with scientists from the Metabolic Disease Institute at the University of Cincinnati, is published online in the journal Hepatology.

The study was conducted in mice, some of which were fed a normal diet of rodent chow and some a 16-week diet of fructose and sucrose-enriched drinking water and trans-fat solids. Their liver tissue was then analyzed for fat content, scar tissue formation (fibrosis), and the biological mechanism of damage.

This was done by measuring reactive oxygen stress, inflammatory cell type and plasma levels of oxidative stress markers, which are known to play important roles in the development of obesity-related liver disease and its progression to end-stage liver disease.

The investigators found that mice fed the normal calorie chow diet remained lean and did not have fatty liver disease. Mice fed high calorie diets (trans-fat alone or a combination of trans-fat and high fructose) became obese and had fatty liver disease.

Soya Tech eNews June 24, 2010

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Scientists uncover link between vitamin K and diabetes prevention

Consuming high levels of vitamin K could protect against the development of type-2 diabetes, according to a study from the Netherlands. Scientists monitored the diets of 38,000 Dutch adults for ten years and discovered that those who got the most vitamin K in their diets were around 20% less likely to be diagnosed with type 2 diabetes during the study period.

The researchers, based at the University Medical Center Utrecht in the Netherlands, said the findings did not show conclusively that the vitamin was the reason for the lower risk. However, the connection was strong enough to warrant further research into whether a lack of vitamin K can play a role in the development of type 2 diabetes. Vitamin K exists in two natural forms: vitamin K1, or phylloquinone, which is found mainly in green leafy vegetables; and vitamin K2, or menaquinone, which is found in meat, cheese and eggs. In the study, both kinds were found to be related to a lower diabetes risk, though the relationship was strongest with vitamin K2.

The findings, reported in the journal *Diabetes Care*, were drawn from answers to dietary questionnaires completed by 38,094 men and women aged between 20 and 70. Over the 10 year study period, 918 participants were diagnosed with type 2 diabetes. In general, the researchers found that the risk of developing type 2 diabetes fell for every 10mcg increase in vitamin K2 intake. Overall, the 25% of participants with the highest vitamin K intake were 20% less likely to be diagnosed with diabetes than the 25% with the lowest intake.

It's not known exactly vitamin K might protect against diabetes. The researchers said there was some evidence it reduced systemic inflammation, which could enhance the body's use of insulin, the hormone that regulates blood sugar levels. But more research was needed, they added.

Functional Ingredients story by Richard Clarke June 22, 2010

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Short-Chain Fatty Acids Promote Satiety

Short-chain fatty acids, in particular propionic acid, benefit weight management because they produce the satiety hormone, leptin, and reduce the production of resistin, which improves the effectiveness of insulin, according to new research published in the *European Journal of Clinical Investigation*.

Bacteria in the large intestine break down food components that cannot be digested by the human body. In the process they produce short-chain fatty acids—acetic acid, propionic acid and butyric acid—that are absorbed by the body and act as an energy source for a variety of organs, such as the gut wall, liver and muscle tissue.

After fat tissue has been exposed to propionic acid it increases the production of the satiety hormone leptin and reduces the production of resistin. The influence of propionic acid on the production of these two hormones has a two-way effect on the health status of individuals who are overweight or obese—a reduction in food intake and increased insulin sensitivity.

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White Rice Increases Diabetes Risk, Brown Rice Decreases Risk

Consuming more white rice is associated with a higher risk for developing type 2 diabetes, whereas consuming more brown rice may be associated with a lower risk for the disease, according to a report in the June 14 issue of ***Archives of Internal Medicine*** (2010;170(11):961-969).

"Rice has been a staple food in Asian countries for centuries," the authors wrote as background information in the article. "By the 20th century, the advance of grain-processing technology made large-scale production of refined grains possible. Through refining processes, the outer bran and germ portions of intact rice grains (i.e., brown rice) are removed to produce white rice that primarily consists of starchy endosperm." U.S. rice consumption is lower than Asian countries, but is increasing rapidly, and more than 70 percent of the rice consumed is white.

Qi Sun, M.D., Sc.D., of Harvard School of Public Health, Boston, and colleagues assessed rice consumption and diabetes risk among 39,765 men and 157,463 women in three large studies: the Health Professionals Follow-Up Study and the Nurses' Health Study I and II. After adjusting for age and other lifestyle and dietary risk factors, those who consumed five or more servings of white rice per week had a 17-percent increased risk of diabetes compared with those who consumed less than one serving per month. In contrast, eating two or more servings of brown rice per week was associated with an 11-percent reduced risk of developing type-2 diabetes than eating less than one serving per month.

Based on the results, the researchers estimated replacing 50 g (equivalent to one-third of a serving) of white rice per day with the same amount of brown rice would be associated with a 16-percent lower risk of type 2 diabetes. Replacing white rice with whole grains as a group could be associated with a risk reduction as great as 36 percent.

In general, white rice has a higher glycemic index—a measure of how much a food raises blood glucose levels compared with the same amount of glucose or white bread—than brown rice, the authors noted. "The high glycemic index of white rice consumption is likely the consequence of disrupting the physical and botanical structure of rice grains during the refining process, in which almost all the bran and some of the germ are removed," they wrote. "The other consequence of the refining process includes loss of fiber, vitamins, magnesium and other minerals, lignans, phytoestrogens and phytic acid, many of which may be protective factors for diabetes risk."

The current Dietary Guidelines for Americans recommend that at least half of carbohydrate intake come from whole grains. "From a public health point of view, replacing refined grains such as white rice with whole grains,

including brown rice, should be recommended to facilitate the prevention of type-2 diabetes," the authors concluded.

Food Product Design June 14, 2010

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Vitamin D May Reduce Breast Cancer Risk, Not Calcium

No associations were found between overall vitamin D or calcium intake and breast cancer risk; however, vitamin D from supplements was independently associated with reduced breast cancer risk, according to a study published in the American Journal of Clinical Nutrition (2010;91(6):1699-1707). Breast cancer cases aged 25 to 74 years (diagnosed 2002 to 2003) were identified through the Ontario Cancer Registry. Controls were identified by using random digit dialing; 3,101 cases and 3,471 controls completed epidemiologic and food-frequency questionnaires.

Vitamin D and calcium intakes from food only and total combined intakes (food and supplements) were not associated with breast cancer risk, although the mean intake of vitamin D was low. Vitamin D supplement intake more than 10 μg/d (400 IU/d) compared with no intake was associated with a reduced risk of breast cancer. No categories of calcium supplement intake were significantly associated with reduced breast cancer risk, but a significant inverse trend was observed (P=0.04). There were no significant interactions involving vitamin D, calcium or menopausal status.

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Vitamin E Intake Improves Fatty Liver Disease

Vitamin E has been shown effective in treating nonalcoholic steatohepatitis (NASH), an obesity-associated chronic liver disease that can lead to cirrhosis, liver cancer and death, according to a new study published in the New England Journal of Medicine. NASH also is related to or a part of type 2 diabetes, lipid disorders and cardiovascular disease.

"There is an increasing prevalence of nonalcoholic steatohepatitis in this country, something that is directly related to the obesity epidemic," said Dr. Joel Lavine, co-chair of the Network's steering committee and a co-author of the study. "The good news is that this study showed that cheap and readily available vitamin E can help many of those with the condition. We also looked at the drug pioglitazone, which showed some benefits, although not as dramatic as with vitamin E."

In the Pioglitazone or Vitamin E for NASH Study (PIVENS), investigators randomly assigned 247 nondiabetic adults with biopsy-confirmed NASH to receive vitamin E, pioglitazone or placebo. Vitamin E functions as an antioxidant while pioglitazone improves the sensitivity of cells to insulin, a hormone that controls both sugar and fat metabolism.

After 96 weeks of treatment, vitamin E improved all features of NASH with the exception of the amount of scar tissue in the liver; 43 percent of those treated with vitamin E met the primary endpoint of the trial, which was a composite of the scores for several features of NASH indicative of disease activity, compared with only 19 percent of those who received a placebo.

Pioglitazone also improved many features of NASH and met the primary endpoint in 34 percent of individuals who received it but fell short of statistical significance. Pioglitazone treatment led to an average weight gain of 10 pounds over the 96-week duration of the study. Liver enzyme tests also improved in those who received either pioglitazone or vitamin E. Upon stopping the medications, the liver enzymes worsened again suggesting the need for long-term treatment.

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