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OCT 2015

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PROTEIN FOODS AND NUTRITION DEVELOPMENT ASSOCIATION OF INDIA

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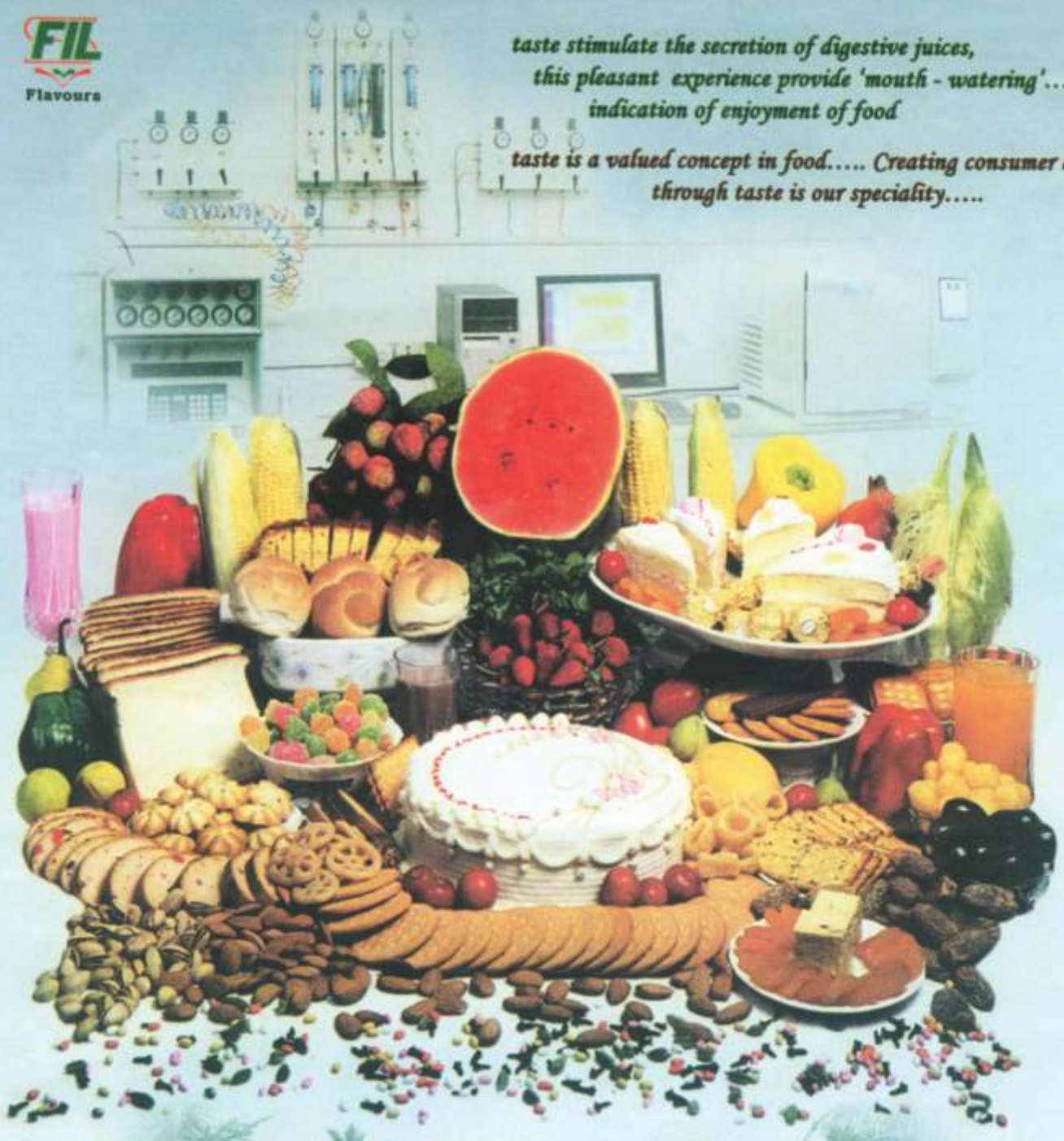

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PFNDAI Bulletin
OCTOBER 2015

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Editorial

FSSAI has prepared draft guidelines to create awareness about nutritious foods for school children and to regulate the high fat, sugar & salt (HFSS) Foods in and around schools. It also gives guidelines about hygiene and how to prepare and keep food safely in schools, at home and in any food preparation place. The attempt is good but looks like a one-track mind.

Although food industry is not totally blameless about aggressively marketing some of the HFSS foods to consumers and at times regardless of age, the entire effort has been to make a scapegoat of industry. The parents, school authority as well as government should share some of the responsibility.

When parents are too busy to prepare lunch box and give some HFSS snacks in their tiffin box we do not try to educate them. When school authorities do not provide nutritious menu for all children and try to rely on canteens to sell them what children want, we do not hold them responsible. Even when many cases of midday meal programmes provide poor quality and at times unhealthy and unsafe food, we don't bother. When government does not ensure that there is sufficient ground area for children to play and instead dereserve the area meant for such playground in favour of commercial activity we never bother. Industry is a convenient target to absolve all others for their blame.

We are making a big noise when school children get obese but we have not bothered about several multiples of children who go to school without any or very little food. We should worry about obesity but we should not forget hunger as well. There are many schools near slums trying to educate children but not able to take adequate care of their food and nutrition. Some mid-day meal programmes are run so poorly that the quality of food served is pretty bad. On the other hand some private NGOs are providing good quality food. Government should not interfere and let schools manage the programme even with private parties.

Guidelines are fine on paper but effectiveness will have to be seen. It is a long process of educating parents and children. Children will eat food which is tasty. We need to think of making nutritious food very tasty. HFSS foods are consumed more because they are tasty. Also have we monitored what these children are eating at home? Even today consumption of processed foods is low even in cities. Much of the sugar, salt and fat are consumed at home through home-cooked food. We must educate mothers to reduce the use of these ingredients at home.

Also our labels of so full of information consumers literally have to search for information useful to them. On one pack of biscuit, there are some eight or more FSSAI license or registration numbers leaving very little space for nutrition information. More often consumers only see the price before purchasing. Let us reduce the clutter that is there on label so consumers especially children will have easy access to useful information.

Let us hope that these new guidelines make school canteen food much better and good & safe food is made available to school children. With season's greetings,

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NUTRIENTS: CONCEPT OF RDA, UTL AND NOAEL

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Approaches to define nutrient requirements undergo considerable scientific deliberations and are subjected to revision from time to time. What has remained constant throughout are the three major terminologies used in defining nutrient requirements, the requirement per se, the Recommended Dietary Allowances (RDA) and the Upper tolerable intake level (UTL).

Requirement is the lowest continuing level of nutrient intake that, at a specified efficiency of utilization, will maintain the defined level of nutriture in the individual. Requirement estimates refer to the level of intake that serves to maintain a level of tissue storage or other reserve that is judged by the Expert Consultation to be desirable. All requirement estimates are presented as the quantity of the nutrient that must be present in the daily diet, as consumed, to meet the requirement. The estimates had been adjusted to

Table-1 Reference Body Weights of Indians Employed for Computing Indian RDA, 2010

Group	Age	Reference Body Weight (kg)
Adult man	18-30 y	60.0 (Ht 173 cm; BMI 20.3)
Adult woman	18-30 y	55.0 (Ht 161 cm, BMI 21.2)
Infants	0-6 m	5.5*
	6 – 12 m	8.4*
Children	1 – 3 y	12.4*
	4 – 6 y	18.1
	7 – 9 y	25.1
Boys	10 - 12 y	34.3
	13 – 15 y	47.6
	16 – 18 y	55.5
Girls	10 – 12 y	35.0
	13 – 15 y	46.6
	16 – 18 y	52.1

Source : NNMB/ India Nutrition profile/*MGRS

Table -2 Outcome variable used for calculating UTL

Nutrient	Outcome variable
Calcium (mg/d)	Hypercalcemia and renal insufficiency
Fluoride (mg/d)	Moderate enamel fluorosis, skeletal fluorosis
Magnesium (mg/d)	Diarrhoea
Phosphorus (g/d)	Hyperphosphatemia
Selenium (pg/d)	Selenosis
α-tocopherol (mg/d)	Hemorrhage seen in rats
Niacin (mg/d)	Vasodilatation
Vitamin B6 (mg/d)	Sensory neuropathy
Vitamin C (mg/d)	Osmotic diarrhea & GI disturbance
Vitamin D (µg/d)	Hypercalcemia

by taking into account the nature of the diet and the dietary factors that affect the ability of the body to release and absorb the nutrient. Nutrient requirements are therefore population specific due to variations in genetic environment and socio-demographic characteristics of the population. It is appealing but not practical to therefore unify the requirements across globe and countries have their own system of deriving the requirements. Except where specifically indicated, the estimates refer to the maintenance of a defined level of nutritional status (in healthy individuals) in individuals already in that state. The estimated requirements may be altered by disease or other conditions.

Individuals differ in their requirements, even though they may have the same general characteristic (e.g. age, sex, physiological state, body size). Therefore population estimates of dietary allowances follows normal distribution and a point in the upper tail of the requirement distribution is identified as the recommended level of intake (Figure 1). Estimated Average Requirements (EAR) or mean, which is expected to satisfy the needs of 50% of the people in that age group and adequate intake (AI), where no RDA has been established, were added subsequently to provide more clarity to what they define. In general RDA is mean +2SD or EAR+2SD and is the daily dietary intake level of a nutrient considered sufficient to meet the requirements of 97.5% of healthy individuals in each life-stage and gender group. UTL is derived based on risk-assessment approach and is aimed at providing a guideline on the level of intake that is not harmful on a continuous intake from collective sources.

Basis of deriving RDA

Several approaches have been traditionally used in deriving the nutrient requirements. They include prevention/cure of deficiency diseases, saturation of tissue, balance studies, changes in secondary variable and amounts in typical diets. In India, the six major approaches include intake, growth, nutrient balance studies, factorial approach, depletion- repletion and nutrient turnover. The choice of approach for an individual nutrient depends on the nature and physiological behaviour of the nutrient. However, the point is clear that the requirements are intended for propelling a population towards overall health and therefore, do not consider both extremes of malnutrition for calculations. In India this has translated to using the 95th percentile values on the NNMB database as the reference bodyweight for the age group more than 5years (Table-1). Apart from the reference body weights, the physical activity ratios, habitual diet and bioavailability of nutrients from Indian diet has been considered in arriving at Indian RDA, tailoring it to Indian conditions. For infants, requirements are estimated from the amount of each nutrient in human milk and quantity ingested by infants whose growth rates are satisfactory.

UTL & NOAEL

The Tolerable Upper Intake Level (UL) is the highest level of daily nutrient intake that is likely to pose no risk of adverse health effects to almost all individuals in the general population. As intake increases above the UL, the risk of adverse effects increases. Upper tolerable limit is built upon risk assessment and often uses extrapolated information from animal studies employing factors such as no observed adverse effect level (NOAEL), Lowest-observed-adverse-effect level (LOAEL) and uncertainty factor (UF).

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Safety Assessment of Botanicals and Botanical Preparations

By Dr. K. Balasubramanian,,
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Introduction

Botanicals and Botanical preparations intended for human consumption as food supplements and related products are used and marketed widely. This paper aims to create the awareness about the safety assessment of Botanical and Botanical preparation.

Herbal materials and extracts form a major component in indigenous people's traditional medicine and are a fundamental element in Ayurvedic, naturopathic, traditional oriental, and Native American Indian medicine. In Africa and Asia, 80% of the population use traditional medicine routinely. In India over 70% of the population relies on some form of traditional medicine, mainly Ayurveda, Unani, and Siddha. The global scenario present in the table 1.

These materials, contain hundreds of different chemical constituents that may be responsible for any therapeutic effects observed in Boswellia serrata (shallaki), Commiphora mukul (Indian bdellium tree), Withania somnifera (Indian ginseng), Vitex negundo (five-leaved chaste tree), Ricinus communis (castor oil plant), Nyctanthes arbortristis (Har singar) and Zingiber officinale (Ginger). It has been indicated for the treatment of osteoarthritis, rheumatoid arthritis, lumbago, spondylitis, etc., Although herbal entities are believed to be relatively safe, the toxicity characteristics of the Botanicals and Botanical preparation need to be confirmed prior to human treatment or commercial use.

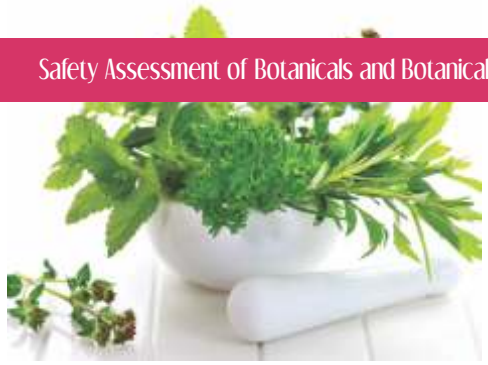
Regulatory Status in Different Countries

European Union (EU): In EU, botanicals are more strictly regulated. The European Agency of Evaluation of Medicinal Products (EMEA) provides general guidelines for setting uniform set of specifications for the botanical preparations manufactured and sold in Europe. These guidelines for assessing quality of botanicals provide specifications for tests, procedures, and acceptance criteria used to assure the quality of botanical preparations at release and during its shelf life.

United States: In the United States, Dietary Supplement and Health Education Act (DSHEA), 1994 classifies botanical medicines as dietary supplements along with vitamins, minerals, amino acids, enzymes and other health products. Under DHSEA, botanicals can be labeled and advertised as having certain healthful or nutritional properties as long as no "therapeutic claims" are made. Those botanicals making "therapeutic claim" can be approved as drugs by United States Food and Drug Administration

Table 1: Global Scenario - Use of Botanical Ingredients

CHINA	40%
CHILE	71%
COLUMBIA	40%
INDIA	65%
AUSTRALIA	48%
BELGIUM	70%
CANADA	70%
FRANCE	49%
USA	42%
UK	70%
NORTH IRELAND	90%



(USFDA). FDA has published specific guideline for industries manufacturing such botanical drug products.

India: Recognizing the global demand, Government of India has released Good Manufacturing Practices (GMPs) for manufacturing Ayurvedic, Siddha and Unani medicines to improve the quality and standard of drugs. The new rules came into force from June 2000 as an amendment to the Drugs and Cosmetics Act, 1940. Department of Indian Systems of Medicine and Homeopathy (ISM&H) is trying to frame safety and efficacy regulations for licensing new patent and proprietary botanical medicines.

FSSAI Regulation on Nutraceuticals in India:

FSSAI has defined the various categories of all such foods and has proposed that the foods may not be termed medicines. The foods have been categorized as;

- Foods containing prebiotic ingredients which are foods with live micro-organisms beneficial to human health, which when ingested in adequate amounts demonstrate health benefits.
- Foods for Special Dietary Uses (FSDU) are not meant for infants and which need to be taken under medical advice for specific health conditions like low weight, obesity, diabetes, high blood pressure and foods like gluten free foods.
- Foods for Special Medical Purposes (FSMP) are foods intended for particular dietary use specially processed or formulated and intended for patients with dietary needs
- Nutraceuticals means a naturally occurring chemical compound having a physiological benefit or provide protection against chronic disease.
- Novel Foods have been defined as foods that do not have a history of human consumption or has any other ingredient used in it which or the source from which it is derived does not have a history of human consumption as a food ingredient
- Specialty foods are those that contain ingredients based on Ayurveda, Unani and Siddha and Traditional Health Systems of India and are proven to be safe based on scientific evidence and health uses referred in the authoritative texts

World Health Organization (WHO)

In 1997, draft guidelines for methodology on research and evaluation of traditional medicine developed by World Health Organization.

World Health Organization has tried to establish internationally recognizable regulatory guidelines to define basic criteria for the evaluation of quality, safety and efficacy of botanical medicines. WHO assists national regulatory authorities; Guidelines for assessing the quality of botanical materials mainly emphasize the need to ensure the quality of medicinal plant products by using modern techniques and applying suitable standards.

Safety Assessment

Safety assessment of each Botanical should be identified by adequate characterization and description of the botanical parts and preparation methodology used. It is mandatory to get further Data's for Botanicals because of possible adulterations, misclassifications, replacements or falsifications, and restorations, establishment of adequate quality control is necessary.

Based on available knowledge, information, data and subsequent level in which further testing data on a case by case basis. Adequate body of knowledge exists, can benefit from a "presumption of safety" without any need for further testing. The approach proposed by the Scientific Committee for the safety assessment of botanicals and botanical preparations is in line with EFSA's policy to stimulate food and feed risk assessment approaches that minimize the number of experimental animals and any suffering.

Safety assessment based on available knowledge

Depending on the botanical ingredient and its uses, there are circumstances under which no additional data are judged necessary for the safety evaluation. This implies that not only use levels but also chemotypes of botanicals and the chemical composition of the botanical preparations should be in line with historically used ones. This approach can only be applied when intakes due to the intended levels of use are within the range of intake levels derived from the European Member States' average diets or from studies on specific subgroups. It is recognized that the acceptability of such an approach relies mainly on the objective of not significantly increasing exposures beyond the levels linked to the safe history of use.

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In some cases it may be derived from experimental studies in animals. NOAEL is the highest continuing intake of a nutrient at which no adverse effects have been observed in the individuals or groups studied. LOAEL is the lowest continuing intake at which an adverse effect has been identified **(Figure-2)**.

Uncertainty factor (UF)

The potential sources of uncertainty that are considered:

(1) Inter-individual variation and sensitivity: a small uncertainty factor is used if it is judged that little population variability is expected for the adverse effect, and a larger uncertainty factor (close to 10) may be used if variability is expected to be great.

(2) Experimental animal to human: an uncertainty factor is generally applied to the NOAEL to account for the uncertainty in extrapolating from animal data to humans. A larger uncertainty factor may be used if it is believed that the animal responses will under predict average human responses.

(3) LOAEL to NOAEL: if a NOAEL is not available, an uncertainty factor may be applied to account for the uncertainty in deriving a UL from the LOAEL. The size of the uncertainty factor involves a judgement based on the severity and incidence of the observed effect at the LOAEL and the slope of the dose response.
(4) Sub chronic NOAEL to predict chronic NOAEL: when data are lacking on chronic exposures, scientific judgement is necessary to determine whether chronic exposure is likely to lead to adverse effects at lower intakes than those producing effects after sub chronic exposures.

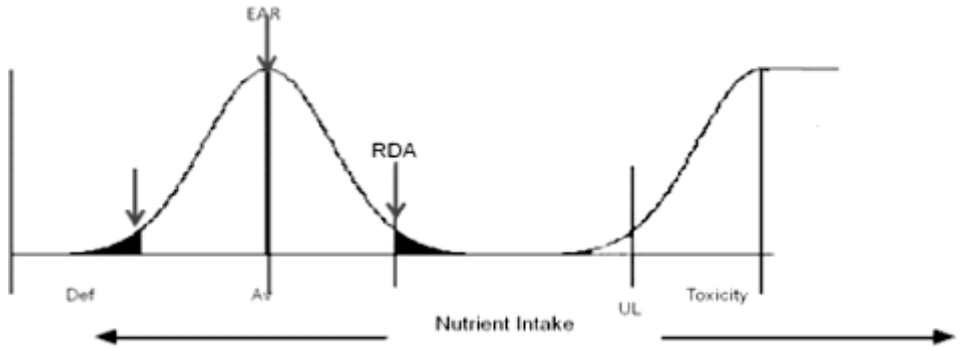

Figure 1. Nutrient intake follows a normal distribution. Def- deficiency, Av- average, EAR-estimated average requirement, RDA-recommended dietary allowance mean +2SD or EAR+2SD, upper limit UL.

There is no established benefit for healthy individuals if they consume nutrient intakes above the RDA or AI. The term tolerable intake does not imply a possible beneficial effect. Instead, the term is intended to connote a level of intake that can, with high probability, be tolerated biologically from all sources. The UL is not intended to be a recommended level of intake. The outcome used is appearance of a particular disease. UTL is often 2-50 times RDA. Direct use of the UL in the Nutrition facts box has been discouraged due to chances of misinterpretation, including the possibility that consumers might view the UL as an optimum or, conversely, a toxic amount.

Therefore, currently RDAs are used for labeling purpose and regulatory science should consider evolving guidelines based on strong scientific evidence.

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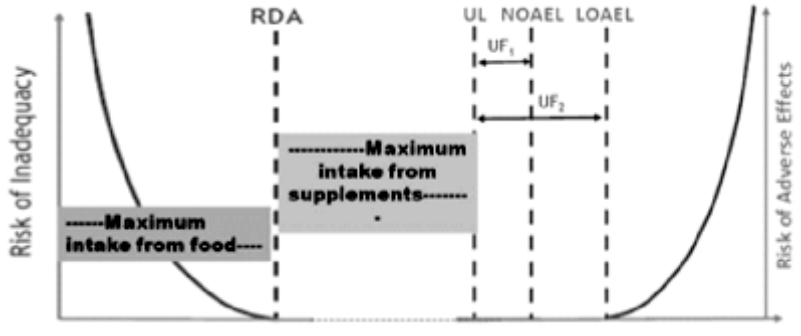

Figure 2. Concept of RDA, UTL, NOAEL, LOAEL and UF. LOAEL- The lowest dose that provokes adverse effect; NOAEL - The dose that has no reported adverse effects, UL- tolerable upper level of intake. UTL is derived from NOAEL or LOAEL by applying uncertainty factor (UF). UTL= NOAEL÷UF1 or UTL=LOAEL÷UF2.
UTL= maximum intake from food + maximum intake from all supplements.

Academies Press (US); 1998.

3. Trace elements in human nutrition and health. World Health Organization Geneva, WHO Library Cataloguing in Publication Data, 1996.

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Safety assessment based on Additional data

- Toxicokinetics including metabolism: Information on toxicokinetics of relevant biologically active constituents present in the botanical or botanical preparation should be provided whenever available from the literature.
- Genotoxicity testing: Genotoxicity testing of botanicals and botanical preparations, in vitro tests covering effects both at gene and chromosome levels are required..
- Subchronic toxicity testing: A 90-day study in the rat with the test material administered via the diet is the minimum requirement to establish a no-observed-adverse-effect level. Subchronic toxicity testing should be carried out independently of the results of the in vitro and in vivo genotoxicity testing.
- Other studies: Depending on the outcome of the genotoxicity and subchronic toxicity studies, or other specific relevant information, further studies may be required.

Provide guidance on how to assess safety of botanical ingredients

Regulation 258/97/EC: Novel foods and novel food ingredients applies to all foods, including food supplements, containing substances which have not been used for human consumption to a significant degree within the community.

Regulation 97/618/EC: Concerning the scientific aspects and the presentation of information necessary to support applications for the placing on the market of novel foods and novel food ingredients.

Regulation 1829/2003/EC: Genetically modified food and feed would apply to any GMO ingredients used in food supplements derived from genetically modified plants, information should be provided in line with the guidance document of the EFSA scientific Panel on GMO for the risk assessment of genetically modified plants and derived food.

Proposed data requirements for safety assessment

This would include maximum permissible levels of chemical, biological contaminants (e.g. pesticides, mycotoxins and heavy metals) modalities for ensuring quality, and application of good hygienic practice, including HACCP methodologies (technical, exposure and toxicological nature).

Technical data

The detailed technical data is mandatory for the Botanicals are mandatory. Identification of each botanical source and botanical preparation in some cases are complicated. It is recommended to follow as much as possible the nomenclature of the European Pharmacopeia. The following Parameter are necessary for the assessing the safety of botanical and botanical preparations.

- **Scientific (Latin) name:** full systematic species name including botanical family, genus, species, variety, subspecies, author's name and chemo type.

- **Synonyms:** botanical name(s) that may be used interchangeably with the preferred scientific name

- **Common names:** vernacular name(s)

- **Part used in the preparation:** root, leaf, seed etc.,

- **Geographical origin:** continent, country or region

- **Growth and harvesting**

conditions: wild or cultivated, cultivation practices, time of harvest in relation to both season and stage of the plant growth.

➢ **Manufacturing Process:** It includes the information of methods, Substance entering in Manufacturing process, Solvent or reagents used and Standardization criteria.

➢ **Chemical Composition:** It includes Classification of Compounds, Concentration of substance at respective parts, Constituents to characterize the quality, chemical finger print, production process, Chemical, physiological or toxicological properties.

➢ **Specification:** It should include the major groups of constituents present in the botanical preparation including for example: amino acids, lipids, polysaccharides, volatile oil, inorganic ions, polyphenols, alkaloids, terpenes, alkenylbenzenes, lignin, saponins. Additional information on contaminants levels (e.g. heavy metals, mycotoxins, pesticide residues, and polycyclic aromatic hydrocarbon (PAH)) should be provided.

➢ **Stability:** It includes Shelf life time of the Botanicals and information regarding possible degradation also be provided.

➢ **QPS -Qualified Presumption of Safety:** QPS is based on four principle consideration:
Taxonomy- Definition of the taxonomic unit (species/genus) for which QPS status sought.
Body of knowledge – Whether there is sufficient knowledge concerning the group of botanicals to reach a decision on their safety
Toxicity – whether the taxonomic unit contains naturally occurring substances of concern. If so, whether sufficient is known about their toxicity to identify a dose under, which such substances could be concluded as being of no concern.
End use- The presence of a substance of concern in a given botanical does not necessarily mean that this substance will also be present in the botanical preparation and, if present, that is at a dosage causing a health concern.

➢ **Proposed Uses and Use Levels:** Each Botanical and Botanical preparation should have information on intended uses and recommended intakes for a product should specifically mention uses and use levels for the different categories common foods, food supplements, medicinal products. Special attention should be given to population groups with specific uses like for example young children. Information on the duration of the proposed uses and use levels should also be provided.

➢ **Information on Existing Assessments:** Information on any existing assessments by international bodies or national competent authorities should be provided.

➢ **Exposure:** Each Botanical and Botanical preparation data and information should be provided anticipated human exposure to the botanical ingredient, including amount frequency and duration. Possibility of additional/ combined human exposure to the botanical or botanical preparation through different categories of food, food supplements and medicinal products can be consumed together and modality use of the ingredient. Information on historical (food, food supplement and medicinal) is use of the ingredient in human population groups in relation to the modalities of use and resulting exposure levels if known.

➢ **Toxicological Data:** To get the Toxicological data, Test methods described by OECD or in European Commission Directives 87/432/EEC and 67/548/EC are recommended. Use of any methods differing from internationally agreed protocols should be justified. Protocols for special studies differing from standard tests should be developed on a case-by-case basis. To ensure general acceptance of the data submitted, studies should be carried out according to the principles of Good Laboratory Practice (GLP) described in Council Directive 87/18/EEC and accompanied by a statement of GLP compliance. Adequate explanation should be provided for divergence from these principles.

Conclusion

It has been concluded that the Botanical and Botanical Preparation should have necessary efficacy documents to establish their safety for Human consumption. The traditional Botanicals which are having a long history of use in the market need not to have any supporting Documents and Toxicological Studies to show their Efficacy.

Other Botanicals which are newly discovered have to show sufficient Toxicological and Safety Assessment data for the Efficacy of the product.

Research in Health & Nutrition

Eating spicy foods regularly may extend lifespan

5 August 2015 Medical News Today

Spicy food can make you feel like your mouth is on fire and cause you to sweat profusely. However, a new study suggests that regularly eating spicy food could also lower the risk of death from specific conditions. ***Fresh chilis contain capsaicin, which has been reported to have anticancer, anti-inflammatory and antihypertensive effects.***

The observational study, published in The BMJ, found people whose daily diets regularly featured spicy foods had a lower risk of death from cancer, ischemic heart disease and respiratory disease. Many previous studies have demonstrated health benefits for spices such as red pepper, and others have demonstrated that certain bioactive agents in spices such as capsaicin can have beneficial effects in conditions such as obesity and cardiovascular disease.

While these studies suggest that spices could play a prominent role in human health, there is currently a lack of evidence for the effects of daily spicy food consumption on disease-specific and all-cause mortality from population studies. To address this, a research team led by researchers from the Chinese Academy of Medical Sciences analyzed data obtained from the China Kadoorie Biobank - a prospective cohort study of more than half a million adults from geographically diverse regions in China. They followed a total of 487,375 participants aged between 30 and 79 who were regularly assessed for illness. When each participant was enrolled to the study between 2004-2008, they completed a questionnaire about their health and consumption of spicy foods, red meat, vegetables and alcohol.

During the follow-up period, 5% of surviving participants were randomly surveyed again in 2008 to assess whether the baseline questionnaire results accurately reflected spicy food consumption over time. The study authors report these questionnaires indicated that spicy food consumption was reported consistently. A total of 20,224 deaths were recorded during the follow-up period, with participants tracked for an average of 7.2 years.

Frequent consumption of spicy food linked to 14% reduced risk of death during follow-up

The researchers observed that participants who reported eating spicy foods 3-7 days a week were 14% less likely to have died than participants who ate spicy foods less than once a week. Participants who ate spicy foods once or twice a week were at a 10% reduced risk of dying compared with participants who ate spicy foods less than once a week.

Fast facts about capsaicin

• Native Americans have used cayenne pepper as a form of medication for at least 9,000 years
• Capsaicin can be found in many over-the-counter medicines for pain relief
• Capsaicin is also an ingredient in many forms of pepper spray.

Learn about the health benefits of cayenne pepper

Frequent consumption of spicy foods was also associated with a lower risk of death from cancer, ischemic heart disease and respiratory system diseases. This reduced risk was more prominent among female participants than male participants. In terms of spicy food, the researchers found that the most commonly used spices for participants who ate spicy foods weekly were fresh and dried chili peppers. Participants who regularly ate fresh chili had a reduced risk of death from cancer, ischemic heart disease and diabetes.

"Possible mechanisms might involve the bioaccessibility and bioavailability of bioactive ingredients and nutrients of spicy foods," the authors write, "but further studies are needed to verify our findings."

The authors caution that because the study was an observational one, causal inferences should not be made and further prospective studies should be conducted to demonstrate the generalizability of their findings.

In an accompanying editorial, Nita G. Forouhi, of the Epidemiology Unit at the University of Cambridge in the UK, writes that a systematic appraisal of the potential benefits and adverse effects of spicy foods is warranted. "Should people eat spicy food? It is too early to say, but the debate and the research interest are certainly hotting up," she concludes.

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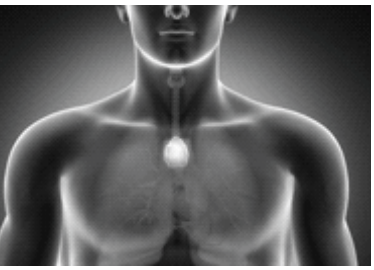


Age-related immune system decline slowed by antioxidants

7 August 2015 Medical News Today

New research has demonstrated how the aging process damages the immune system, while showing how antioxidants in the diet could slow the build-up of this damage.

Findings from the study, published in Cell Reports, also lend support to the "free-radical theory" of aging, whereby reactive oxygen species such as hydrogen peroxide that are produced by normal metabolism cause damage to cells. This damage contributes to both aging and age-related diseases.

The study was conducted by researchers from The Scripps Research Institute (TSRI) who focused their attention on an organ called the thymus that is responsible for the production of T lymphocytes - also referred to as T cells.

T cells are white blood cells that control the body's immune response. These cells are continuously lost, and it is the job of the thymus - located between the lungs - to replenish them, enabling the body to respond to new infections. However, the thymus is unable to continuously produce high levels of T cells.
"The thymus begins to atrophy rapidly in very early adulthood, simultaneously losing its function," explains study author Dr. Howard Petrie. "This new study shows for the first time a mechanism for the long-suspected connection between normal immune function and antioxidants."

Antioxidants are substances that could prevent or delay damage to cells. Examples include beta-carotene, vitamin C and vitamin E. They can often be found in fruits and vegetables and are also available in the form of supplements.

The researchers set out to explore the mechanisms behind the connection by developing a computational approach they could use to assess gene activity in two types of thymus cell in mice - stromal cells and lymphoid cells.
In the stromal cells, they observed that a deficiency in an antioxidant enzyme called catalase led to the production of reactive oxygen species through metabolism, which in turn sped up the rate at which damage occurred.

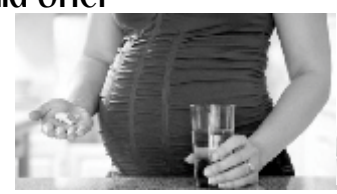
Common dietary antioxidants found to preserve size of the thymus

The researchers then tested the role of this antioxidant by increasing catalase levels in genetically altered animal models. By doing this, they were able to maintain the size of the thymus for a longer period.
In addition, the researchers were also able to preserve the size of the thymus in animals by giving them two common dietary antioxidants - including vitamin C.

The question of why the thymus decreases in size more rapidly than other body tissues remains unanswered, however. Dr. Petrie says that while other research has demonstrated the thymus is responsive to sex hormones, their new study shows that its aging process is the same as in other tissues. **"However, the process is accelerated in the thymus by a deficiency in the essential protective effects of catalase, which is found at higher levels in almost all other body tissues,"** he continues.

The researchers also point out that while increasing catalase levels in stromal cells preserved the size of the thymus for a longer period, it did not prevent it from atrophying - as yet, there is no way to completely halt metabolic damage accumulated over time.
Recently, Medical News Today reported on a study suggesting that blood vessels adapt during the aging process to reduce the damage caused by oxidative stress.
Researchers at the University of Missouri School of Medicine in Columbia discovered that oxidative stress produced abnormally high levels of calcium in the linings of arteries in younger mice compared with older mice.

Universal iodine supplementation during pregnancy could offer huge cost savings



10 August 2015
Medical News Today

Giving all pregnant women iodine supplements, even in mildly iodine deficient countries like the UK, could result in huge cost savings for health care systems and society, according to new modelling research published in The Lancet Diabetes & Endocrinology journal.

The new estimates suggest that introducing iodine supplementation in pregnancy in the UK could save the National Health Service (NHS) around £200 per expectant mother and provide monetary benefits to society of around £4500 per child from increased lifetime earnings and lower public sector costs. With around 1.9 billion people and 241 million school-age children (aged 6-12 years) living in the 32 countries that have iodine deficiency, the authors conclude

that the benefits of universal iodine supplementation during pregnancy could be substantial.

"Iodine deficiency in pregnancy remains the leading cause of preventable retardation worldwide. Even mild iodine deficiency during pregnancy is associated with children with lower IQs," explains Kate Jolly, a co-author and Professor of Public Health at the University of Birmingham in the UK. "It's time for all women living in iodine deficient countries without universal supplementation of iodine, who are pregnant, breastfeeding, or planning a pregnancy to be advised to take a daily supplement containing iodine."

Iodine is not made naturally in the body and must be consumed by eating foods like dairy and seafood or supplements. Severe iodine deficiency during pregnancy can cause substantial mental impairment and delayed development in children, resulting in a lower IQ and consequently lower educational attainment and earning potential. International health organisations like WHO and the European Food Safety Authority recommend that pregnant and breastfeeding women take daily iodine supplements. However, no recommendation for iodine supplementation has been issued to pregnant women in the UK, even though mild iodine deficiency has been reported to be widespread.

As a randomised trial might not be approved because of ethical concerns in the untreated group, a team of researchers from the University of Birmingham did a modelling study to examine the cost-effectiveness of iodine supplementation versus no supplementation for pregnant women in the UK. Using data from a systematic review of published studies and expert opinion they modelled both the direct health service savings and monetary benefits to society (lifetime earnings) in terms of gains from an additional IQ point in the children. By converting the effects of iodine supplementation in pregnancy on developing brains into IQ points, the authors estimate that the benefits equate to 1.22 IQ points per child, with monetary benefits of around £199 per expectant mother for the NHS, and £4476 per pregnancy for society.

According to the authors, "As food fortification alone may not be enough to achieve iodine sufficiency for pregnant women, our results strengthen the case for universal iodine supplementation of all women before and during pregnancy and whilst breastfeeding in mild-to-moderate iodine deficient countries."

Progress toward the perfect pea: peas developed that will help animals absorb more protein from their diet

13 August 2015 Medical News Today

A group at the John Innes Centre has developed peas that will help animals absorb more protein from their diet. The study is published in PLOS ONE.

Pea and other legume seeds contain several proteins that stop nutrients being absorbed fully in the intestines. One such class of molecule is the protease inhibitors. These slow down the rate at which humans, poultry or livestock digest proteins by incapacitating the enzymes that break them down. Previous nutritional studies with broiler chickens have shown that peas with proteins which disrupt digestion can reduce protein availability by up to 10%.

Dr Claire Domoney's group has identified and studied peas with mutations in genes coding for the seed protease inhibitors, known as the trypsin/chymotrypsin inhibitors. They found three types of mutation, one of which was in a wild relative of pea, and which completely wiped out the seed's ability to inhibit protein digestion. The other two mutations were generated by mutagenesis and were also effective in reducing the inhibitors, although less dramatically so.

Peas provide a valuable and nutritious crop for human and pet food and animal feed. Dr Domoney's results provide proof of principle for the ways in which food and feedstuffs can be improved through large-scale genetic approaches. The research can be extended to more proteins in pea and other legume crops, where food or feed use may be limited by the same or different seed proteins. Removal of allergenic proteins, for example, is an important goal for improving many food and feed crops.

Dr Claire Domoney said: 'The discovery of a wild pea line, a Pisum elatius line from Turkey which lacks a protein defined as an 'anti-nutrient', is a clear example of the value of diverse germplasm collections. Being able to generate and/or discover genetic variation for traits of interest to growers is essential for improving crop traits. In our case, the wild pea mutant has been crossed readily with the cultivated species, Pisum sativum, providing a headstart for breeders. Mutagenised resources, such as that at INRA, are also an invaluable

resource for novel variation. We are now in a good position with new technologies to be able to screen very large numbers of lines for small changes in genes of interest.'

Breeders, including Limagrain and Wherry & Sons, are already showing interest in the new peas. As non-GM methods were used, Dr Domoney expects widespread adoption of the variant pea lines and that the novel peas could reach the market within five years.

Mr Peter Smith, Arable Crops Director at Wherry & Sons Ltd, said: 'The value of genetics and targeted research inpulse crops aids the UK industry in achieving specific needs. The removal of inhibitors in peas is an example of one of many traits which should enable the industry to move forward with a nutritionally improved crop benefiting throughout the food chain. As pulses potentially become grown on a wider scale in the UK we must remain focused on producing a better product in comparison to imported pulses and protein crops.'

This research was funded by Defra Pulse Crop Genetic Improvement Network, EU Grain Legumes Integrated Project and the Biotechnology and Biological Sciences Research Council. The JIC pea germplasm collection is part-funded by Defra.

Could beetroot juice help you exercise for longer?

NutraIngredients, 30Jul2015

Chronic consumption of beetroot juice may improve cardiovascular health and potentially delay the onset of fatigue in healthy people, says a new study.

Fifteen days of drinking 70 ml of beetroot juice per day was associated with increases in blood levels of nitrates and nitrites, and decreases in systolic and diastolic blood pressure, compared to consuming the same amount of a nitrate-free beetroot juice, according to findings published in the American Journal of Physiology Regulatory, Integrative and Comparative Physiology .

"These findings suggest that beetroot juice can act as a dietary ergogenic supplement capable of enhancing oxygen delivery and reducing work of the heart, allowing exercise to be performed at a given workload for a longer period of time before the onset of fatigue," wrote scientists from Kyung Hee University in Korea and the University of California at Davis. "Beetroot juice supplementation may also represent an alternative, more natural intervention for individuals that suffer from reductions in functional capacity and exercise tolerance related to cardiovascular diseases such as hypertension, heart failure and cardiovascular ischemia."

Growing interest

There has been increasing levels of interest in the potential benefits of beetroot juice for boosting athletic performance, particularly following a report in the Wall Street Journal that stated that the Auburn University football team drinks the juice before its games.

The majority of the science has been in support of the potential sports nutrition benefits of beetroot, linked to the nitrate concentration in the vegetable. Recent studies have reported significant benefits for a range of athletes, including swimmers and cyclists.

The scientists behind the new study sought to examine if chronic consumption of beetroot juice could affect cardiovascular health and impact exercise in 14 healthy men with an average age of 21. The men were randomly assigned to receive 70 ml per day of beetroot juice or the same volume of nitrate-depleted beetroot juice for 15 days in a double-blind, crossover trial. A two week washout period followed the first intervention phase before the participants were crossed over to the other group.

Results showed that beetroot juice consumption was associated with significant reduction in systolic and diastolic blood pressure, compared with the control (nitrate-depleted juice) group and compared to pre-supplementation values for all levels of exercise workload (30%, 60%, and 80% of VO2peak).

Reductions were also recorded for MAP (mean arterial pressure) and TPR (total peripheral resistance; a measure of blood flow). "Our results indicate that effects of an acute dose of [nitrates] on cardiovascular function during exercise can not only be maintained via dietary supplementation with a smaller dose but also can be extended such that cardiac function (i.e., stroke volume and cardiac output) is enhanced and after load on the heart is reduced further (i.e., reductions in DBP and MAP)," wrote the researchers. Endothelial function, as measured by flow mediated dilation (FMD), also improved post-supplementation by over 5%, compared to pre-supplementation, added the researchers.

Clinical implications

"Compared to acute effects of beetroot juice, the relevance of our results relates to the ability of nitrates to act chronically as a

dietary nutraceutical that is capable of maintaining or enhancing its acute effects on oxygen delivery at a given level of exercise, while also causing reductions in blood pressure and work of the heart," they wrote. "Consequently, the onset of fatigue may be delayed in healthy individuals and athletes, allowing for exercise to be performed for longer periods of time.

"These effects of chronic dietary supplementation with nitrates also have clinical implications," they added. "It is well known that functional capacity and exercise tolerance are reduced in pathological conditions such as hypertension, heart failure, coronary heart disease and diabetes, which can limit the ability to perform work and participate in activities of daily life. Since such limitations are related to endothelial dysfunction, increases in vascular resistance and reductions in skeletal muscle blood flow, regular treatment with dietary nitrates may at least partially offset these debilitating effects."

Kids with poor diets score poorly on cognitive tests: Finnish researchers

Food Navigator, 14Aug2015

The worse the diet quality of children, the worse they score on cognitive tests especially boys, research finds.

The researchers from the University of Eastern Finland, Kuopio University Hospital and the Kuopio Research Institute of Exercise Medicine in Finland tested 428 children aged six to eight years to assess the association between scores on Dietary Approaches to Stop Hypertension (DASH) and the Baltic Sea Diet Score (BSDS) with scores on a cognitive test.

The results showed that among all children, diet quality was "directly associated" with the brain test score – a relationship far stronger in boys than girls. Within this, boys with the lowest consumption of fruit and high-fibre grain products had lower cognitive test scores than other boys.

"Adequate nutrition is the foundation of normal physical and cognitive development in children. Undernourishment and low availability of nutritionally adequate and safe foods have been found to decrease cognitive functions in children," they wrote in the British Journal of Nutrition. "Nevertheless, abundance of foods containing lots of sucrose and saturated fat has been linked to cognitive decline in adults. In fact, unhealthy food choices may be a more important determinant of decreased cognition than undernourishment among children in developed countries, including Finland."

With DASH and BSDS as a reference, the study highlighted the importance of a diet high in vitamin, polyphenol and flavonoid-rich fruit, berries, vegetables and fish and low in red meat and sausages in the normal development of cognition in children. BSDS measured intakes of fruit and berries, vegetables (legumes included, potatoes excluded), high-fibre grain products, low fat milk, fish, red meat and sausage, the ratio of polyunsaturated fatty acids (PUFAs) to saturated fatty acids (SFA) and total fat.

DASH measured intakes of fruit and fruit juices, vegetables (potatoes excluded), high-fibre grain products, low fat milk and sour milk products, red meat and sausage, sugar-sweetened beverages and sodium. The two diet scores overall had stronger direct associations with cognition than any of their components alone, suggesting the diet as a whole was a better predictor of cognition than single foods or nutrients.

The researchers said it was unclear why the association was stronger for girls, although past research had suggested male brains were more vulnerable to stress than females' and that boys' cognitive development benefited more from dietary intervention during infancy.

"Moreover, nutrient-enriched formula during infancy had been associated with increased caudate nucleus volumes at the age of 15 years in boys but not in girls. Frontal and parietal cortices of the brain reach their peak thickness one year later in boys than in girls. It is, therefore, possible that the later maturation of male brains could partly explain the stronger association of dietary factors with cognition in boys than in girls in the present study sample."

Overall the boys had a lower DASH score and slightly lower BSDS, consumed more red meat and sausages and had a higher sodium intake than the girls. "A higher consumption of red meat and sausages and a lower consumption of fish may be harmful for cognition in children," they wrote. The cognitive test used Raven's Coloured Progressive Matrices – assessed the children's ability to find similarities, differences and discrete patterns and did not depend on acquired knowledge or language skills.

Calcium & magnesium reduce risk of metabolic syndrome: 9000strong study

NutraIngredients, 13Aug2015

Calcium and magnesium may reduce the risk of metabolic syndrome – but men need above and beyond recommended levels for this effect, say researchers.

The researchers from the Case Western Reserve University in the US used 9,148 adults to test the theory that higher dietary intakes of calcium and magnesium decreased the risk of metabolic syndrome.

This had been shown previously for the minerals individually but this latest study, published in the British Journal of Nutrition, was the first to look at them in combination. Using 24hour recalls as part of the National Health and Nutrition Examination Study 2001–2010, they found women who met the US recommended dietary allowance (RDA) for both magnesium (310–320 mg per day) and calcium (1000–
1200 mg per day) saw the greatest decrease in risk of metabolic syndrome. The European RDA for magnesium is 375 mg and 800 mg for calcium.

Meanwhile, they did not see the same association for men meeting the RDA for magnesium (400–420 mg per day) and calcium (1000–1200 mg per day), individually or in combination. However, when these intakes were increased to over 386 mg for magnesium and over 1224 mg per day for calcium, the odds of metabolic syndrome for the men was lowered.

"The underlying mechanisms driving the differences we and others have observed by sex are not well understood and warrant additional mechanistic studies," the researchers wrote. The study measured serum triglyceride, high density lipoprotein (HDL) cholesterol and glucose levels as markers of the condition.

What is it – and how many people have it?
The researchers described metabolic syndrome as a "clustering of metabolic traits" including abdominal obesity, glucose intolerance, hypertension and dyslipidaemia (high amounts of lipids like cholesterol in the blood) – which in turn were associated with an increased risk of diseases like cardiovascular disease, certain cancers and type 2 diabetes.

In the US the overall prevalence of the metabolic syndrome has increased from 23.7% in 1988–1994 to 34.2% in 1999–2006 for adults aged over 20 – this breaks down to an increase from 24.8 to 34.9% for men and 23.4 to 33.3% for women. A 2008 study entitled the "Metabolic Syndrome Pandemic" estimated about one fourth of the adult European population has the condition. According to the UK's National Health Service, European men with metabolic syndrome tend to have a waist circumference of 37 inches or more and for European and South Asian women 31.5 inches or more.

Moderate butter intake increases LDL and HDL cholesterol levels: Danish study

NutraIngredients, 10Aug2015

Moderate butter consumption could result in higher levels of both 'bad' LDL and 'good' HDL cholesterol, the findings of a Danish study suggest.

The University of Copenhagen study, published last month in the American Journal of Clinical Nutrition, sought to examine the effect moderate butter intake has on cardiovascular disease risk markers compared to a diet with the same amount of olive oil.

Supported by the Danish Dairy Research Foundation (MFF), the study compared the effects of moderate butter intake, moderate olive oil intake, or a habitual diet on blood lipids, high sensitivity Creactive protein (hsCRP), glucose, and insulin. "Butter is known to have a cholesterol-raising effect and, therefore, has often been included as a negative control in dietary studies, whereas the effect of moderate butter intake has not been elucidated to our knowledge," said the study.

Before the study was published, MFF wrote that a "plausible result" of the University of Copenhagen study "may be that butter when eaten in moderate amount could be part of a healthy diet. Acquaintance of this might improve the image of butter benefiting the consumers, as well as the dairy industry," it said.
To test this hypothesis, 47 healthy men and women substituted part of their habitual diets with 4.5% of energy from butter supplied by Danish dairy giant Arla Foods or olive oil.

Cont'd on Pg 24

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Food Science & Industry News

How do you like your latte? People will pay more for coffee with latte art, suggests study

Food Navigator USA, 12Aug2015

Latte art – the designs sprinkled on the froth of a milky coffee by baristas – influences people's perceptions of the beverage and can even make them willing to pay 11 to 13% more. The distinction between angular and rounded shapes also affects consumers' attitudes towards the drink, according to a study in the Journal of Sensory Studies.

Perceptions of quality

In Britain, some 70m cups of coffee are drunk in cafes, restaurants and similar outlets every day. In Australia, around 2.7m cups are consumed. "Such figures clearly highlight the strong financial incentive to try and optimize a consumer's experience of a given cup of coffee," wrote George Van Doorn, one of the authors, in the study.

Researchers from Australia and the UK carried out a series of four experiments to investigate whether both expectations and perceptions of milk-based coffee drinks would be influenced by latte art and its shape. "Taken together, the results of [our] surveys and experiments demonstrate the presence or absence of latte art influences people's willingness to pay for a warm, milk-based coffee beverage," said Van Doorn. "If coffee producers want to manipulate people's expectations of their products, adding a star-like shape to a cappuccino will likely increase expected bitterness, likability and quality; although rounded and angular shapes influence the perception of cost and quality.

"Cafe owners and baristas should carefully consider whether latte art should be added to the product they are serving, and what type of visual design they intend to use rounded designs may be preferable. These results are consistent with a growing body of research demonstrating the visual presentation of food can exert a profound effect on how much people are willing to pay and, on occasion, can even affect the consumer's enjoyment of the food."

Expectation and perception

The first experiment showed pictures of two cups of coffee to people over the internet to assess expectations. One had latte art and the other didn't. The results of this experiment "clearly demonstrated that people were willing to pay significantly more for a coffee with latte art than for an equivalent drink without art," explained Van Doorn. This could be because latte art is associated with a higher quality drink (because more time has gone into it) or because they have paid more for this kind of beverage in the past.

A second experiment, conducted in real life with coffee in a café, showed people were willing to pay more for a coffee with latte art than a drink without. A third experiment looked at the effect of latte art shapes, via an online questionnaire to understand the expectation behind the forms. Drawing on previous research, the researchers expected people would prefer rounded shapes such as circles to angular shapes such as stars and triangles. Circular shapes have been associated with sweetness, while angularity with bitterness.

However, the study showed that participants expected cappuccino to be more bitter, liked more, and of better quality when accompanied by an angular shape. "Although speculative, it is possible that people judged the coffee with a star on it to be of better quality because the star brings to mind the positive characteristics of a market leading company (e.g. Costa)," said Van Doorn.

Another explanation is that the star shape covered more surface area with chocolate. However, a final experiment which provided participants with an actual cup of coffee suggested a cappuccino with a rounded shape was perceived to be of better quality and should cost more. "This may be explained by referring to differences between expectations and perceptions."

In the year 2020: Global nutraceuticals market to be worth €35bn; 7% annual growth forecast

10Aug2015 NutraIngredients

Botanicals are the fastest growing nutraceutical ingredient class in a category being driven by ageing

Cont'd on Pg 22

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Nutrition Week Activity 2015 – LADY IRWIN COLLEGE, DELHI

By Ms. Ummeayman R., Nutritionist, PFNDAI

The Nutrition Awareness Activity was organized in Delhi at Lady Irwin College on 2nd September 2015. One of the objectives of the Association is the awareness creation towards safe and nutritious foods and healthy lifestyle and so the theme of the event was "Food Safety & Nutrition".

Students of Food Science and Nutrition from various colleges in Delhi participated in the Poster making competition and Recipe making competition. The intercollegiate poster making competition was organized on the theme "Healthy Food Choice for Prevention of Non –Communicable Diseases" with special relevance to the present lifestyle. Recipe Completions was conducted, wherein the students had prepared recipes of 'Low Salt products'. The participants made a very good attempt to come up with creative, innovative, delicious, yet nutritious recipes. The students activity was further energised by the exhibits by Kelloggs India, wherein they sampled the breakfast cereals products and Pepsico's display of the Oats meals and sampling of the products with quiz contest for visitors at the counter of Pepsico.


Healthy Recipe

The theme of the seminar being 'Food Safety & Nutrition', Dr. Anupa Siddhu, Principal, Lady Irwin College, commenced the seminar with the welcome note on Food Secure India, particularly Nutrition Secure India. By import policy we see that food is available but now we have to see that it reaches the people too. She also gave an insight into the current scenario of nutrition and health of Indian population as India has to face a challenge of double burden of nutrition which is under nourished and overweight population and income disparity would further shift population towards malnutrition.

Presently there is equitable distribution of food in form of pouches, although the portion size is not so healthy but it is available, so we need to see how we can make a healthy choice. Indian policy of 'Alpahar' was followed by our ancestors and meals were divided in portions throughout the day but now we skip portions and have a single meal, this single bolus will lead to negative health impact.

Posters


Dr. Renu Kohli

Mrs. Renu Kohli, Associate Director, R&D Nutrition-Pepsico India, presented 'Oat Nutrition: Current and Emerging Science' wherein she presented the various scientificliteratures that support the health benefits of

consumption of oats. Oats being rich in fibre content with 3g of beta glucan obtained from 2 bowls of oats, there is impact on lipid parameters. Fibre also gives satiety effect and amount of food we eat is reduced.

'Sports Nutrition' was presented by Mr. Rohit Kulkarni, Sports Dietician & Scientist-Venky's India. Development of sports leagues has increased the focus on sport nutrition and there is a demand for sports nutrition guidance. Nutritional guidance is beneficial to athletes but some do associate with gym nutrition. Athlete's diet is more focused towards hydration and energy and there is a different requirement for different athletes in various sports.

Dr. Uday Saxena, member of scientific committee of FSSAI, presented the 'Food Safety Laws in India'. He presented an awareness film on food safety and also gave an insight into the various sections of FSSA Act that pertain to penalties that areapplicable if the food doesnot meet the criteria of safety .

Dr. Neena Bhatia, HOD, Food Science-Lady Irwin College concluded the seminar and Ms. Ummeayman R. Nutritionist-PFNDAI, presented the vote of thanks and appreciated the presentation of delegates and thought provoking questions by the audience and the enthusiastic participation of the students. The activity was supported by Kelloggs India, Pepsico and Kamani Oils.

Cont'd from Pg 18

populations around the world, a report has found.

The Markets and Markets (M&M) report extract did not place a value on the current international market but said it would grow at 7% annually until 2020 when it would hit €35bn, with the Asia Pacific growing fastest. The figure includes nutrients being used in animal nutrition and cosmeceuticals.The firm noted the rising popularity of functional foods in various markets. "Manufacturers are also taking in consideration the convenience factor for consumers and providing them with healthy nutrients in the form of food and beverages instead of supplements."

Yet food supplements remained the biggest market for healthy nutrients ranging from phytochemicals to omega3s to vitamins, minerals, fibre forms, prebiotics and probiotics and more. Growth here explained why botanicals were the fastest growing nutraceutical type. The report found the Asia Pacific, Europe and North America were the biggest regional consumers of health nutrients with Latin America, Africa and the Middle East taking a much smaller slice of the pie.

Apac
Japan, India and China would lead growth in the Asia Pacific, the report found, a finding somewhat at odds with others that show growth slowing in China and India at least, and rising in south east Asian nations like Thailand, Malaysia and Vietnam, albeit from a smaller base. "The growing health awareness and rising cases of various chronic diseases such as blood pressure, diabetes, and rickets in this region are also driving the market," M&M said, noting similar health concerns were driving markets elsewhere too. It added: "Japan is the fastest growing country market in the Asia Pacific region. This is due to the rapidly aging population here."

Middle East, North Africa
Another report by Future Market Insights (FMI) forecast 7.1% yearly growth for the Middle East and North Africa regions between now and 2020. FMI said "Advancements in product offering" and higher consumer awareness was fuelling the growth "in a wide range of products such as medicines and food & beverages".
Trade was also being facilitated by regulatory changes favouring international players that was promoting imports into the region. "This is one of the major factors driving growth of the nutraceuticals market in MENA region."

The market analyst said consumers were learning that nutraceuticals could in some situations replace "conventional medicines". This was leading food and supplement makers "to diversify their product offerings and introduce nutraceutical products to keep up with the demand." Food supplements remained the biggest segment of the market, holding 37%. Of this segment, vitmains, minerals and proteins accounted for 75% of sales. Protein supplements were worth about €1bn in 2014.

Functional beverages were the next biggest segment at 27.9%. The six nations of the Gulf Cooperation Council (GCC) – Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain, and Oman – represented the biggest market: About €3.25bn in 2014 and set to hit €4.86bn by 2020. The rest of the Middle East was valued at €1.88bn last year. North Africa would grow at "healthy single-digit" rates until 2020.

Sweet potato varieties may combat vitamin A deficiency in Africa

IFT Weekly Aug 26, 2015

A study published in Crop Science shows that two varieties of sweet potatoes may decrease vitamin A deficiency in Africa. Sweet potatoes are a staple in the South African diet, and they contain high levels of beta-carotene, which our bodies convert to vitamin A.

"We realized it would be great if we could develop a local variety [of sweet potato] which has good yield, high dry mass, and desirable taste attributes, and promote it to combat vitamin A deficiency," said Sunette Laurie, a senior researcher with the Agricultural Research Council in Pretoria, South Africa. "Those traits are actually very important. Africans prefer sweet potatoes with a higher dry matter content, a firm texture, and a sweet taste."

Imported varieties were too moist, too low in dry matter content, or had low yield and could not adapt to South African growing conditions. The researchers tested 12 varieties of sweet potatoes and because growing conditions can vary widely, they planted them in three different areas: humid subtropical, drier subtropical, and temperate. The researchers also set up tasting panels for the different varieties.

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SAD DEMISE OF TECHNOCRAT YESHWANT REGE

Shri Yeshwant Rege, a scientist and partner of Dr. Rege Laboratories, Goa which has been a member of PFNDAI for several years, passed away on Thursday 8th October 2015 in Goa. Rege started Dr. Rege Labs with his illustrious father Dr. U. Y. Rege, currently the Governing Board member of PFNDAI, in Kundaim in 1999 manufacturing popular nutritional products. Yeshwant was a brilliant technocrat with expertise in export and promotion of dietary supplements and nutritional dairy based products. He was a very jovial and extremely dynamic person. For his professional success he won Pharma Achiever of the Year in SME in 2011. He was also an extremely helpful person which was recognized by an award of Good Samaritan Award which he received at the hands of Nobel Laureate Prof. M. Yunus. He was an extremely popular person in Pharma & Food Industry. We extend our heartfelt condolences to his family members and pray to God for eternal peace to the departed soul.

Yeshwant Rege (far right)

Research in Health & Nutrition

Cont'd from Pg 16

The University of Copenhagen team Sara Engel and Tine Tholstrup found that "moderate intake of butter" led to an increase in total cholesterol and low density lipoprotein (LDL) cholesterol the 'bad' cholesterol that clogs arteries when "compared with the effects of olive oil intake and habitual diet." However, it also resulted in an increase in high density lipoprotein (HDL) cholesterol ' good' cholesterol that helps remove LDL cholesterol from the arteries when compared with the habitual diet.

"We conclude that hypercholesterolemic people should keep their consumption of butter to a minimum, whereas moderate butter intake may be considered part of the diet in the normo-cholesterolemic population," it concluded.

MFF, which is chaired by Arla Foods' Hans Henrik Lund, told DairyReporter.com it is far from disappointed with the results. "The Danish Dairy Research Foundation appreciates all kind of well conducted research about dairy products," said MFF's Louise Beltoft Borup Andersen. "We have noted that butter increased LDL cholesterol as expected, but also HDL cholesterol, which led the authors to conclude that there is room for a moderate intake of butter in a healthy diet for healthy people."

"We will communicate this conclusion as any other conclusion to representatives from the Danish dairy industry and other stakeholders and we look forward to more research within the area of dairy fats and health," she added.

Research review questions whether low FODMAP diets are solution to digestive woes

Food Navigator USA, 07Aug2015

Limiting consumption of certain carbs may not be the panacea once thought for bloating and abdominal pain caused by irritable bowel syndrome, and actually could cause more harm if not overseen by a healthcare provider,

a new data review suggests.

In recent years, poorly absorbed shortchain carbohydrates, collectively known as FODMAPs, have been blamed for triggering digestive discomfort in some people – prompting some dietitians to advocate limiting them. But a review of the available data published Aug. 6 in the journal Drug and Therapeutics Bulletin suggest "there is very limited evidence" to support a diet low in FODMAPs, which are found in wheat, onions, legumes, some dairy and some natural and artificial sweeteners.

"Evidence for the efficacy of the low FODMAP diet to improve symptoms of irritable bowel syndrome is based on a few relatively small, short term unblinded or singleblinded controlled trials," none of which exceeded six weeks, according to the review in DTB. Likewise, the ideal duration of diet adherence is unknown, the review adds.

The review also points out the restrictive diet could cause harm if not properly followed. For example, some adherents might not consume sufficient nutrients or fiber while on the diet. In addition, some FODMAPs are prebiotics that promote the growth of probiotic bacteria in the gut, such as bifidobacteria, which could improve digestive health, the review notes.

The review's fears about harm, however, are not grounded in the research. The authors acknowledge they are not aware of any published data that has assessed the nutritional adequacy of patients' intake while on a low FODMAP diet. They also note that there were few reports of adverse events in the studies. However, they suggest that people who selfdiagnose their digestive problems as related to FODMAPs and do not seek a healthcare provider's guidance could go astray on what is a very difficult diet to which to safely adhere.

Low FODMAP diet could reset the gut

While the research may be limited, a statistically significant portion of participants in all the studies reported some level of relief from IBS symptoms on the low FODMAP diet. Even a little relief may be enough for some patients to try the diet, given that many people who suffer from IBS have done so for years and tried many potential solutions without luck, said Cynthia Harriman, director of Food and Nutrition Strategies at Oldways Whole Grains Council. She added that the goal of the low FODMAP or any restrictive diet is to only temporarily restrict foods until the gut is "back in order" and then reintroduce foods slowly so patients can eat healthy foods without drastic long term restrictions.

She suggested a main advantage to restrictive diets, such as the low FODMAP diet, might be their initial restrictive stage, which "serves to starve out the bacteria species that have been hanging around in your gut, shaking things up a bit and making a change possible – if you eat the right foods to recolonize yourself with 'better' bacteria."

Indeed, the review noted in one study participants who took a probiotic supplement saw similar beneficial results to those who were on the low FODMAP diet compared to those who were in the control group.

"Let's not blame the canary" With this in mind, Harriman suggested blaming FODMAPs, or before that gluten, for digestive problems may be misplaced.

"Gluten, FODMAPs, and whatever will be the NEXT candidate (and there will be one!), are really canaries in the coal mine. Let's not blame the canary: Let's clean up the mine!" To do this, she suggested tackling the question: "What has our overall Western Diet done to our digestive tracts that we have trouble digesting wonderfully healthy foods that people have eaten as far back as we can remember?"

Continuous supplementation with carotenoids may further boost eye health: Study

NutraIngredients USA, 07Aug2015

Sustained supplementation with the macular carotenoids can lead to greater augmentation of macular pigment and improve contrast sensitivity, says a new study.

Different formulations of lutein, zeaxanthin and mesozeaxanthin were examined in people with early age-related macular degeneration (AMD), with results showing that all of the combinations significantly improved macular pigment in the participants.

Furthermore, the formulation with 17 mg per day mesozeaxanthin, 3 mg per day lutein, and 2 mg per day zeaxanthin was found to produce significant increases in macular pigmentation at each eccentricity, while no such increases were observed in the formulation with no mesozeaxanthin (20 mg per day lutein and 0.86 mg per day zeaxanthin), according to results published in Eye .

"We report that the inclusion of mesozeaxanthin in a supplement formulation seems to confer benefits in terms of macular pigment augmentation and in terms of enhanced contrast sensitivity in

subjects with early AMD," wrote the authors, led by Kwadwo Akuffo, a postgraduate research student at the Waterford Institute of Technology in Ireland.

"An important and novel finding rests on the observation that sustained supplementation with the macular carotenoids seems necessary to maximally augment macular pigment and to optimize contrast sensitivity over a 3year period in patients with early AMD."

Eyes
The macula is a yellow spot of about five millimeters diameter on the retina. As we age, levels of the pigments in the macula decrease naturally, thereby increasing the risk of age-related macular degeneration (AMD). The yellow colour is due to the content of the carotenoids lutein and zeaxanthin, which we derive from the diet. These compounds are the only carotenoids capable of filtering the harmful blue light than can damage the light receptor cells in the eye, the rods and the cones.

A toothin macular pigment layer can allow the blue light through and destroy the cells. Maintaining high levels of the macular carotenoids, and therefore the macular pigment, is a valid approach to maintaining eye health and reducing the risk of AMD. The majority of the science has focused on only lutein and zeaxanthin, but a 2013 study from the same research groups behind the new study reported that a combination of three carotenoids lutein, zeaxanthin and mesozeaxanthin – may be needed to boost retinal levels and support eye health (British Journal of Nutrition , Vol. 110, pp. 289300).

The new study adds to this earlier data by finding that continuous supplementation for three years in people with early AMD did "further augment" the macular pigment, and improved the contrast sensitivity of the participants. "The inclusion of mesozeaxanthin in the formulation appears to be important if increases in macular pigment, and consequential improvements in vision, are to be maximized in subjects with early AMD receiving supplements," wrote the researchers.

Supplements
The 67 people with early AMD enrolled in the trial took one of three supplementation regimes: The first group received supplements containing 20 mg per day lutein and 0.86 mg per day zeaxanthin, the second group received supplements containing 10 mg per day mesozeaxanthin, 10 mg per day lutein, and 2 mg per day zeaxanthin, and the third group consumed supplements containing 17 mg per day mesozeaxanthin, 3 mg per day lutein, and 2 mg per day zeaxanthin.

"Sustained supplementation appears necessary, for at least 3 years, if macular pigment is to be augmented maximally and contrast sensitivity is to be optimized over that period of time," wrote the researchers. "Of note, modest visual benefits were observed in the current study. Future clinical trials should examine the impact of supplementation with formulations containing mesozeaxanthin and zeaxanthin at similar doses. The Central Retinal Enrichment Supplementation Trial (CREST), currently underway, will also add to our understanding of the role of the macular carotenoids, including mesozeaxanthin, on vision in healthy and diseased eyes."

Mesozeaxanthin is GRAS
Mesozeaxanthin has been a divisive ingredient for the dietary supplement and functional food industries, with some suppliers taking the stance that the science behind mesozeaxanthin is in its infancy and our knowledge is limited. On the other hand, Prof John Nolan and Prof Stephen Beatty from the Waterford Institute of Technology are convinced that all three macular pigments (lutein, zeaxanthin, and mesozeaxanthin) are required for optimal eye health.

Curcumin for sports nutrition? RCT supports role for pain reduction after heavy exercise

NutraIngredients USA, 10Aug2015

Supplements of curcumin, the yellow pigment that gives turmeric its colour, may reduce pain associated with exercise, and perhaps boost performance, says a new study.

Five grams per day of curcumin were associated with a reduction in pain associated with delayed onset muscle soreness (DOMS), according to scientists from SportsMed Canterbury (New Zealand), Massey University (NZ), the Australian Institute of Sport in Canberra.

Writing in the European Journal of Applied Physiology the researchers also noted that curcumin supplementation was associated with reduced levels of a blood marker for muscle damage, and a suggestion of reduced systemic inflammation.

"These findings provide the first empirical evidence to support the possibility of using curcumin to prevent and combat DOMS associated with heavy exercise," wrote the researchers, led by David Rowlands, PhD, Director of the Exercise Physiology Lab and Metabolic and

Microvascular Research Group in the School of Sport and Exercise at Massey University.

Mainstream
Curcumin/turmeric supplements finally tipped over into the mainstream last year. According to a report published in the American Botanical Council's HerbalGram , sales of herbal dietary supplements with turmeric/curcumin as the primary ingredient grew by 26.2% in 2013 to take the top spot in the natural channel. The science has continued to grow, too, with new studies supporting the potential brain, cardiovascular, joint, and muscle benefits of the ingredient.

The new study suggests a role for the ingredient in the booming sports nutrition sector, but more research is needed to support these preliminary results. "Further research is required to determine the mechanisms of action, to quantify if the effect is great enough to provide shortterm worthwhile benefit to performance sports, military and other activity causing skeletal muscle trauma, and to assess curcumin's effect on females and clinical populations," wrote the researchers. Other work should explore the effects of chronic supplementation on training adaptation, to investigate the possibility of attenuated exercise adaptation in sport and clinical populations."

Study details
Dr Rowlands and his co-workers recruited 17 men to participate in their double-blind randomized-controlled crossover trial. The men were randomly assigned to receive 5 grams per day of curcumin orally or placebo for two days before and three days after a performance tests. This was followed by a two week 'washout' period and then men were then crossed over to the other group. The dose was calculated from animal studies and extrapolated to humans.

Results showed that one and two days after exercise that curcumin supplementation was associated with "moderatelarge reductions in pain" during a variety of exercises, including singleleg squat, gluteal stretch, and squat jump.
"Associated with the pain reduction was a small increase in singleleg jump performance [of 15%]," said the researchers.

However, there was a lack of a change in inflammatory status, said Dr Rowlands, which they found surprising. "We may have just missed it or used the wrong markers, or it's working on a different system," he told us. "Oral curcumin likely reduces pain associated with DOMS with some evidence for enhanced recovery of muscle performance," they wrote.

Future opportunities
Dr Rowlands told us that the researchers produced the supplement themselves, and there were no adverse events reported by the study participants. The research team does not have any plans at present for further work, but would be interested if a funding opportunity arose to do a dose response study and work with the elderly. "We'd also be interested in evaluating curcumin in real performance situations like a tournament, a cycling tour, or intense training blocks."

Nine Alzheimer's risk factors may contribute to two thirds of cases

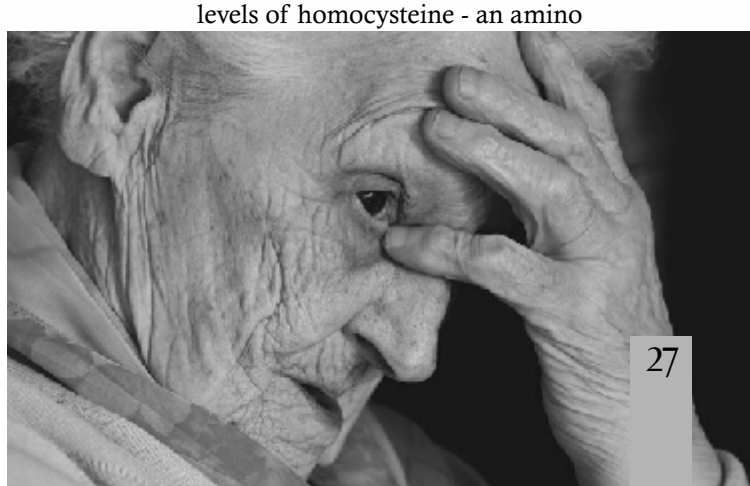
21 August 2015 Medical News Today

Nine potentially modifiable risk factors may contribute to up to two thirds of Alzheimer's disease cases worldwide, suggests an analysis of the available evidence, published online in the Journal of Neurology Neurosurgery & Psychiatry.

The analysis indicates the complexity of Alzheimer's disease development and just how varied the risk factors for it are. However, the researchers suggest that preventive strategies targeting diet, drugs, body chemistry, mental health, pre-existing disease, and lifestyle may help to stave off dementia. This could be particularly important, given that, as yet, there is no cure, they say.
The researchers wanted to look at the factors associated with the development of Alzheimer's disease in a bid to determine the degree to which these might be modified and so potentially reduce overall risk. They therefore trawled key research databases, looking for relevant studies published in English from 1968 up to July 2014.

Out of almost 17,000 studies, 323, covering 93 different potential risk factors and more than 5000 people, were suitable for inclusion in the analysis. The researchers pooled the data from each of the studies and graded the evidence according to its strength. They found grade 1 level evidence in favour of a protective effect for the female hormone oestrogen, cholesterol-lowering drugs (statins), drugs to lower high blood pressure, and anti-inflammatory drugs (NSAIDs). They found the same level of evidence for folate, vitamins C and E, and coffee, all of which were associated with helping to stave off the disease.

Similarly, the pooled data indicated a strong association between high levels of homocysteine - an amino



acid manufactured in the body - and depression and a significantly heightened risk of developing Alzheimer's disease.
The evidence also strongly pointed to the complex roles of pre-existing conditions as either heightening or lowering the risk.
The factors associated with a heightened risk included frailty, carotid artery narrowing, high and low blood pressure, and type 2 diabetes (in the Asian population). Those associated with a lowered risk included a history of arthritis, heart disease, metabolic syndrome, and cancer.

Certain factors seemed to be linked to altered risk, depending on the time of life and ethnic background. For example, high or low body mass index (BMI) in mid-life and low educational attainment were associated with increased risk, whereas high BMI in later life, exercising one's brain, current smoking (excluding the Asian population), light to moderate drinking, and stress were associated with lowered risk. There were no significant associations found for workplace factors.

The researchers then assessed the population attributable risk (PAR) for nine risk factors which had strong evidence in favour of an association with Alzheimer's disease in the pooled analysis, and for which there are data on global prevalence. PAR refers to a mathematical formula used to define the proportion of disease in a defined population that would disappear if exposure to a specific risk factor were to be eliminated.

The nine risk factors included obesity, current smoking (in the Asian population), carotid artery narrowing, type 2 diabetes (in the Asian population), low educational attainment, high levels of homocysteine, depression, high blood pressure and frailty. The combined PAR indicated that these nine factors, each of which is potentially modifiable, contribute up to around two thirds of cases globally.

This is an observational study, so no definitive conclusions can be drawn about cause and effect, but the researchers suggest that preventive strategies, targeting diet, prescription drugs, body chemistry, mental health, underlying disease, and lifestyle might help curb the number of new cases of Alzheimer's disease.

New weapon in the fight against malnutrition

Science Daily August 4, 2015

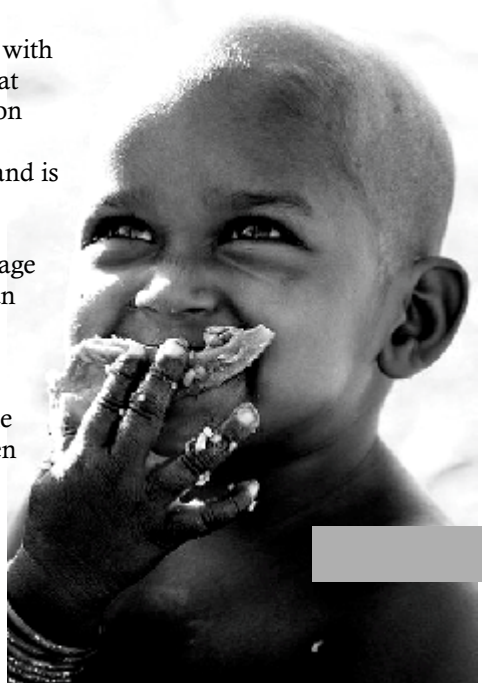
University of British Columbia Malnutrition affects millions of people worldwide and is responsible for one¬ fifth of deaths in children under the age of five.

Children can also experience impaired cognitive development and stunted growth. Now scientists have opened the doors to new research into malnutrition by creating an animal model that replicates the imbalance of gut bacteria associated with the difficult¬ to ¬treat disease.

UBC scientists have opened the doors to new research into malnutrition by creating an animal model that replicates the imbalance of gut bacteria associated with the difficult¬ to treat disease. Malnutrition affects millions of people worldwide and is responsible for one ¬fifth of deaths in children under the age of five. Children can also experience impaired cognitive development and stunted growth. The problem arises when people don't have enough food to eat and their diet lacks proper nutrients. The disease also has a lot to do with environmental factors and it has been a challenge to develop treatments to reverse malnutrition.

"Everyone thought that you simply needed to feed people and they'd be fine, but it didn't work," said Brett Finlay, a professor of microbiology and biochemistry at UBC. "The gut bacteria model allows us to figure out what's going on and to think about ways to fix it." According to Finlay and UBC PhD student Eric Brown, malnutrition can be difficult to treat because it affects the good bacteria that live in the gut. People suffering from malnutrition often show signs of a disease known as environmental enteropathy, which is an inflammatory disorder of the small intestine and is likely caused by ingesting pathogenic fecal bacteria early in life from a contaminated environment. This shifts the balance of the original healthy bacteria in the gut and leads to poor absorption of nutrients.

The study, published in Nature Communications, explains how the research team developed a mouse model to reproduce the symptoms of environmental enteropathy and malnourishment. "We were able to see how a malnourished diet has a strong, measurable impact on the microbes in the small intestine," said Brown. "This new model gives us the opportunity to examine the impact of malnutrition on gut microbiology and assess the role of infections."



Pathogenic bacterial infections like

salmonella and E. coli are huge problems in developing countries because they are much more harmful to people suffering from malnutrition, leading to chronic diarrhea and inflammation.
"Treatments and vaccines created in developed nations and tested on healthy people often don't work in malnourished populations," said Finlay, distinguished professor at UBC's Peter Wall Institute for Advanced Studies. "People suffering from malnutrition respond differently." With an animal model, Finlay said researchers will be better able to test treatments and understand how malnutrition impacts a child's development.

When dinner table defiance could lead to health problems

August 6, 2015 Science Daily

When most people think of eating disorders, they think of anorexia nervosa and bulimia nervosa. But there's another condition that has nothing to do with concerns over weight, shape or body image, and it has been recognized in the latest edition of the Diagnostic and Statistical Manual of Mental Disorders, which doctors use to diagnose conditions.

Avoidant/Restrictive Food Intake Disorder, or ARFID, is an eating or feeding disturbance that results in persistent failure to meet appropriate nutritional and energy needs.

It can lead to one or more of the following conditions:
• Significant weight loss or failure to achieve expected weight gains or growth
• Significant nutritional deficiencies
• Dependency on a naso-gastric or gastrostomy tube or oral nutritional supplements without physical reason
• Marked interference with psychosocial functioning

Dr. Rollyn Ornstein, interim division chief of Adolescent Medicine and Eating Disorders at Penn State Hershey Children's Hospital, says ARFID is more serious than simply being a picky eater. Sometimes a child will be referred to Ornstein after a choking or significant vomiting incident that makes them want to avoid certain foods, or maybe even solid food altogether. Many infants, toddlers and preschoolers are labelled picky eaters, and parents assume or are told that it is a phase the child will grow out of. But if a child enters school and still displays a significant level of selective eating, it may be something to address. Ornstein says even though the condition now has a name, many pediatricians are not well-versed in identifying or treating it.

"You know your child best. So if you think there is a problem, you shouldn't feel bad about seeking help from an expert," she says. "It shouldn't be ignored for too long because if they have texture or sensory issues, it becomes harder to deal with as they get older."
Most of the children Ornstein sees are at least eight years of age; some won't swallow for fear of choking, while others have ongoing complaints of belly aches and not being hungry. "Often there is underlying anxiety, but it isn't always so severe as to have been obvious before," she says.

If left untreated, children with ARFID could lose weight and become malnourished, and the eating issues can interfere with activities of everyday life such as eating dinner and socializing with other children. Those who don't have enough fibre in their diets may also suffer from constipation.
A recent Duke University study found that children with severe selective eating disorder were more than twice as likely to be diagnosed with social anxiety or depression, and that doesn't surprise Ornstein. She says a Penn State Hershey study of children admitted to her day program for children ages 8 to 16 with eating difficulties found that 23 percent had ARFID -- even though it wasn't labelled as such at the time -- and many of those children had higher rates of anxiety disorders as well.

Sunlight and vitamin d: Necessary for public health

August 6, 2015 Science Daily

The Journal of the American College of Nutrition is pleased to offer Open Access to a scientific consensus paper, Sunlight and Vitamin D: Necessary for Public Health, authored by scientists from the University of California, San Diego, Creighton University, Boston University Medical Center, and the Medical University of South Carolina, along with other research contributors.

The paper presents information to illustrate that UV exposure not only provides the benefits of vitamin D production, but also many additional health benefits not related to vitamin D. The current culture of sun avoidance in the United States carries with it both health risks and quantifiable harm. The consensus was developed by Grassroots Health, a non-profit public health research organization, and was led by Dr. Cedric Garland, professor of family and preventive medicine at the University of California, San Diego and Dr. Robert P. Heaney, Professor of Medicine and John A. Creighton University Professor Emeritus of Creighton University.

"Humans have adapted to sun exposure over many thousands of years and derive numerous physiological benefits from UV exposure in addition to vitamin D," said Carole Baggerly, executive director of Grassroots Health and co-author of the paper.

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Regulatory & Safety News

Detecting hidden ingredients in dietary supplements

Science Daily August 5, 2015

To lose weight, boost energy or soothe nerves, many consumers turn to dietary supplements. But some of these products contain undeclared substances.

To protect consumers from taking something without their knowledge, scientists have developed a technique to determine what secret ingredients could be lurking in these supplements. They report their approach, which helped them find the active Viagra ingredient and other synthetic designer compounds in various products, in ACS' Journal of Agricultural & Food Chemistry.

Dietary supplements can appear to be a healthful option for treating certain health conditions. Their labels list herbs or other natural ingredients that consumers assume are safe to take. But over the past several years, regulators have detected prohibited substances in some of these products that aren't included on the labels. The drug sibutramine is one of these substances. It was once approved for weight loss but was withdrawn after concerns arose that the medication could increase the risk of heart attacks. To catch supplements spiked with sibutramine and other undeclared substances, Zhiqiang Huang, Bin Guo and colleagues came up with a strategy.

Using an advanced liquid chromatography-mass spectrometry screening procedure, the researchers tested more than 100 syrups, capsules and other types of supplements purchased in markets in China and online. The products' labels claimed benefits from blood pressure reduction to enhanced sexual performance. Their approach successfully detected a wide range of targeted adulterants -- including sibutramine and sildenafil, the active ingredient in Viagra -- and other unexpected drug compounds.

Five-colour nutritional labelling system is the most effective for consumers

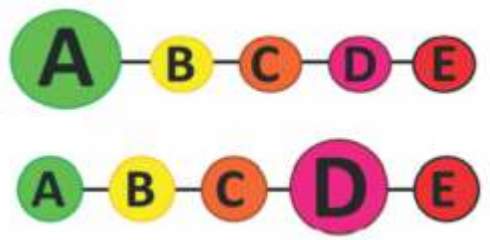
Science Daily August 31, 2015

While the French High Council for Public Health (HCSP) made public on Monday, 24 August 2015, a positive opinion regarding the relevance of the 5-colour code for the public, a team of researchers (Inserm/INRA/Paris 13 University) directed by Serge Hercberg, on publication of their article in the journal Nutrients, demonstrated that the 5-colour nutrition label (5-CNL) is the most effective nutritional information system for allowing consumers to recognise and compare the nutritional quality of foods, including "at-risk" populations (older subjects, those with a lower educational level, lower income, lower nutritional knowledge, and overweight or obese individuals).

Article 5 of the Health Act, introduced by Marisol Touraine, Minister of Health, and passed by the French Parliament, states, ." ..to make it easier to inform consumers and to help the consumer make informed choices, that the mandatory nutrition declaration may be accompanied by a presentation or complementary expression using graphics or symbols on the front of packaging."

Several systems have been proposed at national and international level. In France, many learned societies support the establishment of the 5-CNL 5-colour nutritional labelling system (green/yellow/orange/ fuchsia pink/red). The latter is based on the calculation of a nutritional quality score (nutrient profiling system, Food Standards Agency, FSA), which takes several elements present on the nutrition label into account (calories, simple sugars, saturated fatty acids, sodium, fibre, protein and percentage of fruits and vegetables per 100 g of product), to arrive at a unique indicator of the nutritional quality of the food.

Several studies have already contributed to the validation of the FSA score, by showing that the nutritional quality of foods consumed evaluated by the FSA score is linked to the overall quality of the diet and nutritional status of individuals, and in a prospective manner to the risk of disease.



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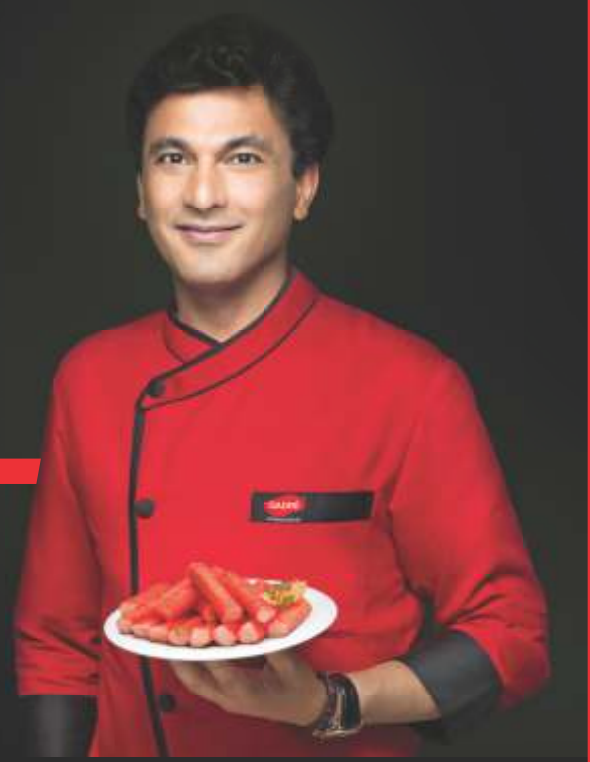
DISCOVER THE MANY FLAVOURS OF THE OCEAN.

READY-TO-SAVOUR FROZEN SEAFOOD.



Vikas Khanna
Michelin Starred Chef

The Story behind Indias Seafood Experts.

Founded in 1978 by Mr. Deepak Gadre and headquartered in Ratnagiri, Gadre Marine Export Pvt. Ltd. was originally a processing and packaging unit of frozen marine products such as shrimps, squids and cuttlesh. In 1994, they set up India's rst and only Surimi manufacturing plant. Today, Gadre is the third largest manufacturer of Surimi in the world.

Gadres world-class plants are equipped with state-of-the-art machines that ensure every product meets a supreme level of quality, while their stringent processes and rst-rate storage and refrigeration facilities, make certain their customers get nothing but the very best. Discover their wide range of frozen seafood options today.

An Ocean of Deliciousness.

Gadre Marine Export Pvt. Ltd. manufactures frozen seafood products that encapsulate the avours of the ocean. Crab Sticks, one of their most innovative products is made using sh meat infused with a unique crab avour. Its versatility adds a delectable twist to a wide variety of dishes, making it the perfect on-the-go snack. Crab Sticks are pre-cooked, so it is an extremely convenient food option too.

Gadres array of seafood options includes Crab Claws, Crumbed Fish Fingers, Lobster Bite, Shrimp Samosa, Masala Mackerel, Masala Prawns and many more delectable ready-to-cook seafood options. They also have a raw sh range that includes Premium Pomfret, Seer Fish Steak and Jumbo Seer Fish Steak.

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GADRÉ®
PREMIUM SEAFOOD

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These scientific studies underscore the interest of putting the 5-colour nutrition label (5-CNL), based on FSA score, on the front of food packaging in order to better guide consumers in their food choices. This system is the subject of considerable controversy, fuelled among others by the various industrial stakeholders, who cast doubt on its value.

The study published today by EREN under the direction of Pauline Ducrot (PhD student in Nutrition) and Sandrine Péneau (Lecturer in Nutrition, Paris 13 University) in the journal Nutrients compares the effect of different nutrition labels on the front of packs of various foods on the ability of consumers to rank foods appropriately. The study was carried out on a sample of 14,230 adults participating in the NutriNet-Santé study. The impact of 4 simplified nutritional labelling systems was tested: the colour-based 5-CNL system; the Green Tick, similar to that used in some Scandinavian countries and the Netherlands; the Multiple Traffic Light system used in Great Britain, and the Guideline Daily Amounts (or Reference Intakes) system already used in France by some industrial companies. A logo-free situation was also used as a reference.

With the help of a Web-based questionnaire specifically developed for this study, participants in the study were asked to rank, on a relative basis ("less good," "moderate," "the best" or "I don't know") the nutritional quality of different series of 3 foods belonging to the same category.

Five categories of foods were tested: frozen fish products, pizzas, dairy products, breakfast mueslis and appetisers.
Each participant had to randomly test a combination of food products and nutrition labels from the 5 categories. For this, 25 different versions of the questionnaire were used. A statistical design (Latin Square) made it possible to ensure an equal number of participants for each labelling/product category combination.

The results of this specific study on the comprehension of nutritional logos show that:
1. Generally speaking, individuals "at risk" of having a nutritionally poorer quality diet (older subjects, participants with a lower educational level, lower income, lower nutritional knowledge, and overweight or obese individuals) had greater difficulty in ranking food products according to their nutritional quality.
2. The various nutrition labels significantly increased the ability of individuals, including those at risk, to rank 3 foods in order of their nutritional quality, compared with a logo-free setting.
3. The nutrition labels had more impact than individual characteristics (education level, income, etc.) on increasing the ability of the individuals to correctly rank the foods by nutritional quality. The chance of correctly ranking the products was multiplied up to 12-fold with a logo, whereas individual characteristics enabled an increase in the chance by a factor of only 1.17.
4. Of the nutrition labels tested, the 5-colour nutritional labelling system (5-CNL) was the most effective in terms of comprehension. It performed better than the Traffic Light, Reference Intakes, or Green Tick labelling systems.
5. The 5-CNL system performed better, including among individuals with a relatively "unfavourable" diet in terms of nutrition and health. In particular, the presence of 5-CNL strongly increased (over twenty-fold compared to the logo-free situation) the ability of individuals with no knowledge of nutrition to correctly rank the products compared with a logo-free situation.

The results of this study emphasise the interest of nutrition labels for helping consumers, particularly those at risk of making food choices that are relatively "unfavourable" to their health, to identify the products most conducive to a balanced diet. The 5-colour logo (5-CNL) system turns out to be the best understood among individuals as a whole, and may therefore make it possible to inform consumers effectively and equitably on the nutritional quality of products, and thereby incorporate this information into determinants of their food choices.

Sweeteners in Confectionery Treats

August 03, 2015 – Food Product Design

John H. Downs, Jr., president and CEO of the National Confectioners Association (NCA), said approximately 123 million U.S. households purchase chocolate, non-chocolate candy, gum or mints each year.

"Most people in the United States enjoy candy about twice a week, averaging less than 50 calories per day from confectionery items," he said. "However, candy is enjoyed across every age, demographic group and lifestyle, meaning that it has a high household-purchase rate and produces about $35 billion in retail sales annually in the United States."

It's safe to say, whether it's chocolate, hard candy, chewing gum, licorice or gummies, something about confections brings

out the kid in all of us. The reality is, however, that while consumers love their confectionery treats, many who indulge are limiting their confectionery consumption out of concern for their health.

The digital issue, "Sweets For The Sweet: Sweeteners in Confectionery" published by Food Product Design explores the addition of sweeteners such as sugar alcohols, high-intensity sweeteners and the classics like honey in current-day confections to meet the ever-changing needs of the healthy consumer.

"For many, terms like 'reduced-sugar' or 'sugar-free' do not go with the word 'candy,'" R.J. Foster pointed out in his article Sweet Sensations. "And yet, the confectionery industry is facing growing demand for treats that offer the taste people have grown to love without the adverse health effects they're looking to avoid. Thankfully, there is a growing palette of ingredients from which candy makers can paint a new picture of sweetness that will be appreciated by the even most discerning of confectionery critics."

Sugar alcohols, aka polyols, such as sorbitol and mannitol, are a common ingredient in reduced-sugar and sugar-free applications, especially confections. Being only partially digestible, though, replacing a portion of a formulation's sugar with a sugar alcohol reduces total calories without losing bulk, which can occur when replacing sugar with high-intensity sweeteners. Unique flavouring, texturizing and moisture-controlling effects also make polyols well-suited for confectionery products.

High-intensity sweeteners are another collection of sweeteners that have a long-running relationship with confectionery treats. One of the most familiar artificial sweeteners today is aspartame, better known to consumers by the brand name NutraSweet. Aspartame is considered to have a clean sweet taste similar to that of sucrose. Although typically considered 200-times sweeter than sugar, in confections, it's usually only considered 100 times. Another familiar artificial sweetener is acesulfame K (potassium). Derived from acetoacetic acid, it has a molecular structure similar to saccharin. Formulating with either aspartame or acesulfame K will require the addition of bulking agents to make up mass from loss of sugar.

Of course stevia is included in the lineup of high-intensity sweeteners, but are you familiar with sweet proteins? Today, there are four "sweet proteins" earning the interest of formulators: monellin, miraculin, curculin and brazzein. Despite their potential benefits and growing interest from formulators, however, only one sweet protein is approved for food use in the United States so far: a blend of low-molecular weight proteins called thaumatin.

It is about 2,000-times sweeter than sugar, although with a slow onset of sweetness, and recognized as FDA GRAS for use as a flavour modifier in chewing gum coatings to prolong the flavour of spearmint, peppermint and citrus flavours.

And to round off the palette of sweeteners, gaining a new perspectives on familiar ingredients such as honey and reduced-sugar corn syrup is beneficial to confectionery product developers. Why? Well, honey, about 25-percent sweeter than sucrose, is becoming popular in confections primarily due to being recognized as a natural sweetener by consumers and having the clean-label designation of simply "honey." Sweets for thought.

EFSA sets dietary reference values for magnesium, phosphorus

IFT Weekly Aug 26, 2015

The European Food Safety Authority (EFSA) has proposed adequate intakes (AIs) for magnesium and phosphorus as part of its ongoing review of dietary reference values in the European Union.

Magnesium is a cofactor of more than 300 enzymatic reactions, such as the synthesis of carbohydrates, lipids, nucleic acids, and proteins, and is necessary for specific actions in various organs in the neuromuscular and cardiovascular systems. Phosphorus is involved in many physiological processes, such as the cell's energy cycle, regulation of the body's acid–base balance, cell regulation and signalling, and the mineralization of bones and teeth, as well as being a component of cell structure.

EFSA's Panel on Dietetic Products, Nutritio,n and Allergies (NDA) set an AI for magnesium of 350 mg/day for men and 300 mg/day for women. For children the AI ranges from 170 to 300 mg/day, according to age.

For phosphorus the Panel set an AI for adults of 550 mg/day. For children the range is between 250 and 640 mg/day.

EFSA's two Scientific Opinions were both finalized after public consultation.

Could and should DNP be a classified substance?

NutraIngredients, 28Jul2015

Tackling the problem of toxic fat burner 2,4dinitrophenol (DNP) isn't just about classifying it as an illegal drug, says the UK's Food Standards Agency (FSA).

This was the agency's response to reports that senior Shropshire coroner, John Ellery, would be writing to ministers to ask whether DNP should be as a classified substance. According to UK TV channel ITV, Ellery made the statements at the inquest of Eloise Aimee Parry – the 21yearold who died in April after taking DNP diet pills she bought online.

FSA communications manager Nadina Mustafa told us it was "great" the coroner was raising this issue and they supported the introduction of any measures that would "strengthen their ability" to bring DNP sellers to justice. However, she said the home office was unlikely to classify the substance as an illegal drug because it was not psychoactive. She said this was not a "black and white" issue since the substance had many legitimate industrial purposes in dyes and herbicides. Mustafa said the legislation needed to tackle the issue already existed within food law since it was known to be dangerous to health.

"We know it's dangerous, we know it's toxic. The difficulty is finding the websites," she said. According to the UK newspaper the Guardian, lobbying by the family of two other UK victims 23yearold Sarah Houston and 18year-old Chris Mapletoft to have DNP classified came to nothing earlier this year with the home office citing a lack of psychoactive properties.

The home office's Advisory Council on the Misuse of Drugs (ACMD) did not respond to our request for comment in time for the publication of this article. However, exACMD chief advisor and Professor of Neuro-psychopharmacology at Imperial College London, David Nutt, told us the ACMD would have to consider if DNP was a "health harm" before making a decision.

A 2011 paper published in the Journal of Medical Toxicity said at the time there had been 62 published deaths in medical literature linked to DNP worldwide. Nutt said in the past drugs without a psychoactive effect had been classified, such as steroids for muscle growth which were class C substances in the UK.
Likewise there had been instances of a substance maintaining its legitimate industrial status but being classified in terms of human use, such as the industrial solvent butanediol which is a class C drug. The last substance to be classified was Methoxyketamine. Ultimately though he echoed the FSA's stance that classification was not necessarily the answer, instead warnings were needed.

An eye on the web

Talking to NutraIngredients, Mustafa shared frustration expressed by investigating officer Detective Sergeant Andy Chatting, who reportedly told the inquest: "One site has closed down, but the caveat is sites close down [but] pop up in almost identical format hours later." Mustafa said this closing and reopening of sites was something the FSA had to keep on top of.

Its National Food Crime Unit and overseas partners closed 47 websites since 2012, five of which were outside the UK. Raising awareness was also key and it was working with various partners including eating disorder charities to send out a clear message that DNP was an industrial chemical not fit for human consumption. It encouraged people who came across DNP sold online for human consumption – also known as 2,4dinitrophenol, Dinosan, Dnoc, Solfo Black, Nitrophen, Aldifen and Chemox – to report it to its food crime unit by emailing **foodfraud@foodstandards.gsi.gov.uk** or to local police.

We're not scared

Issuing warnings came with its own hazards though. A firm accused of supplying a body building product that contained DNP said it was considering legal action against the Norwegian food safety authority earlier this month for damage to reputation. The company, which has since withdrawn EU sales of the product said the products in question were counterfeit.

The UK was involved in this investigation, although it did not, like the other authorities, 'name and shame' the product and its apparent makers. Asked whether such legal threats worried the FSA, Mustafa said the potential dangers to consumers went beyond commercial grievances. "Because it's so serious, we report without fear or favour. We wouldn't be afraid of that, we just want to protect consumers." She said she would be very surprised if an authority would be penalised for sounding the alarm if brought before the courts.

According to a report published last June in the Emergency Medical Journal, the number of DNP poisoning cases increased substantially in the last six years. Cases from toxic centre phone records rose from three in both 2007 and 2011 to 22 in 2013, while the number on online database TOXBASE rose from six in 2011 to 35 in 2012 right up to 331 in 2013.

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Nutrition Week Activity 2015 – ICT COLLEGE MUMBAI

By Ms. Siddhita Kadam, Food Scientist, PFNDAI

Milk is a good source of various macro-nutrients, vitamins and minerals and there is a need to acquaint the youth of the nutritional importance of milk. This activity was organised to bring the latest in technology, regulatory, health and wellness information of dairy products.

The Nutrition Awareness Activity was organized in Mumbai at Institute of Chemical Technology College, Matunga, Mumbai and the theme of the seminar was 'NUTRITION AND HEALTH THROUGH SAFE DAIRY PRODUCTS' was celebrated on 5th September 2015. Organizing such an activity is an initiative to bridge the gap between industry and academia and to understand the needs of the industry and to showcase what the industry can offer to the youth.

Students of Food Science and Nutrition from various colleges like, Dr. BMN College, SVT College, ICT, P.N. Doshi College, Nirmala Niketan, SNDT and Ramnarian Ruia participated in the students competitions organized in morning session. The intercollegiate poster making competition was organized on the theme "Milk for Health and Wellness" with special relevance to various dairy products. Recipe Competition was conducted, wherein the students had prepared recipes incorporating milk and dairy products as the theme was 'Milk and Dairy Products in Daily food'. The participants made a very good attempt to come up with creative, innovative, delicious, yet nutritious recipes.

Seminar was attended by students and faculty from various colleges and nutritionists. Dr. Uday Annapure, Head-Food Eng. Tech. Dept, ICT college welcomed all to the nutrition activity.
Dr. J. S. Pai, Executive Director, PFNDAI introduced briefly about nutrition week programme. He gave an insight into the processed foods and an understanding that all processed foods are not unhealthy. These foods which were processed, prepared, and by the companies, have to maintain a brand image in the food sector. They need consumers to repeatedly purchase their products. This seminar was organized with a view to bring the industry and academia on a common platform and give them an understanding of the latest in industrial developments.

Judging Recipes

Dr. Prabhakar Kanade, Consultant-Dairy Industry, spoke on the topic "Safe milk products for Nutrition and Health". He discussed about milk and milk products especially curd. Having milk and fruit everyday in diet (2 servings) are helpful in reducing hypertension.

Dr. Kanade

He also mentioned that no single food is complete but as far as milk is concerned it is a booster dose of many micronutrients along with macronutrients. While speaking about curd, he discussed about how having curd after lunch is good for health and helps in increasing natural micro flora in guts. He also discussed five keys to safer food which has been issued by WHO i.e. keep clean, separate raw and cooked, cook thoroughly, keep food at safe temperature, use safe water and raw material.

Dr. A. Subramani, General Manager- Corporate QA, Mother Dairy. He threw light on "Importance of hygienic


Mr. Subramani

engineering and fail safe system to deliver safe food". While discussing on hygiene engineering, he emphasized on hygienic standards for equipment, sterilization and pasteurization. He stated that by maintaining hygienic standards during processing and storage makes food safe. He presented 'FAIL SAFE SYSTEM' and gave an elaborate understanding of the same. Lastly he added that, "Implementing hygienic engineering methods in each is vital for creating a safe and shelf stable product."

Mrs. Sweety Das, Kellogg's, Sr. Executive Nutritionist spoke about "Role of Cereals in Health and Diseases'. She emphasized on consuming regular whole cereal breakfast increases micronutrient intake. She further highlighted the fact that, daily consumption of breakfast consisting a combination of dairy, fruits and cereals helps to reduce risk of metabolic syndrome, diabetes, cardiovascular disease and hypertension. In 2015, WHO reported that 5.8 million Indians die due to non-communicable diseases such as stroke, lung and heart diseases, cancer and type one diabetes. She concluded that those who consumed whole cereals in breakfast on a daily basis were able to maintain lower level of mental health problems such as less stress, anxiety, depression etc.


Mrs. Sweety Das


Mother Dairy Visicooler

Dr. Pai concluded the seminar and appreciated the presentation of delegates and thought provoking questions by the audience. The seminar was *sponsored by* **Mother Dairy** and *supported by* **Kelloggs** and **Marico.**


Posters

Seminar Speakers

The researchers concluded that two varieties—Impilo and Purple Sunset—are the most promising. Impilo adapted well to the different growing conditions, had acceptable dry mass, good taste, medium-sized roots for market, and a good yield. However, its light orange flesh means less beta-carotene. Purple Sunset is a darker-fleshed variety, but has lower yields and less adaptability to the different growing conditions. A 4.4-oz serving of Impilo provides 113% of the daily vitamin A requirement of a child aged 4–8, while Purple Sunset provides 261%.

Laurie is now involved in efforts to expand the use of these local varieties. Processing facilities are starting to use sweet potatoes to make flour, bread, muffins, and other products, all of which can help combat vitamin A deficiency across the continent.

Enhancing egg's health benefits through hen feed

IFT Weekly August 12, 2015

A study published in the Journal of Food Science shows that supplementing hen feed with prebiotics and probiotics may decrease the eggs cholesterol and saturated fatty acid content while increasing its unsaturated fatty acid and polyunsaturated fatty acid content.

The researchers conducted a 16-week feeding experiment to investigate the effects of a prebiotic (isomaltooligosaccharide – IMO), a probiotic (PrimaLac), and their combination as a synbiotic on the chemical compositions of egg yolks and the egg quality of laying hens. They randomly assigned 160 Hisex Brown pullets to four dietary treatments: basal diet (control); basal diet + 1% prebiotic; basal diet + 0.1% probiotic; and basal diet + 1% prebiotic + 0.1% probiotic.

The researchers found that prebiotic, probiotic, or synbiotic supplementation not only significantly decreased the egg yolk cholesterol and total saturated fatty acids, but also significantly increased total unsaturated fatty acids, total omega 6, and polyunsaturated fatty acids, including linoleic and alpha-linolenic acid levels in the eggs. However, the total lipids, carotenoids, and tocopherols in the egg yolks were similar among all dietary treatments.

Egg quality was not affected by any of the supplementation. They concluded that "supplementations with IMO and PrimaLac alone or in combination as a synbiotic might be useful for improving the cholesterol content and modifying the fatty acid compositions of egg yolk without affecting the quality of eggs from laying hens between 24 and 36 weeks of age."

Research in Health & Nutrition

Cont'd from Pg 29

"These benefits far outweigh those derived from vitamin D intake by supplements, and therefore sun avoidance being recommended by the US Surgeon General and others is unnecessarily putting Americans at risk." The paper concludes that moderate UV exposure is a natural way to improve human health. In fact, patients suffering from cutaneous tuberculosis and other conditions stand to benefit immediately from the use of heliotherapy in their treatments.

This is consistent with the results of a survey released this week by Grassroots Health, which can be accessed at www.grassrootshealth.net, in which 99% of dermatologists surveyed believe that UV exposure is a viable form of treatment for non-lethal skin conditions like psoriasis. "We urge the US Surgeon General's office and other public health entities to do the work needed to recommend UV exposure levels that are both beneficial and safe, and which favour scientifically-researched information over current cultural norms," Baggerly added. The paper notes that further study is needed to better understand the additional health benefits of UV light beyond vitamin D, including those related to the release of nitric

oxide, production of beta-endorphin, and regulation of circadian rhythms -- all important components of life-long health and well-being.

Five reasons why sugar is added to food

Science Daily August 18, 2015

From a food science and technology perspective, sugar (sucrose) plays several roles when it comes to the functional properties in food. In the September issue of Comprehensive Reviews in Food Science and Food Safety published by the Institute of Food Technologists (IFT), authors from the University of Minnesota write about the functional properties of sugar and why they are often added to foods.

1. Taste: Sweetness improves the palatability of many foods. Adding sugar to foods with high nutrient quality may increase the chance they are consumed. In addition, sugar plays an important role in contributing to the flavor profile of foods by interacting with other ingredients to enhance or lessen certain flavors.

2. Colour and Flavour: The Maillard reaction is a chemical reaction between amino acids and reducing sugars that gives browned foods their desirable flavour; and caramelisation is fundamental to the formation of colour in several food products and can't happen without the addition of sugar. Caramelisation happens when sugar is heated to a certain temperature and is used in a wide variety of products including sauces, candies, breads, jams, and dessert wine (Kroh, 1993). The Maillard reaction also provides desirable flavor formation in foods such as baked goods, chocolate, coffee and meat (Danehy and Wolnak, 1983).

3. Bulk and Texture: Sugar provides bulk to foods which impacts the mouthfeel and texture. Sugar affects multiple chemical reactions that form the texture of baked goods, ice cream, candies, and jams, preserves and jellies.

4. Fermentation: Fermentation is a process in which microorganisms in the absence of oxygen generate energy by oxidizing carbohydrates, like sugar. Sugar aids in the fermentation of many common food and beverage products produced including yogurt, vinegar, sour cream, wine, beer, bread, cheese, soy sauce, and sauerkraut.

5. Preservation: The hygroscopic nature of sugar plays a crucial role in reducing water activity in foods. Hygroscopic is defined as the ability to absorb water from the surrounding environment which helps in preserving and extending the shelf-life of food products (Kitts, 2010). Sugar also prevents baked good from becoming dry or stale (Spillane, 2006) and it also preserves the colour of frozen fruits and jellies.

Raisins may positively impact diabetic nutrition

IFT Weekly August 12, 2015

A study published in The Physician and Sportsmedicine shows that raisins may positively affect glucose levels and systolic blood pressure among people with type 2 diabetes mellitus (T2DM).

This 12-week randomized study of 51 study participants evaluated the impact of routine consumption of dark raisins versus alternative processed snacks on glucose levels and other cardiovascular risk factors among patients with type T2DM. The researchers found that those who consumed raisins had a 23% reduction in postprandial glucose levels.

Compared to alternative snacks, those who consumed raisins had a significant 8.7 mmHg reduction in systolic blood pressure but did not experience a significant reduction in diastolic blood pressure. However, it should be noted that those who consumed raisins did not have a significant improvement in body weight, body mass index, waist circumference, fasting insulin, homeostatic model assessment of insulin resistance, total cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol (HDL), triglyceride, or non-HDL cholesterol levels.

The researchers concluded that the data supports raisins as a healthy alternative compared to other snacks in patients with T2DM.

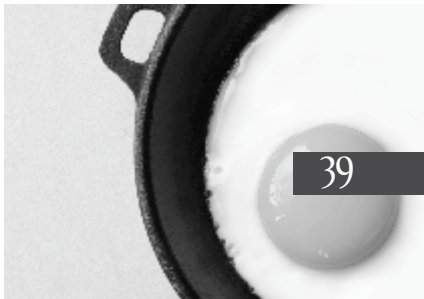
Eating protein-packed breakfast may prevent body fat gain

IFT Weekly Aug 19, 2015

A study published in Obesity shows that consuming a high-protein breakfast (containing 35 g of protein) may prevent body fat gain, reduce daily food intake and feelings of hunger, and stabilize glucose levels among overweight teens who would normally skip breakfast.

A study published in Obesity shows that consuming a high-protein breakfast (containing 35 g of protein) may prevent body fat gain, reduce daily food intake and feelings of hunger, and stabilize glucose levels among overweight teens who would normally skip breakfast.

The researchers fed two groups of overweight teens who reported skipping breakfast between five and seven times a week either normal-protein breakfast meals or high-protein breakfast meals. A third group of teens continued



to skip breakfast for 12 weeks. The normal-protein breakfast meal was milk and cereal and contained 13 g of protein. The high-protein breakfast meals included eggs, dairy, and lean pork that contained 35 g of protein.

Participants in the groups were instructed to report feelings of hunger and their daily intakes of food and beverages. Their body weight and body composition were measured at the beginning and end of the 12-week period. In addition, the participants wore a device that assessed minute-to-minute glucose levels throughout the day.

The researchers found that the group of teens who ate high-protein breakfasts reduced their daily food intake by 400 calories and lost body fat mass, while the groups who ate normal-protein breakfast or continued to skip breakfast gained additional body fat. When individuals ate a high-protein breakfast, they voluntarily consumed less food the rest of the day. In addition, teens who ate high-protein breakfast had more stable glucose levels than the other groups.

Hot chilli may unlock a new treatment for obesity

19 August 2015 Medical News Today

University of Adelaide researchers have discovered a high-fat diet may impair important receptors located in the stomach that signal fullness.

Published In the journal PLOS ONE, researchers from the University's Centre for Nutrition and Gastrointestinal Diseases (based at the South Australian Health and Medical Research Institute) investigated the association between hot chilli pepper receptors (TRPV1) in the stomach and the feeling of fullness, in laboratory studies.

"The stomach stretches when it is full, which activates nerves in the stomach to tell the body that it has had enough food. We found that this activation is regulated through hot chilli pepper or TRPV1 receptors," says Associate Professor Amanda Page, Senior Research Fellow in the University of Adelaide's School of Medicine and lead author on the paper.

"It is known from previous studies that capsaicin, found in hot chillies, reduces food intake in humans. And what we've discovered is that deletion of TRPV1 receptors dampens the response of gastric nerves to stretch - resulting in a delayed feeling of fullness and the consumption of more food. Therefore part of the effect of capsaicin on food intake may be mediated via the stomach. We also found that TRPV1 receptors can be disrupted in high fat diet induced obesity," she says.

Dr Stephen Kentish says these findings will inform further studies and the development of new therapies. "It's exciting that we now know more about the TRPV1 receptor pathway and that the consumption of capsaicin may be able to prevent overeating through an action on nerves in the stomach," says Dr Kentish, National Health and Medical Research Council (NHMRC) Fellow from the University of Adelaide's School of Medicine.

"The next stage of research will involve investigation of the mechanisms behind TRPV1 receptor activation with the aim of developing a more palatable therapy. We will also do further work to determine why a high-fat diet de-sensitises TRPV1 receptors and investigate if we can reverse the damage," he says.

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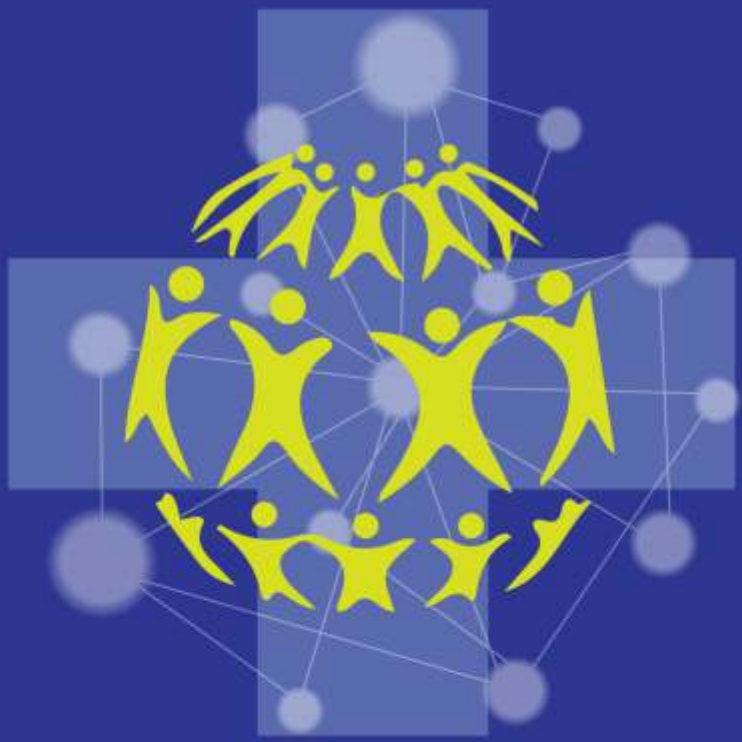

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