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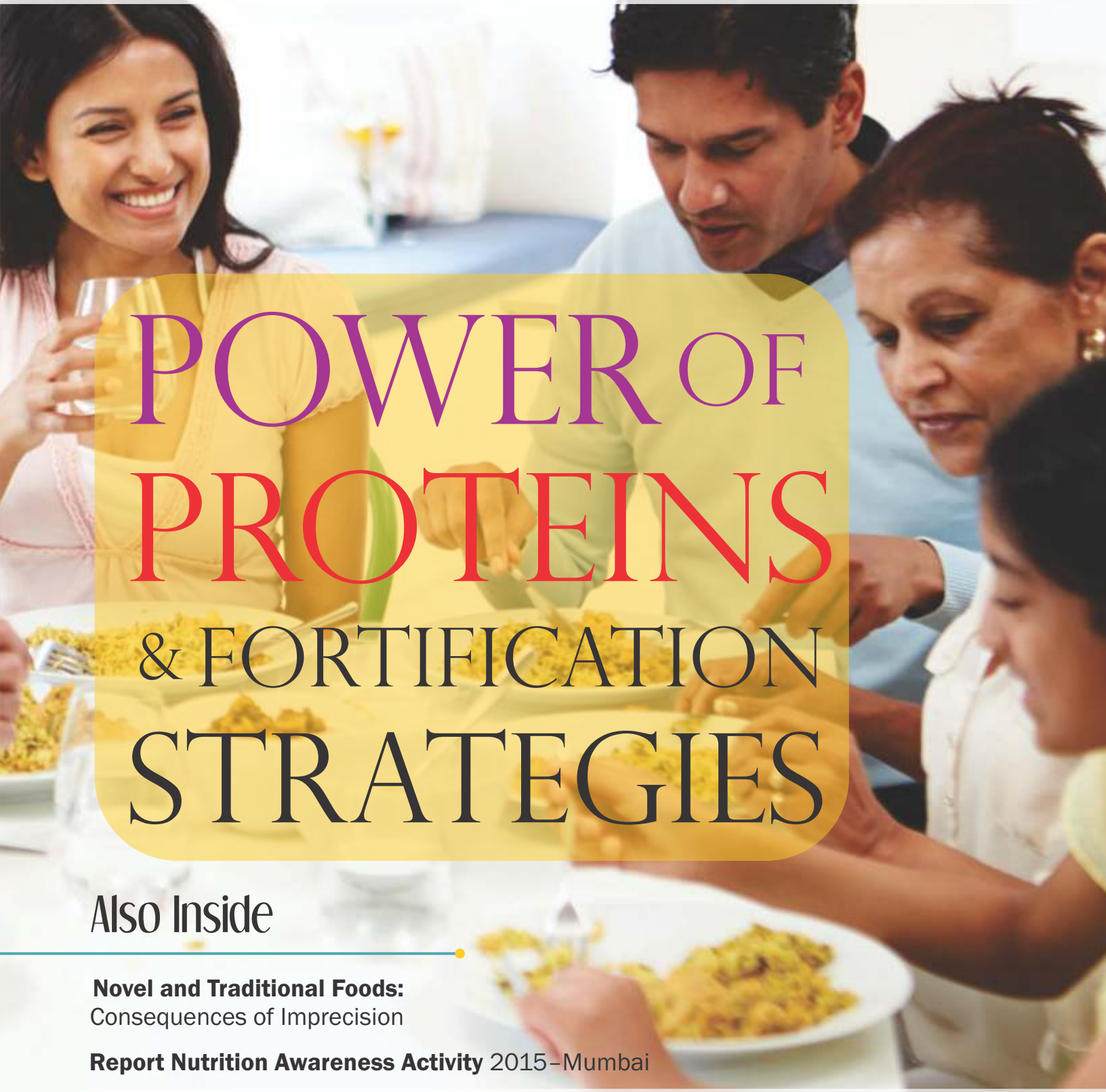

POWER OF PROTEINS & FORTIFICATION STRATEGIES

Also Inside

Novel and Traditional Foods: Consequences of Imprecision

Report Nutrition Awareness Activity 2015–Mumbai

PROTEIN FOODS AND NUTRITION DEVELOPMENT ASSOCIATION OF INDIA

2nd Floor, Mahalaxmi Chambers, 22 Bhulabhai Desai Rd., Mumbai - 26 (India)
Phone : 2353 8858 Telefax : 2353 8998
Email : pfndai@pfndai.org Website : www.pfndai.com

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Editorial

RDA or Recommended Dietary Allowances have been suggested by national institutions after estimating the requirements of the population for those nutrients. As there are differences in requirements in any population, the individual requirements vary and there is a particular value that meets over 90% of that population group. This amount is called the RDA for that group of population e.g. for adult males or adult females or children of a particular age group. Thus although RDA meets requirements of most people it does not meet that of all.

RDA has been developed on the basis of the requirements of healthy individuals and these are daily requirements i.e. every day one must consume these amounts of nutrients through foods or supplements. However, when an individual is deficient, he or she would need more than one RDA for not only meeting the daily requirements but also to partly fill up the deficiency that existed earlier. One RDA would always keep that person in deficient state.

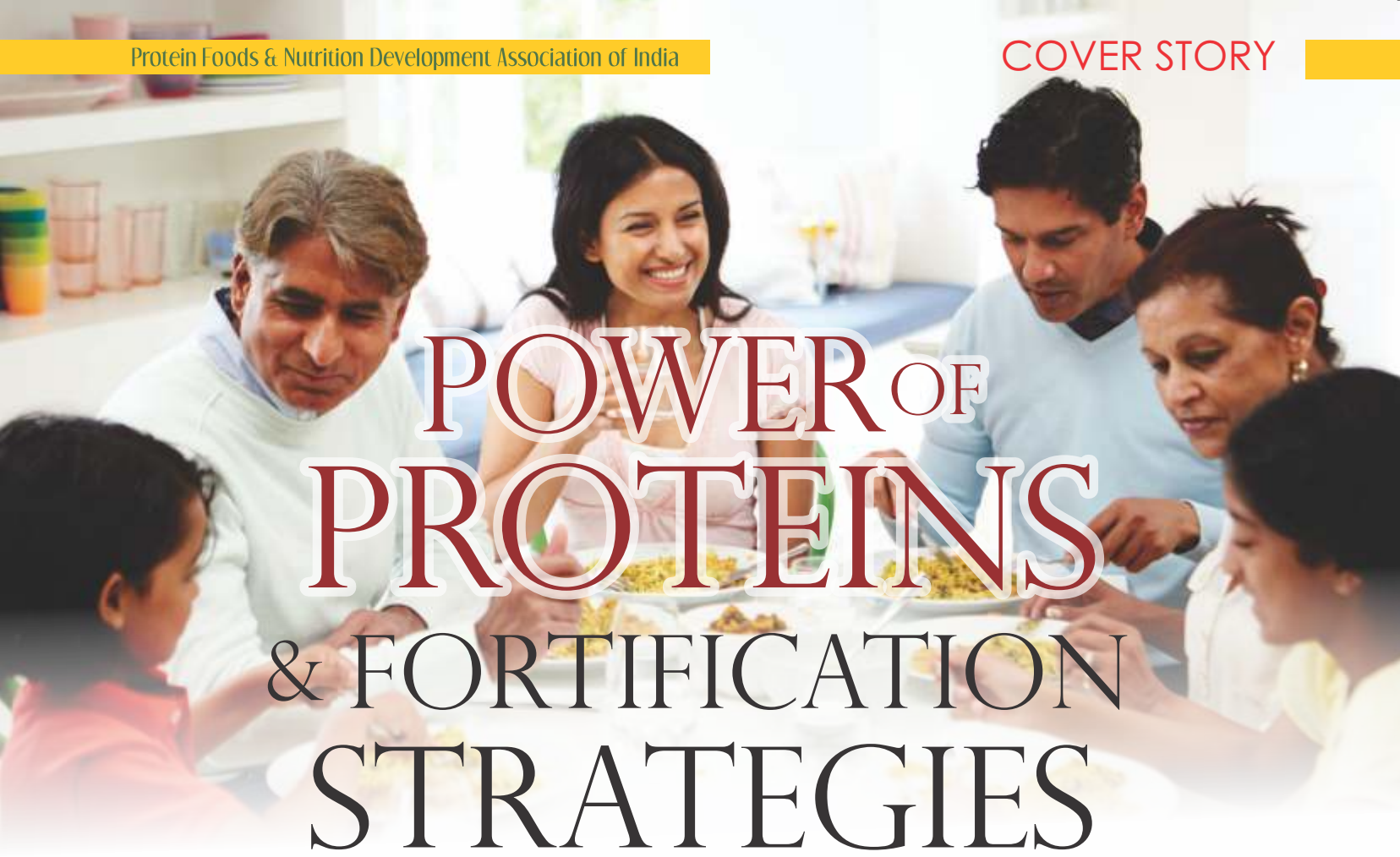
Our Food Law does not allow any food or supplement to have nutrients over one RDA. Industry has been requesting for allowing higher levels as some of these nutrients degrade during storage and overages need to be added. Also some individuals have higher requirements than RDAs prescribed and some deficient individuals need more to come to normal healthy levels in body.

Although food laws could be amended but it also needs corroboration from drug laws as it states that any food product or supplement containing levels of nutrients higher than one RDA are considered drugs. They consider them drugs are these nutrient supplements cure the deficiency diseases like scurvy or beriberi. There may be no difference in physiological action of these nutrients at lower levels within RDA and at higher than RDA levels but just because these cure diseases they are called drugs. However, when there is no clinical deficiency, it still requires higher than RDA levels which do not cure diseases. This anomaly may need to be addressed so we could have foods and supplements with more than one RDA.

We need to also take precautions because that are upper safety limits for all nutrients some very high and others not so high. Niacin for example can go into unsafe region if taken over 2 or 3 RDAs. Also the fat soluble vitamins tend to accumulate in body and reach unsafe levels over a period. Thus care is needed in recommending the dietary levels of nutrients. However, considering the need for higher than RDA levels in some foods and supplements and also considering that many nutrients have upper safe levels quite high, there should be no difficulty in allowing these nutrients at higher than RDA levels and retaining them in food categories.

There is a need to say that some nutrients have been recognized essential more recently which were considered contaminants or unsafe metals such as Zinc, Copper and Selenium. This needs to be taken account of and necessary changes made in the regulations.
Health Science is moving at a rapid pace and our regulations not only must keep pace with current science but also with international practices.
With season's greetings,

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



POWER OF PROTEINS & FORTIFICATION STRATEGIES

Protein has been acknowledged as a very healthy component of foods by not only health professionals but also the consumers who are now aware of needs for protein by body to remain healthy and for children for their growth.

Consumers have also been associating proteins with improved satiety, sustained energy and improved muscle development. The global protein market is anticipated to reach $ 24.5 billion in 2015 and to nearly 5.5 million metric tons of protein ingredients worth $ 31 billion in 2018.

Formulators have many plant and animal based proteins to choose from for fortifying foods and beverages. Currently plant-based proteins like pea and rice proteins are driving the growth. Globally "high in protein" is a health attribute considered important while buying food by a large proportion of consumers globally and many are willing to pay more for products high in protein.

As consumer awareness is increasing, market for protein-fortified products is widening. There is greater focus on sports nutrition and weight management. Protein-enhanced beverages are seeing rapid growth is because they provide boost to nutrition along with "on-the-go" convenience that busy consumers want. As protein demands continue to increase, protein ingredient options also rise but all proteins are not alike and protein quality and nutrition must be considered for successful product development.

Functional foods must satisfy demands of convenience and taste beyond nutrition and health benefits. Protein is a critical nutrient in functional foods and consumers are increasingly seeking convenient formats like bars and beverages. Consumers choose products high in protein because they see them as "good for you". Protein enhancement adds value to many foods such as drinks, dairy products and bars, both in terms of nutritional value and formulation.

Protein has many health functions – it supports bone and joint health, helps in muscle recovery and development of lean muscle, increases satiety more than carbohydrates and fat and soy protein has been shown to reduce LDL or bad cholesterol to improve heart health. Consumers also relate proteins with weight management and sports nutrition.

Food product designers have a large number of protein ingredients from animal and plant to choose from. Animal sources include dairy proteins like whey, casein and milk protein concentrate, and eggs particularly white. Plant protein ingredients include soy, pea, rice, canola, flaxseed, chia and wheat-based proteins.

Improvements in technology and ingredient innovation adding interest in sustainability and cost effectiveness, plant protein ingredients have become more popular. Currently, soy remains the dominant plant-derived protein source. Soy protein is a complete protein providing all essential amino acids adequately. In addition these ingredients have no cholesterol, are low in saturates, and can reduce levels of LDL and triglycerides. They also tend to be economical and don't have price volatility of dairy proteins.

Soy protein in popular in beverages and bars, and provides benefits in processed meats, poultry and seafood, along with meat alternatives. It provides meat-like texture, delivers water holding capacity for improved yield and juiciness. Recently there has been expansion of soy into other applications like cereal, snacks and baked goods.

Pea protein ingredients are growing in market. Although not a complete protein, pea protein offers amino-acid profile rich in lysine, arginine and branched-chain amino acids (BCAAs) isoleucine, leucine and valine. It is used in many products including baked goods, cereal bars, desserts, soups, powdered drinks and soy-milk alternatives.

Other plant derived proteins, such as rice protein, have shown efficacy in sports nutrition in helping muscle recovery and repair. A recent study compared benefits of rice protein with whey protein isolate immediately after training. Participants were measured for muscle thickness, body composition, bench press and leg press strength. Rice protein consumed after resistance exercise decreased fat-mass and increased lean body mass, skeletal muscle hypertrophy, power and strength compared to whey protein.

Protein Considerations

Quality is important when choosing protein ingredients for nutritional applications. Protein quality is measured by PDCAAS (Protein Digestibility Corrected Amino Acid Score) combining amino acid composition with their bioavailability. It ranges from 0 to 1 with 1 meaning the best quality. A high quality protein (with score 1) is readily digestible and contains the dietary essential amino acids in quantities needed by humans. Soy protein, whey protein isolate, casein and milk protein isolate all represent a PDCAAS of 1. However, as per DIAAS (Digestible Indispensable Amino Acid Score) method adopted by FAO, whey protein isolate scores 1.25 and milk protein concentrate scores 1.31.

DIAAS method measures digestibility of individual essential amino acids at ileum (end of small intestine) in pig model while PDCAAS measures faecal crude protein digestibility using rat model. Some consider DIAAS method more valid as it more accurately reflects ability of body to utilise essential amino acids.

Plant derived protein ingredients like isolates, concentrates and hydrolysates digest more quickly than vegetable protein from whole-food sources. There are some enzymes present in plant proteins e.g. trypsinase in soybeans that may interfere with protein digestion by inactivating trypsin, the major protein digesting enzyme in intestine and must be heat inactivated prior to consumption.

Taste, cost and functionality of protein ingredients are also important to consider. Proteins offer a range of functional benefits including extended shelf life, an alternative egg-replacement system, and flavour and texture profile management. Protein ingredients are available that could be incorporated into syrup system instead of sugar, which not only reduces sugar content, but also helps maintain shelf life of bars by keeping bars soft and chewy for longer periods.

Protein's Role in Sports Nutrition

Protein helps in muscle recovery and growth, supports healthy bones and joints and helps immune function among other benefits. Dairy proteins due to their complete protein profile and superior digestibility, are optimum choices for sports nutrition. Whey proteins are soluble in stomach and empty quickly, leading to a rapid, high and transient spike of amino acids into blood. This is associated with increase in postprandial muscle-protein synthesis.

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Novel and Traditional Foods:

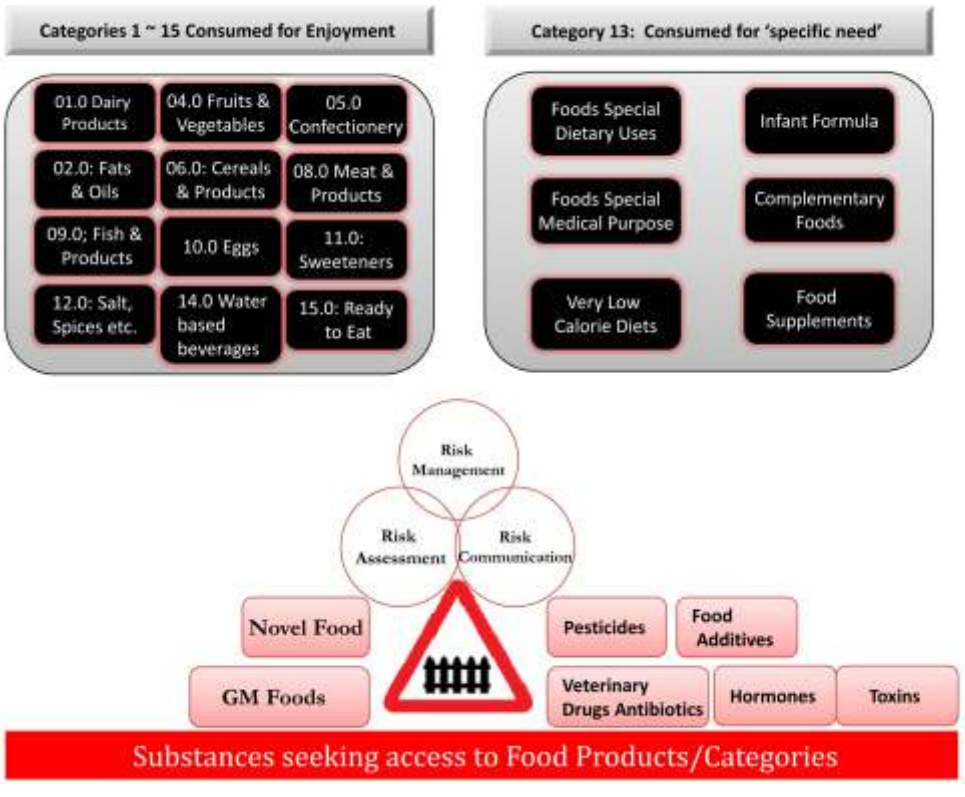
CONSEQUENCES OF IMPRECISION

By **Dr Joseph I Lewis,**
Consultant,
Food Safety and Standards Authority of India (FSSAI)

It may be argued that the word traditional could be used interchangeably with ethnic or regional and mean the same thing – the issue here is not of debate or opinion, but of regulatory precision. The term 'traditional' defined in a regulatory context is not to be carelessly used or casually formed or arises from personal feelings. If the term is currently used to describe 'ethnic' preparations or 'cuisines' (e.g. samosa, bhujia, idli), then the usage must be discouraged comprehensively and closed with regulatory finality. Regulatory texts are not compendiums of arranged prejudices and opinions but of contextual actions in the food control space. More than ever stakeholders must now show perspicacity of understanding if the prevailing uncertainty regarding product approval is to end. The stakes are clear – are stakeholders?

Since early 1970's food technology has made rapid advances with new foods, ingredients and processes being discovered or developed in response to food shortages, consumer benefits or sheer variety. Furthermore, globalization has fuelled trade for these 'new food sources' previously unavailable to Indian consumers and unconsumed by them. In regulatory terms these new food sources are referred to as 'Novel Foods'. While most countries, including India for several decades had safety controls in place for food additives, contaminants, toxins, pesticide residues, etc., new foods, ingredients and processes (novel) had yet to be exclusively formalized. Sections 19 to 23 expressly deal with regulatory controls for additions of substances to foods through well-defined safety gates **(Fig.1)**.

Fig. 1 Illustration of Novel Foods & Food Categories



Section 22 is no exception to the same kind of safety controls that rule sections 19-23. Why novel foods require premarket risk assessment is primarily dependent on its definition.
The bedrock upon which any regulation stands firm are the definitions included at the beginning of regulatory chapters. Everything thereafter is read in context with these definitions. When definitions are incoherent and lack precision the foundation of the regulation crumbles and babel of interpretations ensue. Agreement on definitions is fundamental to proceed further and unless the bounding of meaning of terms, definitions and provisions is settled, the wandering for meaning will continue - as is the present scenario – leading to confusion, uncertainty and untenable action.

Distinction between Foods, Food Categories and Provisions:

Novel foods and proprietary foods are not categories of foods (italics for emphasis). This is amply clear from international resolutions (Codex Food Category System) adopted by India. Unlike food supplements (FS), foods for special dietary uses (FSDU) or foods for special medical purposes (FSMP) which are food categories, novel foods and food ingredients do not share the same end purpose use as FSDU or FSMP, nor similar traits of format (pre-dosed forms) of foods supplements (FS). A reading of the Food Codex Category in the General Standard of Food Additives (GSFA) as well as the 'codex-harmonized draft' on Food Additives 2015, establish this distinction. In either text there is no mention of novel or proprietary foods– nor are food additives specifically allocated to them.

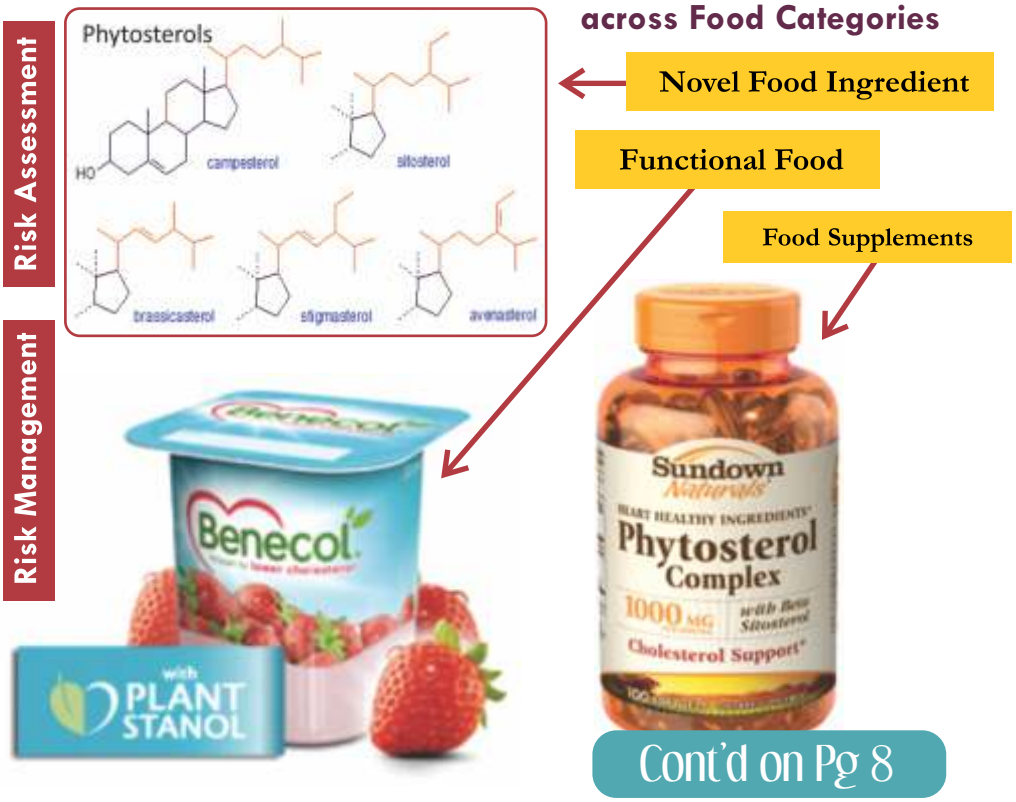
The illustration in **(Fig.1)** shows the relationship of a novel food – a substance (in this case a food or ingredient) - seeking entry into food products belonging to any of the 14 food categories elaborated by Codex. For further clarity and understanding an example is given in **Fig.3** where phytosterols, a novel food ingredient is first granted pre market approval and thereafter permitted in two food categories. Regulatory control is explicit at two levels.

The fact that both novel foods and proprietary foods are not food categories as stated above – what are they and what distinguishes one from the other.

Both novel foods and proprietary foods are provisions in law; in case of the former the provision is for safety assessment (pre-market and in case of the latter a provision for free access (no premarket approval) to the market provided it complies with the appropriate standards of safety governing all foods whether standardized or not. While novel foods are subject to a safety assessment – proprietary foods are not as they use only traditional foods and ingredients whose safety has been established. This is the critical distinction between novel and proprietary foods. However while novel foods are subject to a safety assessment – proprietary foods are not as they use only traditional foods and ingredients whose safety has been established for decades. This is the critical distinction between novel and proprietary foods.

Having settled relationships between food products, food categories and regulatory provisions, we must now be clear about the novelty (of a new kind; different from anything seen or known before) that a food presents. Before that – the terms traditional and non-traditional needs settlement.

Fig. 2: Novel Foods may travel across Food Categories



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When tested at rest and post-exercise in young men, muscle protein synthesis at rest after whey consumption was 18% more than soy and 93% more than casein.

Casein being slower digesting continues to release amino acids into blood hours after digestion resulting in prolonged muscle-protein synthesis, inhibition of whole-body protein breakdown and overall better utilisation of dietary protein.

Whey protein is also one of the best sources of BCAAs which are almost exclusively taken up and used by muscle. Whey protein has one of the highest levels of leucine that influences muscle growth.

While dairy proteins have been accepted in sports nutrition, new research shows a combination of soy, casein and whey protein may prolong delivery of select amino acids to muscle longer than whey alone which could prolong muscle building.

Bars, protein shakes and beverages have been popular forms of protein foods. 2014 IFIC survey found 51% specifically ate bars as a source of protein while 38% protein beverages and shakes. There is a continued growth in sports nutrition products with high quality proteins, popular being ready-to-drink (RTD) beverages, powder mixes and bards. New products like high-protein yogurts and snacks intended for recovery are being introduced.

Plant derived proteins alone or with dairy proteins, are gaining momentum in sports nutrition with use of flaxseeds, chia and ancient grains for bars and ready-to-mix applications. Formulations with fibre, omega-3 fatty acids and antioxidants are available for added benefits.

Satiety, Weight Management

A lot of people are trying to lose weight or maintain their current weight and protein can be useful in this. It increases satiety, improves body composition and also helps reduce the calorie intake after consumption. Its usefulness for weight management and satiety is recognised by consumers who used it.

Protein as well as fibre can help slow digestion and provide energy over a longer period of time helping in reducing overall caloric intake and weight management. Institute of Medicine (IOM) recommends adults a minimum of 0.8g protein per kg body weight per day to prevent breakdown of their own tissues.

A recent study examined effect of consuming soy protein on calorie intake. Participants consumed 20g soy protein in a bar format, tended to decrease subsequent energy intake by about 43 calories compared to those who consumed bar lacking protein.

Whey protein also provides benefits related to body composition. A recent meta-analysis showed participants who used whey protein to replace calorie for weight loss not only experienced greater weight loss but had increased lean body mass compared to those who did not consume whey protein.

Common applications for protein fortification include bars, RTD beverages, meal replacement options including RTD beverages, dry mixes, protein bars and extruded/sheeted snacks. Plant based protein ingredients can improve nutrition in snacks, cereals, cookies, bars, tortillas and baked goods. Fruit and vegetable based drinks are increasing in demands by consumers wanting products that provide nutrients to keep up with their active lifestyles. Proteins are developed that could be easily incorporated into these fast growing segments.

As consumers realise the importance of protein in the diet especially in weight management and sports nutrition, protein are likely to continue to being an essential ingredients in functional foods and beverages.

Protein Fortification Strategies

Formulators have many things to consider when developing and marketing protein-enriched beverages. Many protein options are available to cover many needs of the consumers. Technology is continuing to develop to make protein ingredients suitable for these applications as formulation process becomes more refined.

Challenges in Formulation

While developing protein ingredient for a particular application, all aspects of products including

formulation, production, storage and distribution must be kept in mind. Some main parameters focus on flavour, appearance and stability.

For formulating protein-enriched beverage, first it must be decided what type of protein to be used. Choosing the right type of protein for the end product is important and will include source and type as different proteins perform differently depending on beverage category. Each protein has pluses and minuses.

Milk has a high amino acid score though allergens may be restriction. Soy has high amino acid score but flavour characteristics may be a challenge developing certain flavours with them. Rice and pea proteins are free of major allergens but earthy notes and texture can be a challenge. Stability is also a key consideration for RTD protein-enriched beverage and impacts product's shelf life.

Hydrocolloid solutions are formulated to address stability and ingredient suspension concerns. They also contribute to beverage texture, affecting viscosity, mouth coating and mouth clearing. Viscosity affects texture and mouthfeel but also keeps insoluble protein suspended. Viscosity can be achieved with gums, starches or gums/starch blends depending on the desired properties of final product.

Base of the protein, fat or water-based, is important consideration as these behave differently. Beverages with large amounts of fat use emulsifier to prevent separation. With water based beverages, formulators consider protein stability in terms of product pH. Proteins like casein are not soluble in acidic conditions while whey and soy proteins are soluble in low pH environment and can even appear clear over a specific ph range.

Shelf life is another concern for formulators. With a longer shelf life it is critical that beverage maintains acceptability over entire time span. Over time, viscosity can change, ingredients can settle and other issues may arise. To minimise the impact on shelf life and stability, it is important to understand potential ingredient interactions and identify potential instabilities during the development process.

When developing beverages containing blends of different types of proteins, effective stabilisation can be difficult, but achievable by choosing right hydrocolloids and emulsifiers along with optimised batching procedures and processes.

Consumers are turned off by flavour and colour issues so protein-enriched beverages must be aesthetically pleasing. Protein fortification also affects look and feel of the product. Care must be taken not to denature the protein and not incorporate air into the product which may cause undesirable cloudiness and viscosity. There are no rules about which flavours work well with a given protein, but some complementary flavours are desirable. Rice and pea proteins have earthy notes, so flavour with earthy aspects like nut flavours will work better. Flavours are masked by proteins so additional amounts may be necessary for protein-enriched products.

Condensed from articles in **Survival Guide: Protein** *from* **Food Product Design** February 2015

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Traditional Foods & Ingredients: What is?

Prior to the emergence of the term 'novel foods', food products for decades were being prepared using 'traditional' foods and ingredients – many of them being referred to as commodity foods (e.g. food grains, meat, milk, vegetables, oils, spices, salt, sugar etc.), because of their trading volumes. Their long history of safe use as foods across countries absorbed them into people's perception as traditional foods and ingredients.

Examples of traditional foods (also used as ingredients in compound foods) are food grains, milk, egg, fish, meat, etc., and oil, sugar, salt, vinegar, spices, etc. Food products (compound foods) such as biscuits, chocolates, sweets or savories are made from recipes combining several foods (used as ingredients). There is no safety issue here with all the permutation and combinations consumed over decades and generations.

Many of these traditional foods entered local cuisines in different countries, and obtained local descriptions. Unleavened bread is perhaps the oldest of foods made from traditional ingredients – milled flour, salt and water – and called by different names, roti (India) or pita (Greece), tortilla (Mexico), naan (Persian). It may be argued that the word traditional

could be used interchangeably with ethnic or regional and mean the same thing – the issue here is not of debate or opinion but of regulatory precision.

The term 'traditional' defined in a regulatory context is not to be carelessly used or casually formed or arising from personal feelings. If the term is currently used to describe 'ethnic' preparations or 'cuisines' (e.g. samosa, bhujia, gulab jamun), then the usage should be discouraged comprehensively and closed with finality. Regulatory texts are not compendiums of arranged prejudices and opinions but of contextual action in the food control space. More than ever stakeholders must now show perspicacity of understanding if the prevailing chaos regarding product approval is to end. The stakes are clear – are stakeholders?

Before entering the domain of novel foods, the definition of traditional foods must be settled. Traditional foods are the exact opposite of novel foods. The term traditional food in a global regulatory context refers to a 'time related' and "the nature of use of the material"; in this case material consumed as food. The concept of tradition is linked inextricably to food safety (informal risk assessment) that has happened with the passing of time (history of use). People now regard them as safe, even where there may be the presence of a harmful substance e.g. solanine in potatoes or anti nutritional factors in soybeans. Safety is derived from the 'tradition of usage' as food and in the manner prepared.

Non-Traditional Food: a step before Novel

Before passing into the novel food domain – a traditional food may have be used in a 'non traditional' manner. What are these?
A food consumed to a " significant degree" (widely in one population) may not have acquired the same status - though eaten sporadically or by insular groups – within another indigenous population. A suggested period of consumption (10 years locally or 25 if elsewhere) is indicated. The period of consumption is not meant to be an automatic cut off point but guidance to be applied along with other considerations such as 'equivalence', composition, nutrient profile and absence of known harm when compared with similar foods being eaten. The twin considerations of 'significant degree' of consumption and 'equivalence' are key points in a pre-assessment safety filter prior to determining whether the food is novel or not. A decision tree is a good guidance tool for food

businesses and regulators to help make consistent decisions and approval distinctions. The latter comprises of two regulatory outputs; notification (a simple online registration procedure) or authorization (a premarket safety assessment approval). **(Fig.2)**

Non-traditional foods follow the former (notifications). Foods such as ackee fruit, chia seeds, noni, aloe vera juice, and amaranth seeds would be evaluated under a non-traditional use process.

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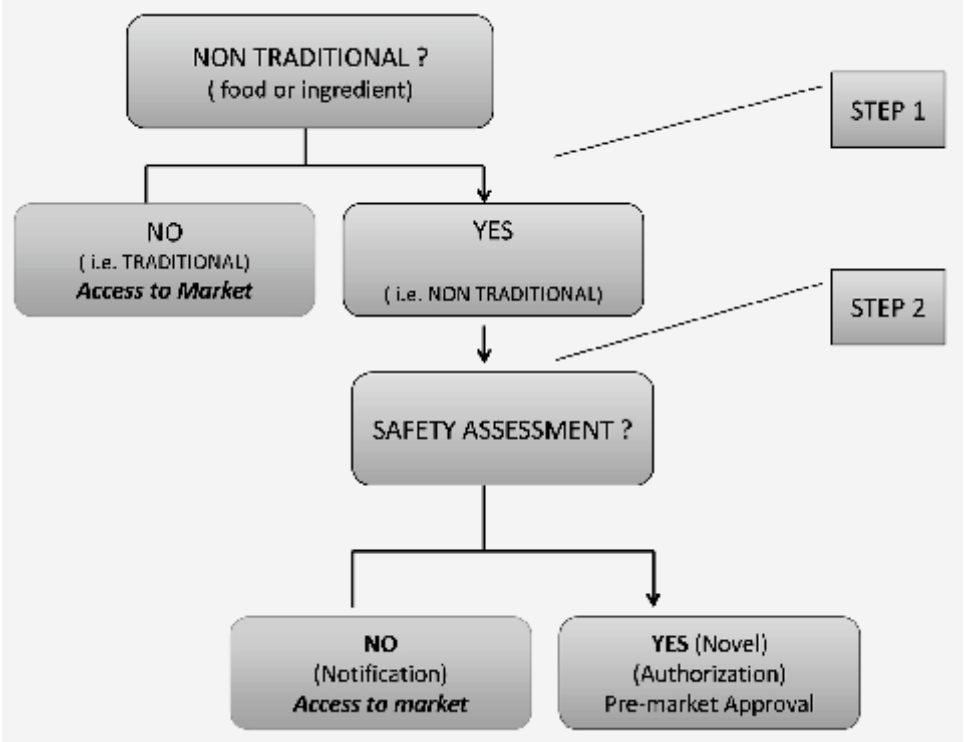
Fig 3: STEPWISE GUIDANCE: Is Premarket Approval Required?



Research in Health & Nutrition

Protein Snacks Reduce Teen's Appetites

May 27, 2015 Food Product Design

Protein is slated as one of the top 10 functional food trends to impact the food and beverage industry in 2015, according to the Institute of Food Technologist (IFT).

Protein is even making its way into breakfast cereals—both hot and cold. Protein boosts satiety, it's clean-label friendly—from sports drinks to snack bars—and, according to a new study published in The Journal of Nutrition, high-protein soy-based afternoon snacks improve appetite, satiety and diet quality in adolescents, while beneficially influencing aspects of mood and cognition (May 20, 2015).

During the study, 31 healthy adolescents randomly ate the following afternoon snacks for three days: a high-protein snack (26 g of protein/6 g of fat per 27 g of carbohydrates), a high-fate snack (4 g of protein/12 g of fat per 32 g of carbohydrates) and no snack.

What the researchers found is high-protein, but not high-fat, delayed eating initiation versus no snack, and both snacks reduced appetite versus no snack with high-protein eliciting greater reductions than high-fay. Only high-fat led to reductions in corticolimbic activation in brain regions controlling food motivation/reward versus no snack. Although no treatment differences in daily energy intake were detected, high-protein led to greater protein consumption than no snack, and greater protein and lower fat consumption than high-fat. High protein led to fewer high-fat/high-sugar evening snacks than no snack and high-fat. Although no treatment effects were detected for mood and cognition, high-protein tended to reduce confusion-bewilderment and increase cognitive flexibility, whereas no snack reduced tension-anxiety and vigor-activity.

High fibre intake may lower type 2 diabetes risk

IFT Weekly June 3, 2015

The researchers examined data on 29,238 Europeans tracked for an average of 11 years.

Those with the highest amount of fiber in their diet (more than 26 g a day) were 18% less likely to develop type 2 diabetes than those with the lowest fiber intake (less than 19 g a day), even after accounting for other dietary and lifestyle factors. However, the benefits of a high fiber diet disappeared for participants' whose body mass index put them in the obese category.

When the researchers focused on specific types of fiber, they found that people who consumed the highest amounts of cereal and vegetable fiber were 19% and 16%, respectively, less likely to develop type 2 diabetes than those who consumed the lowest amounts of these types of fiber. Cereals accounted for 38% of total fiber intake in the study, and were the main source of fiber in all countries except France, where vegetables were the main source of fiber. Consumption of fruit fiber was not associated with a lower risk of diabetes.

The researchers also analyzed the findings of 18 other studies from the United States, Europe, Australia, and Asia. That analysis also found a lowering of type 2 diabetes risk as daily intake of fiber increased.

Animal study: L–alanylglutamine may reduce muscle protein breakdown after exercise

IFT Weekly June 3, 2015

A study published in Amino Acids shows taking L-alanyl-L-glutamine (Sustamine) may inhibit signaling proteins that activate protein degradation, which helps to maximize muscle protein build-up after resistance exercise.

The study included 89 male Sprague-Dawley rats 2–3 months of age who performed resistance exercise. Immediately post exercise, the rats were given either whey protein (0.4 g/kg), low-dose Sustamine (0.1 g/kg), high-dose Sustamine (0.5 g/kg) or placebo, in

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random order. Sixteen rats were used as sedentary controls.

The primary findings were that "Sustamine altered, immediately post exercise the phosphorylation state of signaling proteins in a manner that theoretically should reduce muscle protein breakdown, while whey protein accelerated the phosphorylation of proteins in the mTOR-dependent signaling pathway thereby theoretically activating muscle protein synthesis."

Sustamine is a dipeptide of glutamine that the manufacturer—Kyowa Hakko U.S.A.—claims to enhance recovery, immune system support, and increase metabolic rate.

Diabetes medication may alter how the brain responds to food

From IFT Weekly
June 17, 2015

A study presented at the American Diabetes Association's 75th Scientific Sessions shows that gut hormone-based medications used to treat diabetes, such as GLP-1 receptor agonists, may alter the brain's response to food, possibly reducing cravings and increasing satisfaction while eating.

Previous studies have shown that the brains of obese people have a greater response to pictures of food than those of lean people, and a reduced reward response during the consumption of food, which may lead to overeating. Researchers in Amsterdam tested the hypothesis that the GLP-1 receptor agonist exenatide—a medication which mimics the effects of natural GLP-1 by binding to the GLP-1 receptor—was helping patients with type 2 diabetes lose weight by altering the brain's response to food consumption and decreasing appetite.

"When you eat, there are several hormones released. GLP-1 is one of them," said Liselotte van Bloemendaal, a PhD student at the Diabetes Center, VU University Medical Center in Amsterdam. These hormones relay information to the central nervous system about nutritional status to regulate appetite. Using functional MRIs, which measure brain activity by detecting changes in blood flow, the researchers looked at the reward centers in the brains of obese individuals with and without type 2 diabetes and measured the response to the anticipation of and drinking of chocolate milk while being given GLP-1 receptor agonist intravenously versus placebo. They found that GLP-1 receptor activation decreased anticipatory food reward, which may reduce cravings, and increased the feeling of food reward during consumption, which may reduce overeating.

According to Bloemendaal, further investigation is needed to study whether adding a second hormone—such as glucagon—to GLP-1 receptor agonist treatment could further increase weight loss. The U.S. Food and Drug Administration recently approved the first GLP-1 agonist for the treatment of obesity in the United States.

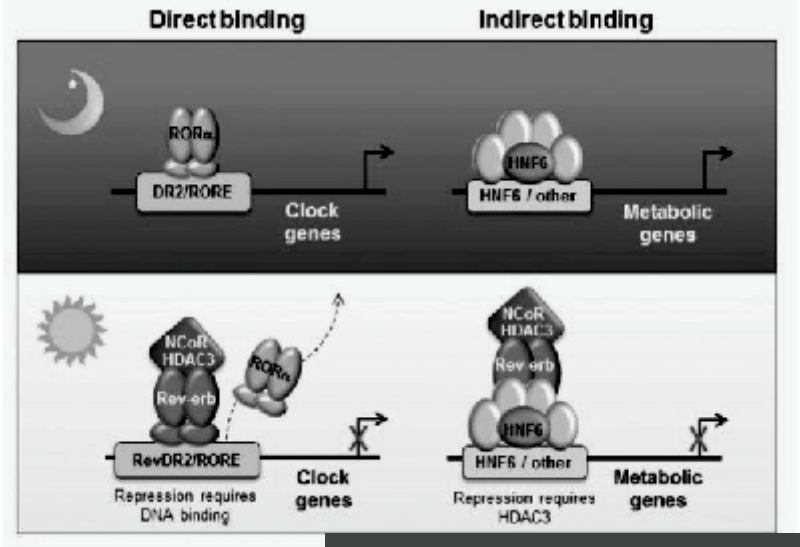
Protein maintains double duty as key cog in body clock and metabolic control

June 4, 2015 Science Daily

Rev-erbα is a transcription factor that regulates a cell's internal clock and a new study describes how it regulates the clock in most cells in the body and metabolic genes in the liver in distinct ways.

Around-the-clock rhythms guide nearly all physiological processes in animals and plants. Each cell in the body contains special proteins that act on one another in interlocking feedback loops to generate near-24 hour oscillations called circadian rhythms. These dictate behaviours controlled by the brain, such as sleeping and eating, as well as metabolic, hormonal, and other rhythms that are intrinsic to the organs of the body. For example, when you eat may have affects on rhythms controlling fat or sugar metabolism, illustrating how circadian and metabolic physiology are intricately intertwined.

Rev-erbα is a transcription factor (TF) that regulates a cell's internal clock and metabolic genes and has



been the focus of the lab of Mitchell Lazar, MD, PhD, director of the Institute for Diabetes, Obesity, and Metabolism at the Perelman School of Medicine at the University of Pennsylvania, for more than two decades. Now, in a new study published online ahead of print in Science Express, the Lazar team describes how Rev-erb α regulates the clock in most cells in the body and metabolic genes in the liver, the body's key organ for metabolism of fat as well as sugar. "The exciting new finding is that, rather than use the same mechanism for regulating both the liver's clock and metabolic function, Rev-erb α does these jobs in distinct ways," Lazar explains.

Knowing the exact molecular players and the differences in these two important and related roles for Rev-erb α is helping scientists better understand and develop drugs for such disorders as diabetes, metabolic disorders in shift workers, and potentially even others.

"We showed that Rev-erb α modulates the clock and metabolism using different mechanisms of interacting with a cell's genome," notes Lazar of Rev-erb α's double duty. "On one hand, clock control requires Rev-erb α to bind directly to the genome, where it competes with other transcription factors, for repression of clock genes during the day."

On the other, Rev-erb α regulates metabolic genes in the liver at places in the genome where it is instructed to bind by other liver-specific factors. This indirect type of control by Rev-erb α is unique to the liver, yet is coupled to the clock since levels of Rev-erb α itself are circadian, meaning that it's only expressed at high levels in the liver at certain times of day.

The metabolic effects of Rev-erb α include a major role in the regulation of liver fat. Fatty liver has become a huge societal problem, and if untreated, can lead to liver inflammation (hepatitis) and life-threatening liver failure (cirrhosis). Fatty liver is highly related to obesity and diabetes, which are also major public health threats in the US and throughout the world.

could be a drug target for fatty liver if it was also involved in the maintaining the body's clock that controls sleep." "It is critical to find new ways to prevent or reverse the accumulation of fat in the liver," Lazar says. "Previously it was difficult to imagine how Rev-erb

The Penn team's new findings show that the role of Rev-erb α in self-sustained control of the molecular clock across all tissues is different from that in the liver. "These two distinct modes of action may give Rev-erb α the ability to stabilize the circadian oscillations of clock genes, while coupling liver metabolism to daily environmental and metabolic changes," Lazar says. The coupling may occur through metabolites such as heme, the body's oxygen-carrying molecule, and other proteins, including an enzyme called histone deacetylase (HDAC), which are more critical for Rev-erb α's metabolic function than its role in the clock.

"This raises the possibility that drugs that specifically affect Rev-erb α's interaction with metabolites or the HDAC enzyme, without disrupting the clock throughout the body could modulate liver metabolism while minimizing effects on the overall integrity of the circadian clock," he says. HDAC inhibitors are already in the clinic for certain forms of cancer. The researchers' hope is that this next chapter in Rev-erb α research can provide a new and more specific way to combat the growing epidemic of metabolic disease, especially fatty liver.

Top salads with eggs to better absorb vegetables' carotenoids

June 5, 2015 Science Daily

Adding eggs to a salad with a variety of raw vegetables is an effective method to improve the absorption of carotenoids, which are fat-soluble nutrients that help reduce inflammation and oxidative stress, according to research.

"Eating a salad with a variety of colourful vegetables provides several unique types of carotenoids, including beta-carotene, lutein, zeaxanthin and lycopene," said Wayne Campbell, a professor of nutrition science. "The lipid contained in whole eggs enhances the absorption of all these carotenoids."

This research is published online in the American Journal of Clinical Nutritionand is funded by the American Egg Board-Egg Nutrition Center, National Institutes of Health and Purdue Ingestive Behavior Research Center.
"Most people do not eat enough vegetables in their diets, and at the same time, people are consuming salad dressings that have less fat or are fat-free," said Jung Eun Kim, a postdoctoral researcher in Purdue's Department of Nutrition Science. "Our research findings support that people obtained more of the health-promoting carotenoids from raw

vegetables when cooked whole eggs were also consumed. Eggs, a nutrient-rich food containing essential amino acids, unsaturated fatty acids and B vitamins, may be used to increase the nutritive value of vegetables, which are under consumed by the majority of people living in the United States."

In the study, 16 participants consumed a raw mixed-vegetable salad with no eggs, a salad with one and a half eggs, and a salad with three eggs at different times. All salads were served with three grams of canola oil. The second salad had 75 grams of scrambled whole eggs and the third 150 grams of scrambled whole eggs. The absorption of carotenoids was 3.8-fold higher when the salad included three eggs compared to no eggs.

The study used scrambled eggs to make sure the participants consumed both the yolk and egg whites.
"While other egg forms were not tested, we believe the results would be comparable as long as the egg yolk is consumed," said Campbell, whose research also has looked at salads with different amounts of soybean oil, canola oil and butter. "The lipids in salad dressings also increase the absorption of carotenoids but it is easy to overuse salad dressings and consume excess calories.
Many salad dressings contain about 140-160 calories per serving, about two tablespoons. One large whole egg is about 70 calories and provides 6 grams of protein. People are at a greater risk of putting too many calories on a salad because they don't always know proper portion sizes for salad dressings, but you do know the portion size of an egg."

Tiny particles, big impact? Researchers investigating how ingesting nanoparticles may influence health

June 8, 2015 Science Daily

Anthony Fiumera, associate professor of biological sciences, and Gretchen Mahler, assistant professor of biomedical engineering, are collaborating on a research project funded by a Binghamton University Transdisciplinary Areas of Excellence (TAE) grant to discover the role ingested nanoparticles play in the physiology and function of the gut and gut microbiome.

The gut microbiome is the population of microbes living within the human intestine, consisting of tens of trillions of microorganisms (including at least 1,000 different species of known bacteria). Nanoparticles, which are often added to processed foods to enhance texture and color, have been linked to changes in gut function. As processed foods become more common elements of our diet, there has been a significant increase in concentrations of these particles found in the human body.

Fiumera works in vivo with fruit flies while Mahler works in vitro using a 3-D cell-culture model of the gastrointestinal (GI) tract to understand how ingesting nanoparticles influences glucose processing and the gut microbiome. By using complementary research methods, the researchers have helped advance each other's understanding of nanoparticles. Using fruit flies, Fiumera looks at the effects of nanoparticles on development, physiology and biochemical composition, as well as the microbial community in the GI tract of the fly. The fly model offers two advantages: 1) research can be done on a wide range of traits that might be altered by changes in metabolism and 2) the metabolic processes within the fly are similar to those in humans. Fiumera also aims to investigate which genes are associated with responses to the nanoparticles, which ultimately may help us understand why individuals react differently to nanoparticles.

For this project, Mahler expanded her GI tract model to include a commensal intestinal bacterial species and used the model to determine a more detailed mechanism of the role of nanoparticle exposure on gut bacteria and intestinal function. Early results have shown that nanoparticle ingestion alters glucose absorption, and that the presence of beneficial gut bacteria eliminates these effects.

Mahler was already investigating nanoparticles when she reached out to Fiumera and proposed they combine their respective expertise. With the help of undergraduate students Gabriella Shull and John Fountain and graduate student Jonathan Richter, Fiumera and Mahler have begun to uncover some effects of ingesting nanoparticles. Since they are using realistic, low concentrations of nanoparticles, the effects are slight, but eventually may be additive.

Milk proteins may protect against cardiovascular disease

June 11, 2015 Science Daily

Researchers at the R&D Center, Seoul Dairy Cooperative, the College of Life Science & Biotechnology, Korea University, and the BK21 Plus Graduate Program, Department of Animal Science and Institute Agricultural Science & Technology, Chonbuk National University in South Korea, have determined that

dietary compounds formed in milk-based products lowered serum total and low-density lipoprotein (LDL) cholesterol levels and triglycerides in mice.

These compounds also protected against acute pulmonary thromboembolism as well as aspirin, but without the possible bleeding consequences often observed in aspirin therapy.

Whey protein concentrate and sodium caseinate were heated with lactose to form whey-protein Maillard reaction products (wMRP). Lactic acid bacteria were then used to produce fermented MRPs (f-MRP). Sodium caseinate alone was also reacted to form Maillard-reacted sodium caseinate (cMRP) and further fermented to f-cMRP.

To determine antithrombotic effects, 60 mice were divided into four treatment groups of 15. Group 1 received phosphate buffered saline (PBS) (negative control), group 2 received aspirin (positive control), group 3 received wMRP, and group 4 received f-MRP in addition to a normal diet. Assessment of antioxidant activity and cholesterol reduction effect of fermented cMRP was done with another group of 60 mice fed various diets with and without f-cMRP.

"This is the first report describing the verification for the impacts of MRPs and their fermented product in cardiovascular risk using animal model," explained lead investigator Younghoon Kim, PhD, of the Department of Animal Science, Chonbuk National University, Republic of Korea, "In addition, our findings represent a real advance in the area of milk proteins and indicate that f-cMRP and cMRP could be recommended for use as potential antioxidants and cardioprotective ingredients for various functional, pharmaceutical, and dairy applications."

Matt Lucy, PhD, Editor-in-Chief, Journal of Dairy Science, and Professor of Animal Science, University of Missouri, added, "We are beginning to understand that dairy products provide benefits to human health beyond the traditional nutrients. This study performed in laboratory animals demonstrates the potential for milk proteins found in naturally fermented foods to improve human cardiovascular health."

Chocolate for your heart

June 15, 2015 Science Daily

Eating 100 g of chocolate daily linked to lowered heart disease and stroke risk

There doesn't seem to be any evidence for cutting out chocolate to lower the risk of cardiovascular disease, conclude the researchers.

They base their findings on almost 21,000 adults taking part in the EPIC-Norfolk study, which is tracking the impact of diet on the long term health of 25,000 men and women in Norfolk, England, using food frequency and lifestyle questionnaires.
The researchers also carried out a systematic review of the available international published evidence on the links between chocolate and cardiovascular disease, involving almost 158,000 people--including the EPIC study participants.

The EPIC-Norfolk participants (9214 men and 11 737 women) were monitored for an average of almost 12 years, during which time 3013 (14%) people experienced either an episode of fatal or non-fatal coronary heart disease or stroke.
Around one in five (20%) participants said they did not eat any chocolate, but among the others, daily consumption averaged 7 g, with some eating up to 100 g.

Higher levels of consumption were associated with younger age and lower weight (BMI), waist: hip ratio, systolic blood pressure, inflammatory proteins, diabetes and more regular physical activity --all of which add up to a favourable cardiovascular disease risk profile.

Eating more chocolate was also associated with higher energy intake and a diet containing more fat and carbs and less protein and alcohol.
The calculations showed that compared with those who ate no chocolate higher intake was linked to an 11% lower risk of cardiovascular disease and a 25% lower risk of associated death.
It was also associated with a 9% lower risk of hospital admission or death as a result of coronary heart disease, after taking account of dietary factors.

And among the 16,000 people whose inflammatory protein (CRP) level had been measured, those eating the most chocolate seemed to have an 18% lower risk than those who ate the least.
The highest chocolate intake was similarly associated with a 23% lower risk of stroke, even after taking account of other potential risk factors.

Of nine relevant studies included in the systematic review, five studies each assessed coronary heart disease and stroke outcome, and they found a significantly lower risk of both conditions associated with regular chocolate consumption.

And it was linked to a 25% lower risk of any episode of cardiovascular disease and a 45% lower risk of associated death.

This is an observational study so no definitive conclusions about cause and effect can be drawn. And the researchers point out that food frequency questionnaires do involve a certain amount of recall bias and underestimation of items eaten.

Reverse causation--whereby those with a higher cardiovascular disease risk profile eat less chocolate and foods containing it than those who are healthier--may also help to explain the results, they say.

Nevertheless, they add: "Cumulative evidence suggests that higher chocolate intake is associated with a lower risk of future cardiovascular events."
And they point out that as milk chocolate, which is considered to be less 'healthy' than dark chocolate, was more frequently eaten by the EPIC-Norfolk participants, the beneficial health effects may extend to this type of chocolate too.

"This may indicate that not only flavonoids, but also other compounds, possibly related to milk constituents, such as calcium and fatty acids, may provide an explanation for the observed association," they suggest. And they conclude: "There does not appear to be any evidence to say that chocolate should be avoided in those who are concerned about cardiovascular risk."

Nut consumption associated with reduced risk of some types of cancer

June 16, 2015 Science Daily

Researchers at the Mayo Clinic in Rochester, Minnesota, and the University of Minnesota in Minneapolis, Minnesota conducted a systematic review and meta-analysis of 36 observational studies (which included 30,708 patients) on the disease-preventive powers of nut consumption to create a comprehensive analysis.

Upon completion, the authors concluded: "nut consumption was inversely associated with risk of colorectal cancer, endometrial cancer, and pancreatic cancer, but not with other types of cancer or type 2 diabetes. Overall, nut intake was associated with a decreased risk of cancer."

While many studies have evaluated the disease-preventive powers of nuts, the authors emphasize there is still a scarcity of available data on the relationship between individual types of cancer and nut consumption. Additional studies are consequently needed to more accurately assess these relationships.

"This is the first systematic review and meta-analysis study estimating the association between nut intake and risk of cancers. Our study suggests that nut consumption may be associated with reduced risk of cancers, which may have practical implication. Aligning with the known beneficial effect of nuts on heart diseases, our study may imply that individuals interested in making better food choices to reduce the risk of cancer and heart disease can consider consuming nuts, after considering the caloric and fat contents of different types of nuts," said Lang Wu, the lead author of this study.

Getting children to embrace healthy food

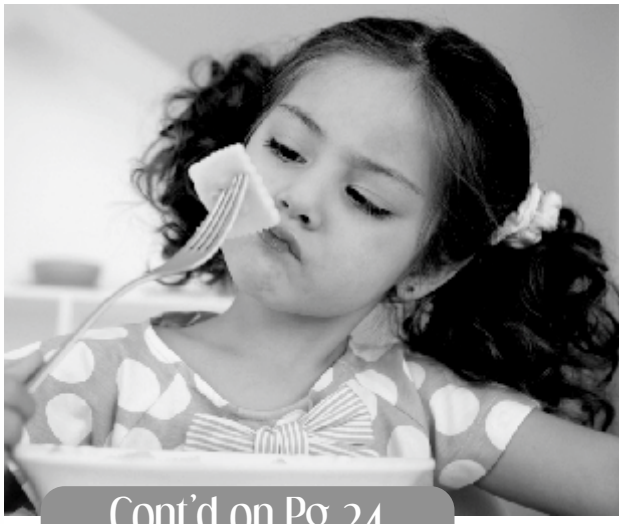
June 23, 2015 Science Daily

Children are especially eager to reach for snacks if the packaging has an appealing design.

"The food industry has a lot of experience in using marketing effects to increase product sales amongst children," says Prof. Bernd Weber from the Center for Economics and Neuroscience (CENs) of the University of Bonn. "By comparison, there is very little knowledge about how such marketing effects can be used to better promote healthy food products to children." This gap was addressed by a study performed by a team working with Prof. Dr. Weber from the CENs and Prof. Dr. Mathilde Kersting from the Dortmund Research Institute for Child Nutrition (FKE).

Three different packaging designs for an identical product

A total of 179 boys and girls from primary schools in Dortmund participated in the research project. The children, aged eight to ten, could choose between three identical yoghurt -fruit- cereal snacks, that fulfilled nutritional requirements according to the FKE guidelines. Critically, only the packaging designs differed: The first was a plain standard packaging, the second packaging depicted additional health information and the third packaging included cartoon characters and an attractive product name -- the latter packaging probably more enticing for children, compared to the other two designs.



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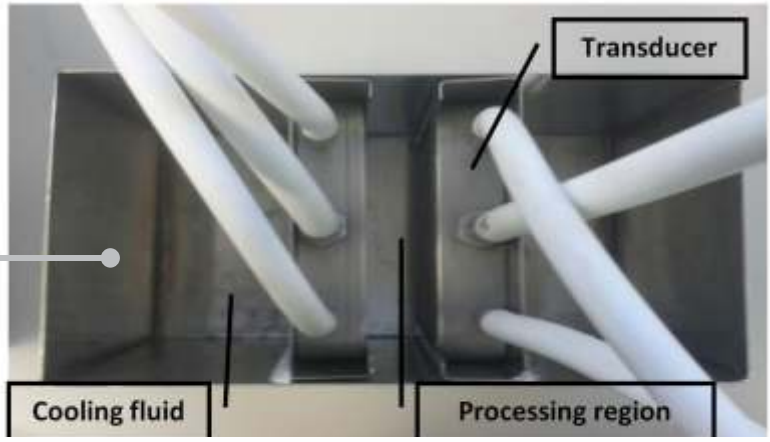

Ultrasonic production of skimmed milk

IFT Weekly June 3, 2015

Research presented at the 169th Meeting of the Acoustical Society of America (ASA) shows that ultrasonic standing waves may be used to separate cream from whole milk in a fast and non-destructive way.

The project, co-funded by the Geoffrey-Gardiner Dairy Foundation and the Australian Research Council, has established a proven ultrasound technique to separate fat globules from milk with high volume throughputs up to 30 L/hr, opening doors for processing dairy and biomedical particulates on an industrial scale.

To date, ultrasonic separation has been mostly applied to small-scale settings, such as microfluidic devices for biomedical applications. Few demonstrations are on volume-scale relevant to industrial application, due to the attenuation of acoustic radiation forces over large distances. To remedy this, the researchers designed a system consisting of two fully-submersible plate transducers placed on either end of a length-tunable, rectangular reaction vessel that can hold up to two litres of milk. They found that ultrasound separation makes the top streams of the milk contain a greater concentration of large fat globules (cream), and the bottom streams more small fat globules (skimmed milk), compared to conventional methods.

The ultrasonic separation process only takes about 10–20 minutes on a litre scale—much faster than traditional methods of natural fat sedimentation and buoyancy processing, commonly used today for the manufacture of Parmesan cheeses, which can take more than six hours. The researchers' next step is to work with small cheese makers to demonstrate the efficacy of the technique in cheese production.

Biggest culprits of food waste at home

IFT Weekly June 10, 2015

A study published in the International Journal of Consumer Studies shows that the top causes of food waste in homes include buying too much, preparing in abundance, unwillingness to consume leftovers, and improper food storage.

"Fortunately most of the factors that lead to food waste can be easily remedied by simple changes in food buying, preparing, and storing," said the study's lead author Gustavo Porpino, PhD candidate at the Getulio Vargas Foundation and visiting scholar at the Cornell Food and Brand Lab.

For the study, in-home interviews were conducted with the mothers of 20 lower middle class families from two suburbs of Sao Paulo, Brazil, to collect information about each family's shopping, cooking, and disposal practices. Each family was also observed and photographed preparing, eating, and disposing of food.

Based on interviews and in-home observations, the researchers determined that the practice that resulted in the most food waste was simply buying too much food, followed by preparing food in abundance. Leaving foods on dishes after meals or not saving leftovers, and decaying of prepared foods after long or inappropriate storage were also significant factors that resulted in disposal of foods.

Furthermore, the researchers found that strategies that are intended to save money, such as buying in bulk and shopping monthly—rather than more frequently—and cooking from scratch, actually contributed to the generation of food waste and ultimately did not result in savings.

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Combined treatments may reduce growth of Salmonella on carrots

From IFT Weekly June 17, 2015

A study published in the Journal of Food Science shows that the combined use of gamma-irradiation, nisin, and essential oils may reduce the growth of Salmonella typhimurium during storage of mini-carrots.

Gamma-irradiation has been used for pasteurization of food products to extend the shelf life. However, radiation to eliminate S. typhimurium is limited because the dose required may cause adverse effects on the sensorial quality of food products.

Therefore, the combined application of ionizing radiation with other treatments such as essential oils to reduce the required doses to kill bacteria in food products has been increasing. Studies have found that the addition of natural or synthetic antimicrobial compounds into food products before applying gamma-radiation could lead to an increase in the sensitivity of food-borne pathogens to irradiation.

In this study, the researchers aimed to use essential oil (EO) alone or combined with nisin—a bacteriocin—and gamma-irradiation to control S. typhimurium during the refrigerated storage of mini-carrots. Peeled mini-carrots were inoculated with S. typhimurium and the inoculated samples were coated by five different coating solutions: nisin solution at final concentration of 103 IU/mL; mountain savory EO solution at 0.35%; carvacrol solution at 0.35%; mountain savoury EO at 0.35% plus nisin solution of 103 IU/mL; or carvacrol at 0.35% plus nisin solution of 103 IU/mL.

Then, the coated mini-carrots were irradiated at 0.5 or 1.0 kGy and compared to an unirradiated control sample. The samples were kept at 4°C and microbial analyses were conducted on day one, three, six, and nine.

The researchers found that the mini-carrots coated with carvacrol plus nisin solution or mountain savoury EO plus nisin solution in combination with irradiation at 1.0 kGy completely eliminated S. typhimurium to under the detection limit during the storage.

Cheese could be the next health food, industry expert suggests

Food Navigator USA, 15Jun2015

The tide may be changing for cheese, as science helps reposition the dairy food as a protein-dense, Calcium-rich, healthy snack rather than as a high fat and sodium food to be enjoyed in moderation, suggests a market trends expert.

For years, cheese has been demonized as a food high in saturated fat, which could raise cholesterol levels and heart disease risks, and as high in sodium, which threatens to elevate blood pressure levels. But emerging science is poking holes in these arguments, creating an opportunity for cheese to be "the next naturally functional success story," Julian Mellentin, director of New Nutrition Business, says in a report released this month.

"A key thing for cheese marketers is to actually challenge all the negatives that are put out about cheese in relation to sodium and fact," he told FoodNavigator USA. To do that, he points to scientific studies published in the last few years that undermine the current negative messages about cheese as an unhealthy food.

For example, a study published in the American Journal of Clinical Nutrition in 2011 found a negative correlation between cheese intake and BMI, casting doubt on the idea that the saturated fat content in cheese could lead to weight gain.

Additional studies published in 2014 in the British Medical Journal , Advances in Nutrition and the journal Nutrition, Metabolism and Cardiovascular Diseases suggest the high sodium content in cheese does not increase blood pressure because of the "whole food matrix" in which it is delivered, Mellentin said.

"Nutritional science, like all sciences, is constantly evolving. In the past, studies focused on analyzing individual nutrients and their effects on the body. Now, there is a growing tendency to look at foods and food groups as a whole, without prejudgements based on their content of an individual content of an individual nutrient," Joana Maricato, an analyst at New Nutrition Business, told FoodNavigator USA.

"As a consequence," she added, "amazing results are appearing from studies on dairy and particularly cheese, proving that the

combination of nutrients in cheese has many promising health benefits that were never considered in the past."

An emerging marketing opportunity
The shifting science surrounding cheese is creating a substantial marketing opportunity for the category, which already touches on several of the key trends driving food sales, such as high protein, low sugar, low lactose and naturally functional products, Mellentin said.

In addition, he noted that "America is the biggest opportunity in the world for increasing cheese consumption. Americans eat just 14 kg each year, about half of France's per capita consumption of 26 kg, so there is massive scope for growth."

Marketers can take advantage of this potential by educating consumers and health care providers about the evolving science surrounding cheese, Mellentin said. They also should literally repackage cheese to make it more desirable and easier to eat, he suggested.

"If the industry does lots of sampling so people can experience different cheese and they are not sold in big blocks, but in small, nicely packaged blocks – and perhaps sold in combination with nuts and fruit – then there is a chance to revolutionize cheese consumption in America," similar to how the introduction of Greek yogurt prompted massive growth in the category.

Cheese-maker Sargento Foods' recently launched Balanced Breaks snack line is an example of a product that is innovative and taking advantage of the evolving image and sales potential of cheese, Mellentin said. The line includes on-the-go packages that combine cheese, nuts and dried fruit and is sold at a premium price.

Food industry's eight step waste, poverty and efficiency plan

Food Navigator, 17Jun2015

The food and drink industry has united behind a new eight-step plan for food businesses to increase resource efficiency, reduce food waste and support people experiencing food poverty.

The FareShare Food Efficiency Framework is being launched today (June 17) at an event in London with the backing of the Food and Drink Federation (FDF), British Retail Consortium (BRC), the Fresh Produce Consortium, Asda, Sainsbury, Tesco, Nestlé and Kellogg. The eight steps to ensure surplus food is identified as early as possible so that it can be made available for charity redistribution is split into three areas – prepare, share and benefit.

Benefits to be reaped
There are immense social, environmental and economic benefits to be reaped from following this guideline,
FareShare's ceo Lindsay Boswell claimed. "We all have a part to play in ensuring that good food is used for its purpose and is redistributed to charities to help those people who need it the most," she said. "We are immensely pleased to see such a broad range of food businesses turning up today to hear from industry leaders so that they can understand how they too can do the right thing with their surplus food."

Preventing food waste was a key priority for food and drink manufacturers, the FDF's director genera lIan Wright said. "Where surpluses cannot be avoided, redirecting food to feed people should be a first consideration," he said. "We hope this event will encourage more food companies to ensure any surplus food is redistributed to people in need."

Top priority
BRC director general Helen Dickinson said the top priority for retailers was to keep food surplus and food waste to an absolute minimum. "While the overall proportion of waste occurring within supermarkets is relatively small, we will nevertheless continue working with our supply chain partners and consumers to reduce waste both along the supply chain and within the home."

Nigel Jenney, chief executive of the Fresh Produce Consortium, said: "Diverting surplus food can help people in need who don't always have regular access to healthy fresh produce. We're encouraging the fresh produce industry to work with organisations like FareShare, and to reduce waste in the supply chain."

In the last year FareShare received 7,360t from the food industry (a 33% increase on the previous year). This food was redistributed to 1,923 charities and community projects and contributed towards no fewer than 15.3M meals. FareShare estimates that there is enough surplus food available for 800M meals and is seeking continued support from the food industry to ensure more is diverted to feed vulnerable people in need.

Double jeopardy: Do fitness foods make people eat more and exercise less?

Food Navigator Asia, 24Jun2015

Products flogging fitness may encourage weight-conscious consumers to eat more and exercise less – leading the scientists behind the research to call for closer monitoring of sports nutrition marketing practices.

. It's hard to imagine a sports nutrition product whose packaging is not fitness branded that is, emblazoned with pictures of athletes, sports references or fitness accessories to incite consumers to get fit.

But a study published in the Journal of Marketing Research has suggested that such cues may actually be counterproductive for people who need them the most. In three studies involving more than 500 people, researchers found that fitness cues for trail mix increased consumption and reduced physical activity afterwards – and the more weight-conscious the individual was, the greater the effect.

"One may have expected that 'restrained eaters' would be more physically active in the presence of fitness-branded food, because the fitness label might prime an exercise goal and restrained eaters want to make up for increased consumption by burning additional calories. However, we show that the opposite is true," they wrote.

For coauthor Joerg Koenigstorfer, this could be because portion sizes for sports food were often smaller meaning consumers underestimated the appropriate serving or because they were labelled as low fat and boasted 'healthy-sounding' names associated with natural ingredients of sport, thus implicitly giving the green light that the consumer could eat more guilt free. Instead of acting as a visual stimulus encouraging the participants to do exercise, the fitness imagery acted as a substitute for exercise.

Need for regulation?

That this was especially true for restrained eaters, who were more at risk of being misled by marketing. The researchers called for additional consumer protection for this vulnerable group. "More emphasis should be placed on monitoring food manufacturers' marketing practices […], in particular when cues related to human fitness are used on food products.

"While there is extensive regulation about nutritional information (including health claims), public policy makers have largely ignored other elements of branding and product packaging."

But Koenigstorfer said that he was not calling on sports nutrition companies to remove all fitness references on their packaging or branding. For one, some of their target consumers such as athletes needed a calorie surplus. Instead, he suggested that a brand could offer gym vouchers or provide exercise tips on the packaging. "[This] may decouple the link between the food product and restrained eaters' weight control goal, thus inhibiting overconsumption and the kind of compensatory thinking that likely led to less physical activity in our studies," he told NutraIngredients.

For the first study, 162 male and female participants were assigned to one of two groups. The first was given a trail mix called 'Fitness' with a pair of running shoes depicted, while the second was simply labelled Trail Mix. Eating behaviour of all subjects was assessed using a 33 item questionnaire. They found the restrained eaters ate more food bearing the fitness label than the plain label.

In study two, the researchers looked at the effect on eating patterns when a food was promoted as healthy ('dietary permitted') or unhealthy ('dietary forbidden'). For the healthy group, 231 mixed subjects were told about the vitamin and mineral content of the trail mix and its positive role in weight management.

The second group was told it contained fatty acids, sugar and oils and could lead to weight gain. The higher the level of dietary restraint, the more 'healthy labelled' trail mix subjects ate.

Finally, the researchers evaluated the effect on physical activity. 145 subjects tasted the trail mix (labelled as before) and were then asked to cycle on an ergometer for as long as they felt like. Again, the restrained eaters exercised less after eating the healthy-labelled food.

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How big is the primary schoolers' motivation to receive a particular snack from among the three choices? This is what the researchers determined, using a special measuring device that measures hand grip strength. It indicates the strength with which the children squeezed their hand in order to receive their desired muesli package. "Using this handgrip dynamometer, we were able to determine the effort that the children were willing to exert to receive the respective product," explains lead author Laura Enax from Prof. Weber's team. Then the children were also allowed to sample the snacks in the different forms of packaging.

Health information is less popular amongst children.

The results show that the children's motivation was greatest for the snack in the packaging with the enticing cartoon characters. The measurements with the dynamometer revealed that children significantly provided more effort to receive the child-oriented snack. Also in the taste test, the snack with the playful cartoon characters scored best. The standard packaging and the packaging appealing to health were far less favoured by the children. The results of the survey as well as the measurement of handgrip force both helped to explain the later product selection. This indicates that merely asking the children for their taste preference was not sufficient on its own to explain the children's' choices, says the researcher.

"This is a classical marketing placebo effect," says Prof. Weber. As in the case of a placebo medication, effects ascribed to certain products, which are not justified by the ingredients. In the study, each cup contained the same yogurt and fruit cereal snack, however, the primary school students believed that they could discern a difference in the flavour of the snack in the different packages.

The method is ready to be used for school meals

"Attractively designed food packaging can tempt children to pick unhealthy foods," says Prof. Kersting from the Dortmund Research Institute for Child Nutrition. "However, marketing effects of this type can also be used to promote healthy food products to children." The method developed in the study can be used, for instance, to investigate how the appeal of school milk or whole-grain sandwiches can be increased. The scientists want to investigate in additional studies whether significantly overweight children in particular are especially receptive to marketing placebo effects on packaging.

How to banish children's fussy eating: Three steps

June 29, 2015 Science Daily

Parents could banish their children's fussy eating habits by following three simple steps, a new study suggests.

Introducing the 'three Rs' -- Repetition, Role Modelling and Rewards -- at meal times could help parents to get their children to eat, and even like, new vegetables, according to new research from Aston and Loughborough Universities.

By repeatedly exposing a child to a certain food ('repetition'), eating it first and show them how tasty it is ('role modelling') and praising them for trying it ('rewards'), a parent can help positively change their child's attitude to the food.

The study found that introducing the 'three Rs' dramatically increased children's liking and consumption of vegetables that they previously disliked.

Dr Claire Farrow, of the Aston Research Centre for Child Health, said: "Not eating enough fruits and vegetables is one of the main risk factors for global mortality. Eating more fruits and vegetables could prevent numerous cancers, stroke, diabetes and obesity. Children in the UK, however, do not eat enough of them -- with only about 20% of them achieving the recommended five-a-day.

"It can be very challenging for families to encourage their children to eat a healthy, balanced diet as children naturally go through stages during their toddler years when they are often fussy and will refuse new foods, particularly vegetables. This is a normal developmental stage for children, but it can often lead to a restricted diet as children become fussier and fussier about what they will not eat. Families need evidence-based scientific advice about what they can do to help encourage children to taste, and eventually like, new or disliked fruits and vegetables.

"Our research shows that a combination of repeatedly exposing children to vegetables, rewarding them for trying the food and modelling enjoying eating the vegetable yourself, can help to encourage children to taste and eventually like vegetables which they did not previously like eating. Eating behaviours have been shown to track throughout childhood and into adulthood -- so it is vitally important that children are exposed to fruits and vegetables early in life to inform healthy eating as they grow into adolescence and adulthood."

A total of 115 children aged between two and four took part in the research. They were placed in four separate groups and given the same vegetable to taste every day for 14 days. Each group was exposed to a different combination of 'food intervention' techniques -- repeated exposure; role modelling and repeated exposure; rewards and repeated exposure or the 'three Rs': role modelling, repeated exposure and rewards. The amount of vegetable consumed by each child was measured at study's conclusion.

All of the children were presented with the vegetables by their parents in their homes. Interventions in school-based settings have been researched previously, with encouraging results. However, school interventions often require whole school sign-up and local government funding. As such, they are unavailable to most families.

At the end of the study, the group of children introduced to the 'three Rs' or 'two Rs' (rewards and repeated exposure) showed significant increases in the amount of vegetable they would eat and in their liking for the previously disliked vegetable. Children exposed to the 'three R's ate an average of 4g of the vegetable, compared to 0.6g before the start of the investigation.

A recent survey conducted by the BBC found that half of all children in the UK aged between seven and 12 do not eat fruit or vegetables every day. Almost a quarter of children surveyed said that they ate sweets or chocolates on a daily basis.

Omega-3 supplements, antioxidants may help with preclinical Alzheimer's disease

June 30, 2015 Science Daily

Clinical trials of omega-3, antioxidant supplementation should be undertaken for people with Alzheimer's disease with mild clinical impairment

"Prevention of mild cognitive impairment progression is one of the best hopes," said Milan Fiala, M.D., Research Professor at the University of California's Department of Surgery in Los Angeles. "In addition to physical and mental exercises recommended by experts, this study suggests that nutrition is equally important."

To make their discovery, Fiala and colleagues investigated the effects of 4 to 17 months of supplementation with omega-3 fatty acids and antioxidants in 12 patients with minor cognitive impairment, 2 patients with pre-mild cognitive impairment, and 7 patients with Alzheimer disease.

They measured the phagocytosis of amyloid-beta 1-42 by flow cytometry and microscopy, the transcription of inflammatory genes by RT-PCR, the production of resolvin D1 by enzyme immunoassay, and the cognitive status by MMSE. In patients with mild clinical impairment and pre-mild clinical impairment, phagocytosis of amyloid-beta by monocytes increased from 530 to 1306 mean fluorescence intensity units. The increase in patients with Alzheimer's disease was not significant.

The lipidic mediator resolvin D1, which stimulates amyloid-beta phagocytosis in vitro, increased in macrophages in 80 percent of patients with mild clinical impairment and pre-mild clinical impairment. The transcription of inflammatory genes' mRNAs was increased in a subgroup of patients with low transcription at baseline, whereas it was not significantly changed in patients with high transcription at baseline.

"We've known for a long time that omega-3 fatty acids and some antioxidants can be beneficial to people with a wide range of health problems, as well as protective for healthy people," said Gerald Weissmann, M.D., Editor-in-Chief of The FASEB Journal. "Now, we know that the effects of these supplements may extend to Alzheimer's disease as well. Although these supplements are considered to be generally safe and are very easy to obtain, full-scale clinical trials are necessary to verify the findings of this research and to identify who might benefit the most."

Cranberry juice may help protect against heart disease and diabetes risk factors

Medical News Today 30 June 2015

Study finds polyphenol-rich cranberries to be a sustainable lifestyle approach to better health

A new study 1 reveals that drinking low-calorie cranberry juice cocktail may help lower the risk of chronic diseases that rank among the leading causes of death worldwide, including heart disease, diabetes and stroke. The finding is welcome news considering the World Health Organization estimates the trio of diseases annually claim 15.6 million lives around the globe2. These illnesses are among the most common and costly health conditions, but fortunately, they are

also among the most preventable through dietary intervention. That's where this research comes in. It shows that cranberries provide a rich source of protective compounds - called polyphenols - that support our body's natural defenses and help us achieve a balanced lifestyle to improve health.

Sipping Your Way to Better Health
To discover the extent to which polyphenol-rich cranberries can bolster whole-body health, researchers from the United States Department of Agriculture (USDA) provided eight weeks' worth of meals to 56 healthy adult volunteers (average 50 years of age). One group drank a glass (8 oz) of low-calorie cranberry juice twice daily (16 oz total). Meanwhile, the other group drank a placebo beverage with a similar color and flavor.

"At the start and end of the experiment, the researchers measured things like blood pressure, blood sugar levels, blood lipids, as well as C-reactive protein, a marker of inflammation," explained Christina Khoo, PhD, Director of Research Sciences at Ocean Spray. "All of these measurements come together to tell a story. The worse off these numbers are in an individual, the more likely he or she will face a health condition like diabetes, heart disease or stroke in the future."

Individuals drinking two glasses of low-calorie cranberry juice a day improved across all these measures. It's a change that adds up, and could be associated with a 10 percent lower risk of heart disease and a 15 percent lower risk of stroke 3. Of note, the reductions in blood pressure numbers alone matched those achieved from top-rated diets such as DASH (Dietary Approaches to Stop Hypertension) 4; an eating pattern established as the gold standard for lowering blood pressure after several successful studies by the National Institutes of Health.

Power-Packed with Polyphenols
"These findings suggest that polyphenols help to protect our bodies, and may be adept at keeping a large number of ailments at bay," said Dr. Khoo. "Luckily for us, a rich source of polyphenols is only a glass of cranberry juice away.

Among the commonly consumed fruits in our diets, cranberries boast some of the highest levels of polyphenols - more than apples, blueberries, grapes or cherries." Incorporating these tart-tasting berries into our daily diets is a sustainable and practical lifestyle approach that holds notable promise for improving health. In addition to the cardiometobolic effects of polyphenols, cranberries also contain unique proanthocyanidins (PACs) that may help prevent certain bacteria from sticking inside the body.

Track Record of Whole-Body Health
The findings by the team of USDA researchers that drinking cranberry juice could lower disease risk comes on the heels of supporting research that further espouses cranberry products as part of a healthy diet and balanced lifestyle.

Two recent studies <sup5,6< sup="">analyzing four years' worth of data from the Center for Disease Control's National Health and Nutrition Examination Survey (NHANES), found that those who regularly drink cranberry juice are more likely to be normal weight, have significantly lower waist circumference and showcase improved heart health characteristics. Add these benefits to cranberry's known track record of maintaining urinary tract health, and you have the makings of quite the all-star berry.

High-fiber diet during pregnancy may protect offspring against asthma

Medical News Today 27 June 2015

Women who consume a high-fiber diet during pregnancy may reduce the risk of their offspring developing asthma, according to the results of a new study published in Nature Communications.

Led by Dr. Alison Thorburn, of the Department of Immunology at Monash University in Australia, the study suggests a high-fiber diet alters a mother's gut bacteria during pregnancy, producing anti-inflammatory substances that suppress asthma-related genes in offspring.

This is not the first to study to associate a high-fiber diet with reduced asthma risk. In January 2014, Medical News Today reported on a study in which researchers found mice fed a high-fiber diet had reduced reactions to asthma-inducing allergens, compared with mice fed a low-fiber diet.

For their study, Dr. Thorburn and colleagues set out to determine whether a high-fiber diet consumed during pregnancy could impact offspring's risk for asthma development.
To reach their findings, the team fed pregnant mice one of three diets during their third trimester: a high-fiber diet, a moderate-fiber diet or a low-fiber diet.

When the offspring of the mice were adults, they were exposed to

house dust mites - a trigger for asthma in humans.
Metabolites produced by fibre digestion suppressed asthma-associated genes in offspring
The researchers found that the offspring of mice whose mothers were fed a high-fiber diet during pregnancy did not develop asthma-like symptoms, while the offspring whose mothers were fed a low-fiber diet did.

Further investigation revealed that the pregnant mice fed a high-fibre diet experienced changes in gut bacteria; they possessed specific microbes that produced anti-inflammatory metabolites when the fibre was digested. These metabolites circulated the bloodstream and travelled through the uterus to the fetus, suppressing Foxp3 genes linked to asthma development.

The researchers wanted to see whether a maternal high-fibre diet in humans would have the same effect on offspring. They did so by analyzing the blood samples and diet data of 40 pregnant women, as well as data detailing the frequency of doctor's visits due to respiratory symptoms in their offspring during the first year of life.

The team found women who consumed a high-fibre diet during pregnancy also had anti-inflammatory metabolites present in their blood, and the offspring of these women were significantly less likely to have visited the doctor two or more times as a result of respiratory complaints in their first year of life.

Commenting on their findings, the researchers say:
"High fibre [...] suppresses expression of certain genes in the mouse fetal lung linked to both human asthma and mouse AAD [allergic airway disease]. Thus, diet acting on the gut microbiota profoundly influences airway responses, and may represent an approach to prevent asthma, including during pregnancy."
In addition, the team says their findings may explain why children who grow up on a farm appear to be at lower asthma risk.

"We speculate [this] may relate to dietary differences between rural and urban settings," they explain, "or may relate to microbes encountered in the farm environment that are geared for high SCFA [short-chain fatty acid] production (that is, feces from livestock that mostly digest fibre)."

Eat protein before carbohydrates to lower post-meal glucose

Medical News Today 25 June 2015

In a new study, researchers from Weill Cornell Medical College in New York City, NY, found that the order in which different types of food are consumed has a significant impact on post-meal glucose and insulin levels in obese people.

For people with type 2 diabetes, it is important to maintain normal glucose levels after eating, because if their blood sugar level spikes then they are at increased risk of complications, including hardening of the arteries and heart disease, which can eventually lead to death.

Some previous studies had found that eating vegetables or protein before carbohydrates could be an effective way to lower post-meal glucose levels. The researchers behind the new study wanted to see whether this association applied to a typical Western diet, with meals consisting of a mix of vegetables, protein carbohydrates and fat.

In the study, 11 patients with obesity and type 2 diabetes who were taking metformin - a drug that helps control glucose levels - ate the same meals in different orders 1 week apart, so that the researchers could observe how their glucose levels were affected.
The set meal consisted of ciabatta bread, orange juice, chicken breast, lettuce and tomato salad with low-fat dressing and steamed broccoli with butter.

Glucose and insulin levels lower when carbohydrates were eaten last
The researchers first took the patients' glucose levels in the morning, 12 hours after they last ate. On the first day of the study, the participants were told to consume the carbohydrates in their meal (ciabatta bread and orange juice) first, and to follow this 15 minutes later by the protein, vegetables and fat in the meal. The participants' glucose levels were checked 30, 60 and 120 minutes after eating.

The experiment was then repeated 1 week later, except this time the food order was reversed - the protein, vegetables and fat were eaten first, with the carbohydrates consumed 15 minutes later.

When the vegetables and protein were eaten before the carbohydrates, the researchers found that glucose levels were 29%, 37% and 17% lower at the 30, 60 and 120-minute checks, compared with when carbohydrates were consumed first. Also, insulin was found to be significantly lower when the participants ate vegetables and protein first.

"Based on this finding, instead of saying 'don't eat that' to their

patients, clinicians might instead say, 'eat this before that,'" says senior author Dr. Louis Aronne, the Sanford I. Weill Professor of Metabolic Research and a professor of clinical medicine at Weill Cornell Medical College.

Dr. Aronne acknowledges that follow-up work is required - the findings are from a pilot study with a very small sample group - but says that "based on this finding, patients with type 2 might be able to make a simple change to lower their blood sugar throughout the day, decrease how much insulin they need to take, and potentially have a long-lasting, positive impact on their health."

"Carbohydrates raise blood sugar, but if you tell someone not to eat them - or to drastically cut back - it's hard for them to comply. This study points to an easier way that patients might lower their blood sugar and insulin levels," Dr. Aronne concludes.

Fasting: health benefits and risks

Medical News Today 27 July 2015

Fasting is commonly associated with the month of Ramadan. As you read this, billions of Muslims around the world are engaging in this declaration of faith that involves abstaining from food and drink from dawn until dusk. While fasting for Ramadan is down to spiritual beliefs, many of us choose to fast with the belief that it benefits our health. But does it?

In recent years, numerous studies have suggested that intermittent fasting - abstaining or reducing food and drink intake periodically - can be good for us, making it one of the most popular diet trends worldwide. One of the most well-known intermittent fasting diets is the 5:2 Fast Diet - a plan that involves eating the recommended calorie intake for 5 days a week but reducing calorie intake to 25% for the remaining 2 days - to 500 calories a day for women and 600 a day for men.

According to Dr. Michael Mosley - author of The Fast Diet books - this eating plan can not only help people lose weight, but it offers an array of other health benefits. "Studies of intermittent fasting show that not only do people see improvements in blood pressure and their cholesterol levels, but also in their insulin sensitivity," he adds.

In June 2014, for example, Medical News Today reported on a study suggesting periodic fasting - defined in the study as 1 day of water-only fasting a week - may reduce the risk of diabetes among people at high risk for the condition.

Another study, conducted by Dr. Valter Longo and colleagues from the University of Southern California (USC) in Los Angeles, found longer periods of fasting - 2-4 days - may even "reboot" the immune system, clearing out old immune cells and regenerating new ones - a process they say could protect against cell damage caused by factors such as aging and chemotherapy. But what are the mechanisms underlying the suggested health benefits of fasting?

The potential benefits of intermittent fasting

Since the body is unable to get its energy from food during fasting, it dips into glucose that is stored in the liver and muscles. This begins around 8 hours after the last meal is consumed. When the stored glucose has been used up, the body then begins to burn fat as a source of energy, which can result in weight loss. As well as aiding weight loss, Dr. Razeen Mahroof, of the University of Oxford in the UK, explains that the use of fat for energy can help preserve muscle and reduce cholesterol levels.

"A detoxification process also occurs, because any toxins stored in the body's fat are dissolved and removed from the body," he adds, noting that after a few days of fasting, higher levels of endorphins - "feel-good" hormones - are produced in the blood, which can have a positive impact on mental well-being. As mentioned previously, the study by Dr. Longo and colleagues suggests prolonged fasting may also be effective for regenerating immune cells.

"When you starve, the system tries to save energy, and one of the things it can do to save energy is to recycle a lot of the immune cells that are not needed, especially those that may be damaged," Dr. Longo explains.

In their study, published in the journal Cell Stem Cell, the team found that repeated cycles of 2-4 days without food over a 6-month period destroyed the old and damaged immune cells in mice and generated new ones.

What is more, the team found that cancer patients who fasted for 3 days prior to chemotherapy were protected against immune system damage that can be caused by the treatment, which they attribute to immune cell regeneration.

"The good news is that the body got rid of the parts of the system that might be damaged or old, the inefficient parts, during the fasting," says Dr. Longo. "Now, if you start with a system heavily damaged by chemotherapy or aging, fasting cycles can generate, literally, a new immune system." With the potential health benefits of fasting widely hailed by nutritionists worldwide, it

is no wonder many of us are putting our love of food to one side in order to give it a try. But intermittent fasting isn't all bells and whistles, according to some researchers and health care professionals, and there are some people who should avoid the diet altogether.

The health risks of fasting

According to the UK's National Health Service (NHS), there are numerous health risks associated with intermittent fasting.

People who fast commonly experience dehydration, largely because their body is not getting any fluid from food. As such, it is recommended that during Ramadan, Muslims consume plenty of water prior to fasting periods. Other individuals following fasting diets should ensure they are properly hydrated during fasting periods.

If you are used to having breakfast, lunch, dinner and snacks in between, fasting periods can be a major challenge. As such, fasting can increase stress levels and disrupt sleep. Dehydration, hunger or lack of sleep during a fasting period can also lead to headaches.

Fasting can also cause heartburn; lack of food leads to a reduction in stomach acid, which digests food and destroys bacteria. But smelling food or even thinking about it during fasting periods can trigger the brain into telling the stomach to produce more acid, leading to heartburn.

While many nutritionists claim intermittent fasting is a good way to lose weight, some health professionals believe such a diet is ineffective for long-term weight loss. "The appeal is that [fasting] is quick, but it is quick fluid loss, not substantial weight loss," says Madelyn Fernstrom, PhD, of the University of Pittsburgh Medical Center's Weight Loss Management Center. "If it's easy off, it will come back quickly - as soon as you start eating normally again."

"My experience has been that [this] way of eating does not produce weight loss even in the short term," dietitian and author of Diet Simple Katherine Tallmadge told ABC News in 2013.

Some health professionals believe intermittent fasting may steer people away from healthy eating recommendations, such as eating five portions of fruits and vegetables a day. Many fear fasting may also trigger eating disorders or binge eating.

In a blog for The Huffington Post last year, fitness and nutrition expert JJ Virgin wrote:

"The 'anything goes' mentality some experts permit during the feeding state could lead someone to overeat, creating guilt, shame, and other problems that only become worse over time. For someone with emotional or psychological eating disorders, intermittent fasting could become a convenient crutch to amplify these issues."

While Dr. Mosely says there is no evidence to suggest the 5:2 Fast Diet is associated with eating disorders, he stresses people who have eating disorders should not engage in intermittent fasting.

Other people who should not follow this diet include people who are underweight, individuals under the age of 18, pregnant women, people with type 1 diabetes and individuals recovering from surgery.

Could we reap the benefits of fasting without fasting?

While intermittent fasting may have health risks, nutritionists claim it can be good for us if individuals consult with their doctors before adopting such a diet and adhere to it correctly. But could there be a way to reap the potential health benefits of fasting without actually having to fast? Dr. Longo believes so. Earlier this week, Dr. Longo and colleagues from USC published a study in the journal Cell Metabolismrevealing how a fasting-mimicking diet (FMD) triggered immune cell regeneration and extended the lifespan of mice.

What is more, on testing the diet in humans - who adhered to it for only 5 days a month for 3 months - they found it reduced a number of risk factors associated with aging, cardiovascular disease (CVD), diabetes and cancer.

The FMD is low in protein, low in unhealthy fats and high in healthy fats, according to the researchers. It stimulates markers linked to fasting, such as low glucose levels and high levels of ketone bodies, in order to mimic the effects of prolonged fasting.

Dr. Longo and colleagues say their diet could promote immune cell regeneration and longevity associated with fasting without the need for food restriction and the potential adverse effects that come with it. "Although the clinical results will require confirmation by a larger randomized trial," they add, "the effects of FMD cycles on biomarkers/risk factors for aging, cancer, diabetes, and CVD, coupled with the very high compliance to the diet and its safety, indicate that this periodic dietary strategy has high potential to be effective in promoting human healthspan."

The team hopes that clinicians will one day have the ability to prescribe this diet to patients. "This is arguably the first non-chronic preclinically and clinically tested anti-aging and healthspan-promoting intervention shown to work and to be very feasible as a doctor or dietitian-supervised intervention," says Dr. Longo.

It may be a while before the FMD receives approval from the US Food and Drug Administration (FDA) for clinical use. First, the team needs to put the diet through a rigorous testing process. Further research is required to gain a better understanding of the exact benefits and risks the FMD poses, and this appears to be the case with existing fasting diets. One thing is clear, however; talk to your doctor before engaging in any form of fasting.

Regulatory & Safety News

EFSA estimates safe intakes for caffeine

IFT Weekly June 3, 2015

The European Food Safety Authority (EFSA) has published its Scientific Opinion on the safety of caffeine, in which it estimates acute and daily intakes that raise no safety concerns for the general healthy population.

The opinion also advises on the consumption of caffeine from all dietary sources in combination with physical exercise, and on the possible risks of consuming caffeine together with alcohol, with other substances found in so-called energy drinks, and with p-synephrine, a substance increasingly found in food supplements.

The assessment was finalized following extensive input from Member States, consumer groups, industry, and other interested parties. It is the first time that the risks from caffeine from all dietary sources have been assessed at a European Union level. A number of risk assessments have been carried out previously by national and other authoritative bodies around the world, which were thoroughly analyzed by EFSA's working group.

The EFSA's Panel on Dietetic Products, Nutrition, and Allergies (NDA) concluded that for adults, single doses of caffeine up to 200 mg—about 3 mg per kilogram of body weight (mg/kg bw) from all sources do not raise safety concerns for the general healthy adult population. The same amount of caffeine does not raise safety concerns when consumed less than two hours prior to intense physical exercise under normal environmental conditions. No studies are available in pregnant women or middle aged/elderly subjects undertaking intense physical exercise.

In addition, the panel determined that intakes up to 400 mg per day (about 5.7 mg/kg bw per day) consumed throughout the day do not raise safety concerns for healthy adults in the general population. However, for pregnant or lactating women, they determined that caffeine intakes from all sources should not exceed 200 mg per day.

For children, the panel concluded that the single doses of caffeine considered to be of no concern for adults (3 mg/kg bw per day) may also be applied to children, because the rate at which children and adolescents process caffeine is at least that of adults, and the studies available on the acute effects of caffeine on anxiety and behavior in children and adolescents support this level. A safety level of 3 mg/kg bw per day is also proposed for habitual caffeine consumption by children and adolescents.

The EFSA panel also concluded that it is safe to consume a single dose of caffeine up to 200 mg with a single energy drink beverage. Additionally, they concluded that alcohol consumption at doses up to about 0.65 g/kg bw would not affect the safety of single doses of caffeine up to 200 mg. Up to these levels of intake, caffeine is unlikely to mask the subjective perception of alcohol intoxication.

EFSA determines acrylamide in food is a public health concern

IFT Weekly June 10, 2015

The European Food Safety Authority (EFSA) has published its scientific opinion on acrylamide in food.

Experts from EFSA's Panel on Contaminants in the Food Chain (CONTAM) have reconfirmed previous evaluations that acrylamide in food potentially increases the risk of developing cancer for consumers in all age groups. This conclusion has not changed since the draft opinion was made available for an open public consultation in July 2014.

Evidence from animal studies shows that acrylamide and its metabolite glycidamide are genotoxic and carcinogenic: they damage DNA and cause cancer. Evidence from human studies that dietary exposure to acrylamide causes cancer is currently limited and inconclusive.

Since acrylamide is present in a wide range of everyday foods, this health concern applies to all consumers but children are the most exposed age group on a body weight basis.

Cont'd on Pg 32

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Cont'd from Pg 30

The most important food groups contributing to acrylamide exposure are fried potato products, coffee, biscuits, crackers, crisp bread, and soft bread. "The public consultation helped us to fine-tune the scientific opinion," said Diane Benford, chair of the CONTAM Panel. "In particular, we have further clarified our evaluation of studies on the effects of acrylamide in humans and our description of the main food sources of acrylamide for consumers. Also, recent studies that we became aware of during the public consultation phase have been integrated into the final scientific opinion."

Although not the focus of EFSA's risk assessment, the scientific opinion includes an overview of data and literature summarizing how the choice of ingredients, the storage method, and the temperature at which food is cooked can influence the amount of acrylamide in different food types and therefore the level of dietary exposure.

EFSA's scientific advice will inform EU and national decision-makers when weighing possible measures for further reducing consumer exposure to acrylamide in food. These may include, for example, advice on eating habits and home-cooking, or controls on commercial food production.

Government of Canada announces proposed new nutrition labels and tools to promote healthier food choices

June 12, 2015 – Health Canada News Release

Improved Nutrition Facts table format and clearer labelling of sugar and serving sizes.

Today, the Honourable Rona Ambrose, Minister of Health, took a major step forward in giving Canadians the information they need to make healthy food choices for themselves and their families by unveiling several initiatives including proposed changes to nutritional labelling regulations.

The proposed labelling changes aim to make it easier for Canadians to read labels and the Nutrition Facts table. Mandating consistent serving sizes will make it easier to compare nutrient contents of similar foods, and make more informed choices when selecting foods for themselves and their families. The ingredient list on the proposed new label would also be easier to read. The labelling changes respond to comments made by parents, consumers and health organizations and the food industry in earlier consultations held throughout 2014.

The Government of Canada is also breaking new ground in the labelling of sugars on foods. Proposed changes would give Canadians clear information about the sugars contained in the foods they eat. The proposed addition of a percentage daily value for sugar and changes to the way sugars are identified in the list of ingredients will make it easier to understand how much sugar is in a product, whether there is a little or a lot of sugar, and what the source of sugar is.

Minister Ambrose also announced new public education tools, including a My Food Guide mobile application and the Eat Well Plate, to help Canadians apply the dietary guidance of Canada's Food Guide to build a healthy meal.
The Eat Well Plate will help Canadians visualize food proportions, and encourages them to make half their plate vegetables and fruit.

The new My Food Guide mobile application will help Canadians access healthy eating information anytime, anywhere. The My Food Guide app allows individuals to create an easy-to-use customized Canada's Food Guide and will help them understand Food Guide servings and types of foods to choose for a healthy diet.

Canadians will be consulted on the proposed regulatory changes to the nutrition information on food labels for a 75-day comment period, ending on August 27. These changes are being published in Canada Gazette, Part I on June 13, 2015.

Quick Facts

• This labelling proposal delivers on a commitment made by the Government of Canada during the 2013 Speech from the Throne to consult with Canadians parents and consumers on how to improve the way nutrition information is presented on food labels.
• Health Canada received feedback from over 10,000 Canadians.
• This proposal also requires that manufacturers list all food colouring agents by their common name within the ingredient list on the label. This will allow consumers who have sensitivities to specific food colours to avoid those ingredients when shopping for food.
A new health claim would also be allowed on pre-packaged fruits and vegetables that would make it easier to let Canadians know about the health benefits of eating fruits and vegetables.

Health groups petition FDA to ban eight food flavours

From IFT Weekly June 17, 2015

According to The Hill, health groups are petitioning the Food and Drug Administration (FDA) to ban eight synthetic flavours in food that they believe to be carcinogens.

The petition, led by the Natural Resources Defense Council (NRDC), said the flavours, which have been used for more than 40 years, are found in ice cream, candy, baked goods, and beverages.

The petition asks the FDA to revoke its 1964 approval that allowed seven of the eight flavourings to be used in food and overturn the industry's 1974 self-approval of the eighth synthetic flavour. According to the NRDC, research by the National Institutes of Health's National Toxicology Program found that each of the eight flavours causes cancer in humans and animals.

The petition was filed by the NRDC, the Center for Science in the Public Interest, the Center for Food Safety, Consumers Union, Improving Kids' Environment, the Center for Environmental Health, the Environmental Working Group, and James Huff, the former associate director for chemical carcinogenesis at the National Institute of Environmental Health Sciences.

The flavours include benzophenone, also known as diphenylketone; ethyl acrylate; eugenyl methyl ether, also known as 4-allylveratrole or methyl eugenol; myrcene, also known as 7-methyl-3-methylene-1,6-octadiene; pulegone, also known as p-menth-4(8)-en-3-one; pyridine; styrene; and trans,trans-2,4-hexadienal.

Food labels nudge diners to eat healthier

June 4, 2015 Science Daily

When people know the calories and fat content in foods, they lean toward healthier fare, a study of food labels in dining halls shows.

Despite municipal and federal legislation in the pipelines for large restaurants and dining facilities to put labels on their foods, there was very little hard data to show such labels are effective in helping people make healthier food choices, until now, the researchers say.
Despite municipal and federal legislation in the pipelines for large restaurants and dining facilities to put labels on their foods, there was very little hard data to show such labels are effective in helping people make healthier food choices, until now.

The study, published in the journal Appetite in April, is important because obesity and related diseases, such as diabetes and hypertension, are steadily rising in the United States. According to recent estimates, 33 percent of U.S. adults are overweight, 35.7 percent are obese and 6.3 percent are extremely obese. Furthermore, the increase in U.S. body weight since the late 1970s parallels an increase in consumption of food away from home.

"Our study is one of the few definitive studies demonstrating, at least in a university dining hall, that putting calories and fat content on the label on various foods purchased in the dining hall produces a reduction in calories and fat content purchased," said David Levitsky, professor of nutritional sciences and a co-author of the paper.

Cornell Dining shared data on food purchases in most Cornell dining halls. The data spanned three semesters before and three semesters after food labels were introduced on individual food servings. Labels included calories, fat and nutrient content. Labelled foods also were categorized high-calorie, low-calorie, high-fat and low-fat. The researchers analyzed how food choices changed after the introduction of labels.

The results revealed a 7 percent reduction of mean total calories and total fat purchased per week. Also, the percent of sales of low-fat and low-calories foods increased, while sales of high-calorie and high-fat foods decreased.
"The reason we found an effect is we had a tremendous amount of data," Levitsky said. "It's a small but significant effect."

The findings support a theory that suggests U.S. weight gain has occurred slowly with gradual increases in daily caloric intake, Levitsky said. Meanwhile, this study demonstrates that small nudges can actually help reduce caloric intake, he said.
"In this 'obesogenic' world, the consumer needs all the help they can get to resist the temptations that the food industry uses to have us increase consumption," Levitsky said. "Insisting that food labels be visible on the foods we purchase may be the kind of help people need to resist the epidemic of obesity."

Council approves final compromise text on novel foods

Food Navigator 12 Jun 2015

A European Council committee has

rejected a proposal that would have allowed the European Parliament the right to veto novel foods approvals – saying this would contradict the law's purpose to simplify authorisation.

Novel foods are foods not widely consumed in the EU before 1997, and the Council's Permanent Representatives Committee (Coreper) approved a final compromise text on new EU rules for novel foods on Thursday. It intends to make it faster and cheaper to introduce novel foods on the EU market while also safeguarding health, and is expected to go back to Parliament for a firstreading vote at the beginning of July.

Council spokesperson Jérôme Unterhuber told FoodNavigator: "The most important EP amendment which Coreper could not accept is the request to have new novel foods authorised with delegated acts. The Council (as the Commission) consider that accepting this amendment would be in contradiction to the purpose of the new regulation, i.e. to simplify and accelerate the authorisation procedure."

EUwide approvals
However, the European Parliament's insistence on a right to veto approvals has been a sticking point during negotiations, and Member States have said they would block such a move on the basis that the issues considered in a novel foods approval are technical in nature and therefore should be left to experts.

Under current rules, novel foods are approved only at a national level, and only for the applicant company, but the Council's proposal would allow EUwide, generic approvals. This would mean that once a novel food was authorised, it could be placed on the market by any food company.

Traditional foods
The proposal would also make it easier to introduce traditional foods into Europe that already have a history of safe consumption elsewhere. "Those foods should have been consumed in a third country for at least 25 years as a part of the customary diet of a significant number of people in at least one third country," said Unterhuber.

Cloning
Finally, the Council's text clarifies that the novel food rules would explicitly cover food from cloned animals, at least until specific rules on cloning come into force.

French colour coded nutrition labels are 'technically feasible', says ANSES

Food Navigator 15 Jun 2015

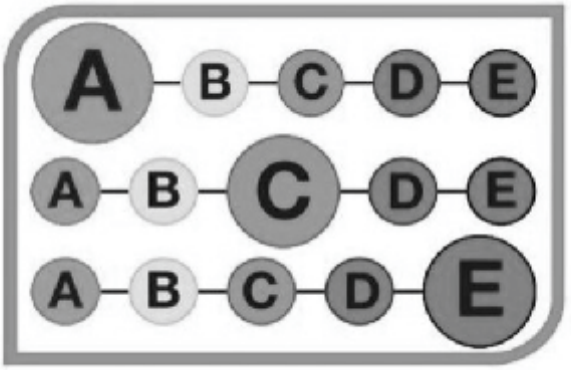
Proposed colour coded nutrition labels are technically feasible but would be ineffective for comparing products in some food categories, according to an analysis from French food agency ANSES.

ANSES was asked by the Directorate General for Health (DGS) to assess the feasibility of the colour coded labelling proposal submitted by Professor Serge Hercberg in January 2014 at the request of the minister of social affairs and health. The programme is based on the Rayner's score system developed by the UK's Food Standards Agency for profiling the nutrient content of foods and drinks.

"ANSES concludes that implementation of the nutritional score, as defined by Rayner et al. (2005), appears to be technically feasible but would require supplementary data in addition to the data whose labelling will become mandatory in 2016 under the EU regulatory framework," it said in a statement.

In particular, it said that while the programme would allow consumers to compare products' relative nutritional value within many food categories, this would not be the case for some food groups, notably non-alcoholic soft drinks, fats, cheeses, fruit purées, chocolates and chocolate based products.

The colour coding takes into account saturated fat, sugar, salt and calories – and in some circumstances protein, fibre, fruits, vegetables and nuts – and combines the results on a five point scale with dots coloured green, yellow, orange, pink or red. A red dot indicates a



product that should be consumed rarely or in limited quantity, while a green dot indicates one that should be consumed daily or in greater quantity.

Oils, cheeses and soft drinks have currently been excluded from the colour coded system, and are expected to be covered in a future proposal. ANSES also emphasised that its analysis of the system was only concerned with its feasibility and did not aim "to evaluate the relevance of using this tool for nutritional labelling, nor its capacity to inform the consumer, to induce changes in behaviour or in the food offer, or its overall relevance with regard to public health".

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2 tsp chopped green chillies
5 green cardamoms
2 inch cinnamon
6 cloves
1 tsp peppercorn
1 cup curd
1 tbsp milk
1 tsp coriander powder
1 tsp red chilli powder
2 tbsp lemon juice
coriander leaves, mint leaves,
saffron, oil,salt, water

Method

- Soak rice for 40 minutes and fry sliced onions till golden brown and keep aside. Also soak saffron in warm water.
- Now make a fine paste of chopped coriander leaves, mint leaves & green chillies. Then make a separate powder of green cardamoms, cloves, cinnamon and peppercorn & keep aside.
- Take beaten curd in a bowl and mix red chilli powder, salt, ginger-garlic paste, green chilli paste, mint and coriander leaves, lemon juice, powdered spices and small fried onions. Now marinate the cooked ***Nutrela Soya Chunks*** in this mixture and keep aside.
- Cook rice in water and salt. Now take a pan & place the marinated ***soya chunks*** followed by a layer of rice. Then sprinkle the saffron-milk mixture over the rice and fried onions and cover it with another layer of rice.
- Now cover the pan with a lid and cook at a high temperature till it starts steaming. Garnish with mint leaves & serve hot.

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REPORT NUTRITION AWARENESS ACTIVITY 2015–MUMBAI

By **Ms. Ummeayman R.,** Nutritionist, PFNDAI

Protein Foods & Nutrition Development Association of India had organized Nutrition Awareness Activity in collaboration withNirmalaNiketan College of Home Science on Saturday July 4, 2015.

Nutrition Competitions for Food & Nutrition Students from colleges in Mumbai were held in the morning session, wherein students of Food Science and Nutrition from various colleges like, Dr.BMN college, SVT College, ICT, P.N.Doshi College, Nirmala Niketan College participated. The intercollegiate poster making competition was organized on the theme "Nutrition in Packages". Recipe Completions was conducted, wherein the students had prepared 'Low Salt-Healthy Snacks'. The participants made a very good attempt to come up with creative, innovative, delicious, yet nutritious recipes.

Quiz competition was conducted for the students, with questions based on Food Science, Marketing, Management, Nutrition News, Food technology and Nutrition. The quiz was very innovative and was titled "Kaun Banega Nutriguru 2".

Seminar on 'Eating Well for Good Health' had participation of students and teachers of Food Science & Nutrition, health professionals including nutritionists, dieticians, and food industry professionals. The event was sponsored by Hindustan Unilever Ltd, and supporting partners were Kamani Oils and Kelloggs India. Following is the brief report of the presentations during the seminar.

Dr.Geeta Ibrahim, Principal, Nirmala Niketan College,in her welcome remarks stated that Nutrition Awareness programs, not only create an awareness of healthy eating and healthy living but also bring academia and industry together. Today it is very important to have such interactions as it provides an insight into the commercial perspective to the students and makes them aware of how the industry thinks, what are the latest in technologies, regulatory and the global scenario on health, wellness and nutrition.

Mr. Bhupinder Singh, Chairman, PFNDAI, introduced the delegates about PFNDAI and its activities. He also stated the importance of exercise for health, along with nutritious food. It is important that the youth understands the importance of balanced diet and how can the nutrient requirement be fulfilled.

In her inaugural address, **Ms. Geetu Verma**, Exec. Dir. Foods, HUL stated the need of healthy lifestyle and the competition that is in industry to innovate products that are not only tasty but healthy and meet the challenges of regulations.

Dr.Sesikeran B., Former Director-NIN, Hyderabad presented on 'The Role of food ingredients in maintaining good health'. Quality of food and safety of food is on the ingredients. Food can be made healthy and tasty depending on the use of ingredients. An ingredient is everything that is added to food and it is like the list of ingredients in a recipe book. The main reason for ingredients in food is to keep it fresh and safe to consume and also make it healthy and tasty with the desired texture. There are certain issues that are important

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for the society and to address them is the need of the hour. There is nutrient issue, how can the nutrient requirement be met with? How can food be made available to everybody. To meet the nutrient requirements as per RDA, a wide variety of food should be consumed for proper nutrition. Everybody does not have a balanced diet so most of the people have nutrient inadequacy and these nutrients cannot be consumed in pills. An alternate remedy is to add the nutrients to food. Nutrients deficiencies have health problems, but this can be overcome by selecting better medium to give nutrients. He also gave an insight into the foods that can be fortified and what is RDA.

Healthy Snacking was presented by Ms. Richa Mattu, Manager-Nutrition & Health, HUL. Snacking has become a concern for many as it has become a habit. With the changing lifestyle there has been a decrease in the consumption of some of cereals and urban population wants to have more of quick and easy food, thus snack foods are a means of some cereal product consumption. Also there has been a change in the snacking habit , generally there were only one or two snack times but now it is observed that most adults and children snack more than twice , some even snack before dinner specifically due to dinner time is after 9 or at times even 11p.m. The top snack products that most people want to snack are biscuits, noodles, and traditional namkeens. Thus some of the products that are consumed as snack are easy to make and readily available. As there are more of working mothers, it is convenient to have snacks which are easy to make and even mothers are concerned of the healthy diet of the child and if the child is getting adequate nutrients. The question always arises is what makes a snack healthy? Soups are healthy snack as they are easy to digest, high in fibre and rich in vitamins, it can be added to salad and made as a part of meal.

Dr. K.D. Yadav, Sr. V.P. (Technical), Kamani Oils , gave an insight into 'Oils & its Nutritional benefits'. With the changing lifestyle, there has been a major increase in cardiovascular diseases. Thus it is important to know about the various oils and fats that are available and their nutritional importance and how we can make use of a blend of oils in our diet. There is a concern towards the consumption of trans fatty as they are not good for health. Flax seed oil is good for consumption as it has trans fat less than 1 % and it can be added in dal, milkshake, icecream etc. Omega 3consumption is also essential as it prevents heart disease n known to improve memory. Coconut oil is 93% saturate fatty acids but is low chain fatty acid so is good as it has much better intake. Rice bran oil does not change the taste of food as it is bland, it does not lead to accumulation in body, and thus it is useful in premature baby dose preparation.

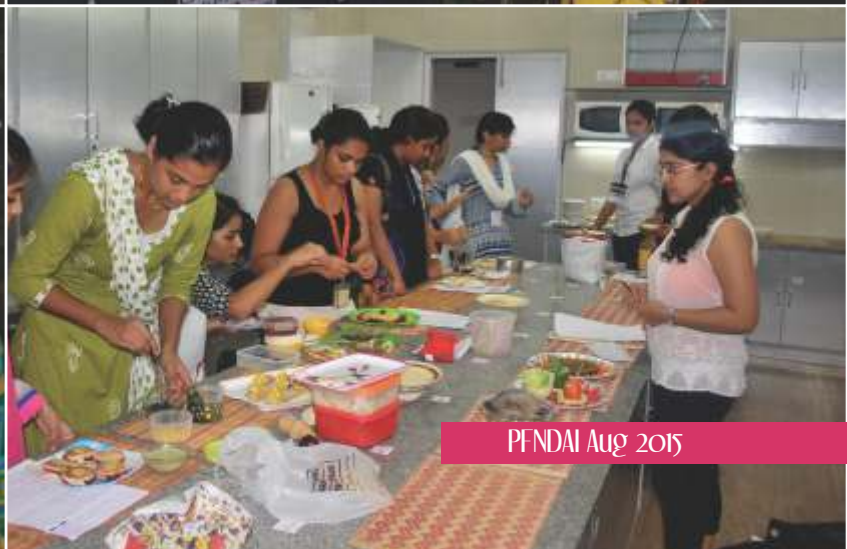
Ms. Sweety Das, Nutrition Associate, Kelloggs gave an insight into the 'Role of cereals in health &diseases'. India is a nation with large population being grain consumers and the staple are cereals and grains. These are important source of protein. Also the diet of people includes source of calcium in the form of milk. Cereals provide good amount of energy and are good source of dietary fibre. The burden of lifestyle changes has given rise to incidence of overweight. India is positioned 3rd in the global ranking of overweight population and there are reports that support approx. 5.8 million die of lifestyle related diseases such as cardio-vascular diseases, cancer, diabetes etc. Many of the lifestyle related health problems can be overcome by regular exercise and balanced diet. Cereals consumption can be helpful in maintaining health and regular consumption of breakfast helps in enhancing micronutrient intake. There are many benefits of consumption of oats, barley and wheat bran as these have a high content of soluble fibre which helps to maintain health.

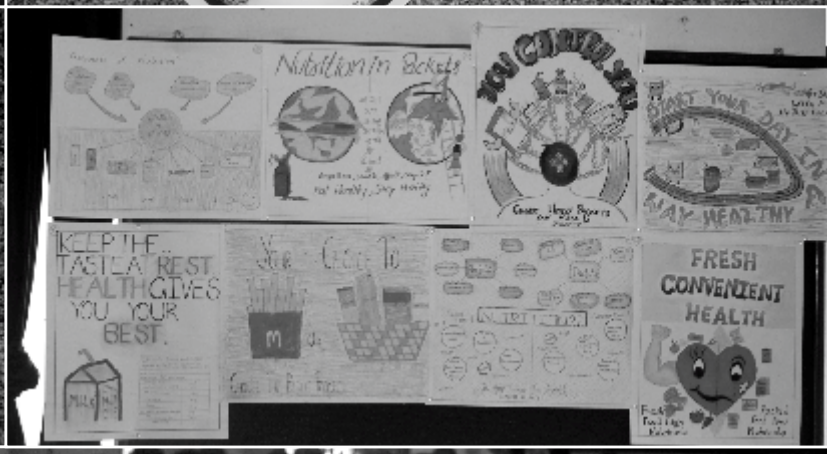
'Importance of Bakery products in diet and nutrition' was presented by **Mr. Amitabh Tewari**, GM- R&D and QA, Parle Products, wherein he presented the nutrients in bakery products and the various bakery products in India. Some of the bakery products are a good source of protein, which is vital nutrient for body development. Bakery products are also rich in mineral and vitamins and the Who recommendation composition is matching in bakery specific biscuits. Its one of the major ingredient is wheat flour, which is good source of minerals, vitamins and fibre. There is lot to innovate in bakery products. Use of raw sugar in biscuits and bakery is also a good way to increase the national benefits of bakery products but it needs

regulatory approval.

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. Dr. J. S. Pai, Exec. Dir., PFNDAI, stated that such initiatives are very much appreciated by the industry and even students enthusiastically look forward to this event. He thanked all the speakers, participants, organizers and sponsors for their support.

Changing Lifestyle especially in the urban areas has led to a need to seek more nutritional solutions to meet the daily demands. To encourage the youth to follow a healthy lifestyle more such awareness activities are planned to be organized in various regions.





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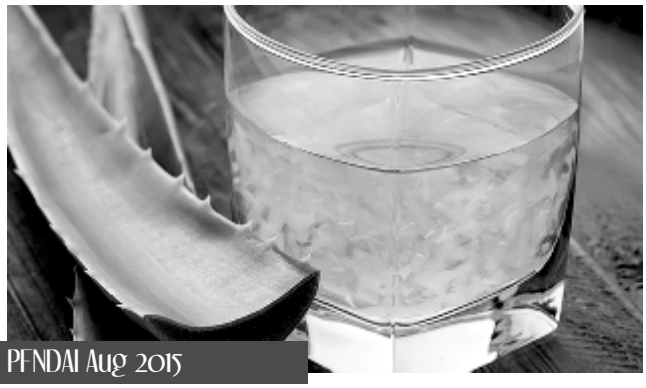
A second type of non-traditional food use is where a substance derived from a food source and that substance does not have a history of human consumption at the level being proposed, other than being consumed as a component of that food source; e.g. EPA/DHA being consumed from fish. The history of safe use – in this case EPA/DHA, at traditional levels of consumption from eating fish is established – only the effect at a higher level of consumption needs to be determined. A simplified process is applied to non-traditional food use.



It should be remembered that foods prepared and used in traditional ways have been judged safe on the basis of long-term experience, even when they contain natural toxicants (e.g. solanine in potatoes) or anti-nutritional substances (e.g. trypsin inhibitors in soybeans). In today's scientific language we would say that a food is considered safe when we are reasonably certain that it will cause no harm if it is used as intended, under the anticipated conditions of consumption. The same reasoning should prevail when considering either non-traditional or novel foods.

Novel Foods:

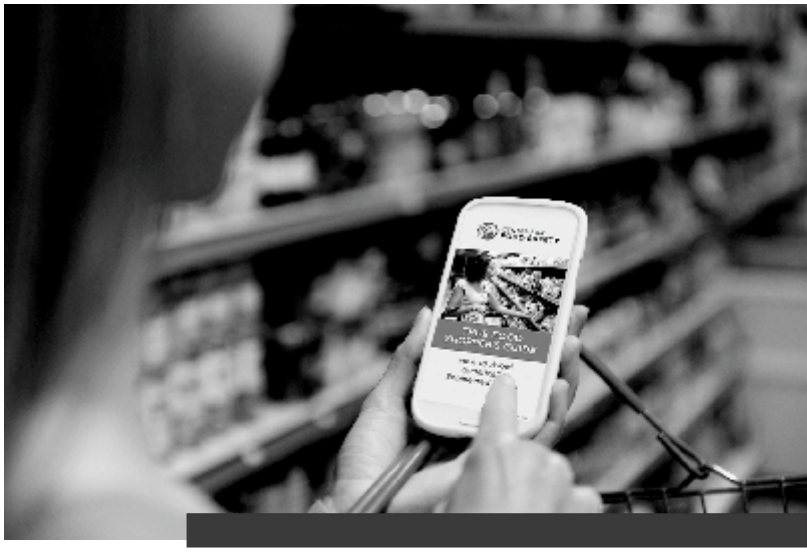
Novel foods exclusively deal with new foods or food ingredients – not food products or food categories or food additives. Prior to an impending Novel Food Regulation (NFR) in India, many ingredients were being evaluated under other inappropriate regulatory provisions; e.g. phytosterols, oligosaccharides etc. Several countries (EU 1997, Canada 1999, Australia New Zealand 2000) had formally put in place regulations to evaluate the safety of these new foods and ingredients. The Australia New Zealand food code is a well-elaborated standard and provides guidance on its working. India has the opportunity to understand the underlying principles on which these regulations reside, as they reflect over 15 years of relevant scientific expertise and control treatments.

After having made the determination that a food is non-traditional, but the simplified procedure as described above is not applicable since its history of use in unknown or insufficient or an equivalence to similar foods in use is not to be found or applicable, the food would then fall under the definition and scope of a novel food and be subjected to a full risk assessment.

Hence a novel food means a non-traditional food that requires an assessment of its safety and impact on public health particular with regard to adverse effects, vulnerable populations and other attending conditions of use. The risk assessment process takes care of these issues.
The traverse of 2 steps from traditional to non-traditional must be done before arriving at whether a food is novel and therefore subject to risk assessment. Key to decision making is the precision of meaning attached to each of these foods – traditional, non-traditional and novel.

Where the dividing line between confusion and clarity is determined on the basis of definitions it is better they are within the realm of being good enough rather than close enough.

(The views expressed here are his own and do not reflect the views or opinions of the Authority)



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Nutrition Society of India – Mumbai Chapter
December 8-9, 2015
Victor Menezes Conv Centre, IIT Bombay

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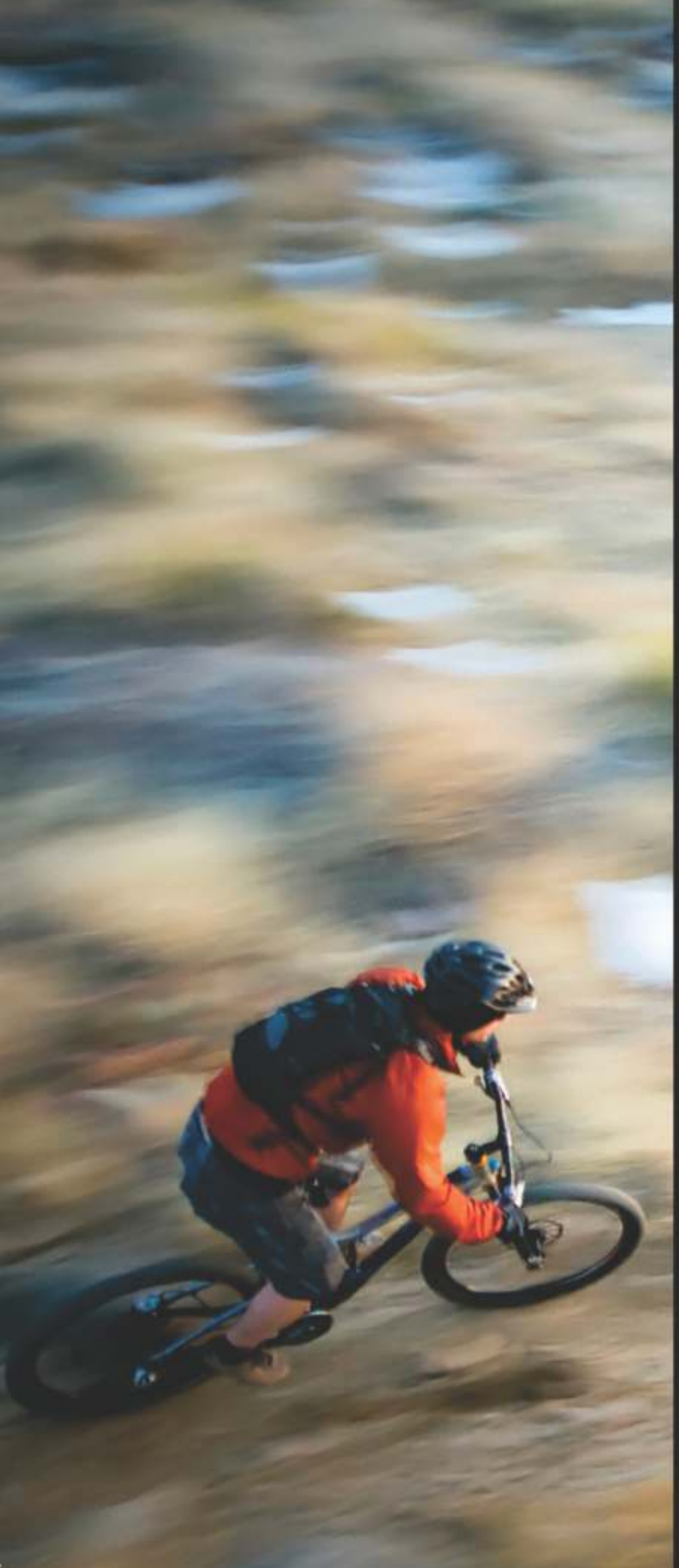

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