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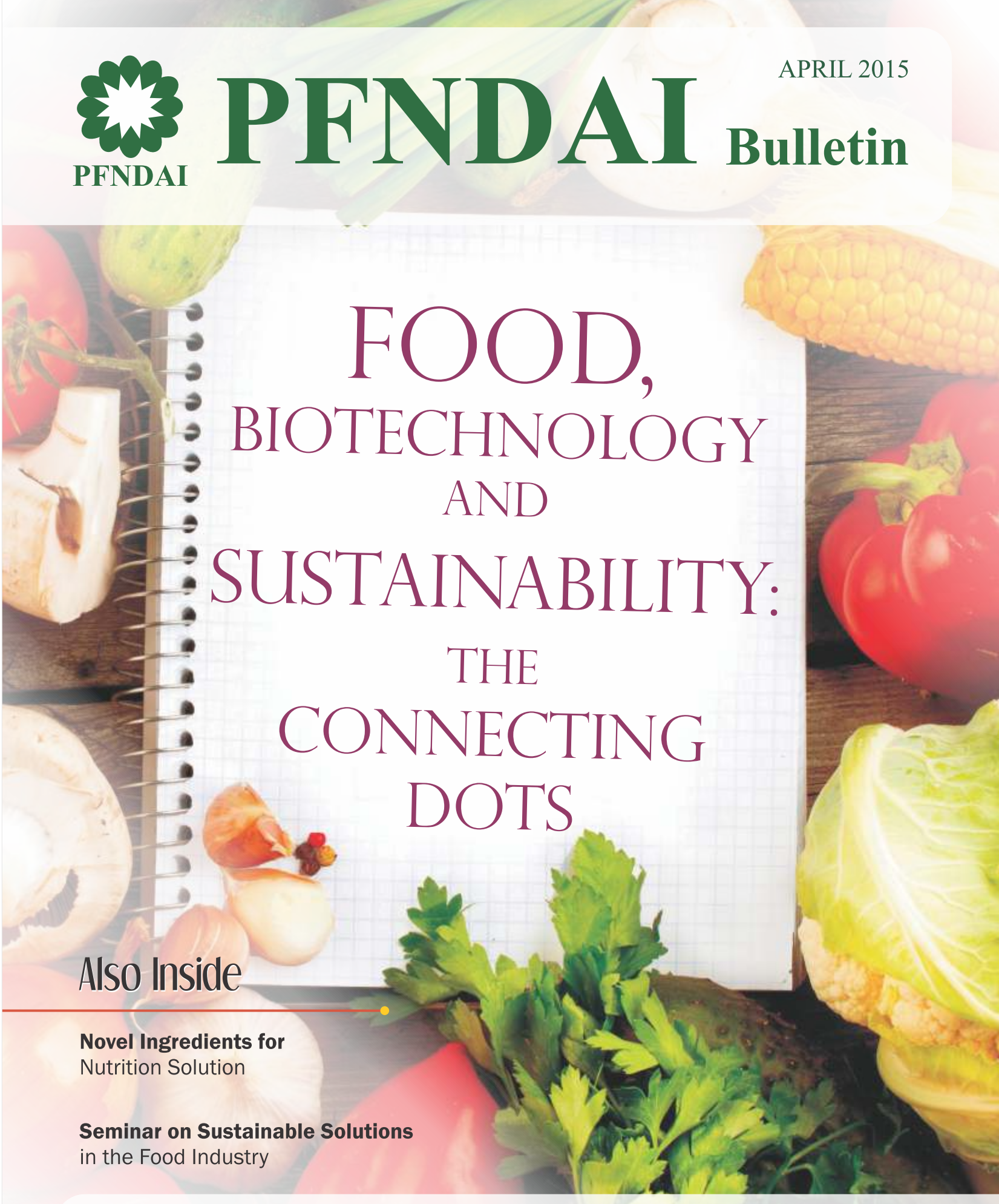
PFNDAI Bulletin

APRIL 2015



FOOD, BIOTECHNOLOGY AND SUSTAINABILITY: THE CONNECTING DOTS

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Novel Ingredients for Nutrition Solution

Seminar on Sustainable Solutions in the Food Industry

PROTEIN FOODS AND NUTRITION DEVELOPMENT ASSOCIATION OF INDIA

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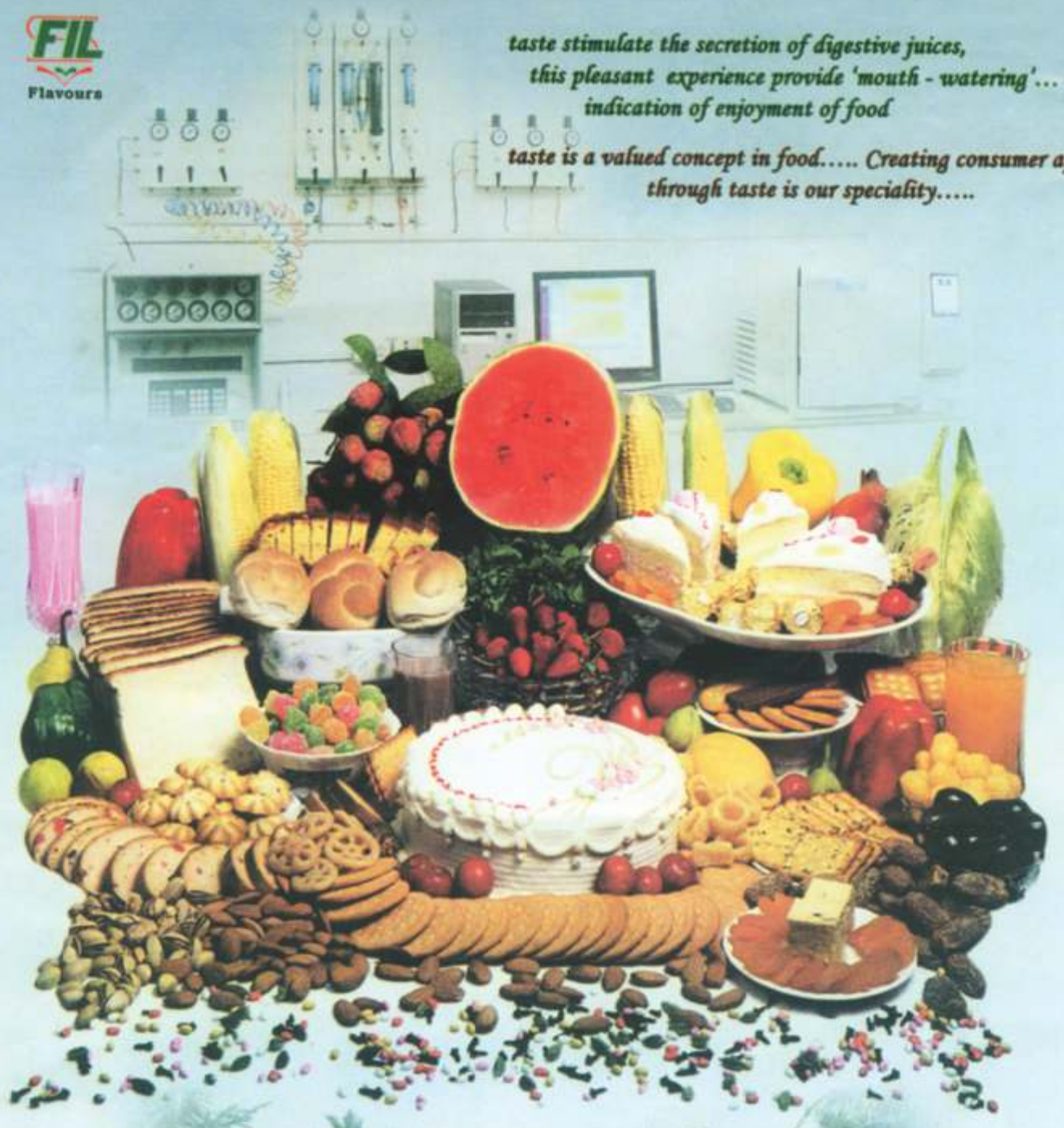

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APRIL 2015

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Editorial

Why are standards made for foods? There are two main reasons. One is to provide the consumer the quality or wholesomeness he or she expects and secondly to ensure safety of food products.

Milk has standards with respect to fat, solids-non-fat (SNF), proteins etc. Consumers expect milk to be pure and it is very difficult to visually see if it is wholesome and pure. Water can be easily added with no noticeable change in common sensory properties of milk so vendors may be tempted to get more profit by adding a little of water and get the same amount of price. This is adulteration and it could also be harmful if unsafe water is added. But basically it is loss of quality that is prevented by making standards. When water is added fat, SNF and proteins become lower than in the pure milk. Thus standards are made so milk could be analysed for these parameters.

Some vendors may skim off the milk fat without adding milk. This also is adulteration unless they label the milk as skimmed milk. The values of fat, SNF and protein are not universally constant. Buffalo milk would have higher percentage of fat than cow milk. Also buffalo milk from some regions may be higher in fat than other regions although the SNF remains somewhat constant. Same is the case of cow milk. So when standards are prepared these factors are considered.

When milk is skimmed to remove milk fat which may be used for some other applications, the remaining milk is lower in fat. Buffalo, cow, and/or skimmed milks could be mixed to prepare toned milks which could also be prepared from milk powders and fat. These milks also have standards. Since they have lower fat contents they cost less and affordable to certain sections. Here also since standards are prescribed, consumers know exactly what they are buying when they pay for it.

There are many other dairy products like cream, chhanna & panneer, butter & ghee, ice cream, yoghurt, cheese, chakka, shrikhand etc. have standards which include fat contents. These are quality standards.

There are safety standards prescribed to make the product safe. Pasteurised Milk has to be heat treated by a processed prescribed by standards. There are standard tests prescribed to verify the efficacy of the pasteurisation process. This is a safety standard which ensures that pasteurised milk does not contain any harmful pathogens.

Similarly there are many products which contain additives. Some additives may be unsafe if consumed excessively so they need to have limits. Certain colours or some antioxidants have been restricted due to this so various products containing these when consumed throughout the day, these limits ensure that total intake of these additives is not beyond the safety limit i.e. beyond ADI (acceptable daily intake).

There are many food products which do not have product standards and are called proprietary foods. They contain common ingredients used generally by consumers and they may contain some additives that are well within the limits prescribed by regulation. In such cases, they do not need any standards nor do they need to be evaluated for safety. Safety of such products needs to be evaluated once they are in the market.Improper manufacturing care or unhygienic conditions can cause them to be unsafe just as any product with standards.

Just because a food has product standards does not mean that these are safety standards. Raw milk has standards pertaining to fat and SNF but they could be unsafe as they are not pasteurised. Many food products have standards which are quality standards. Just because they have standards does not mean they are safe. If they are prepared or handled in unhygienic conditions, there is a possibility of contamination. Similarly, just because proprietary foods do not have standards does not mean they need prior approval before manufacturing. Safety of all products, proprietary and standardised, needs to be evaluated by taking samples from market or during manufacturing and testing for safety.
With season's greetings,

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

FOOD, BIOTECHNOLOGY AND SUSTAINABILITY: THE CONNECTING DOTS

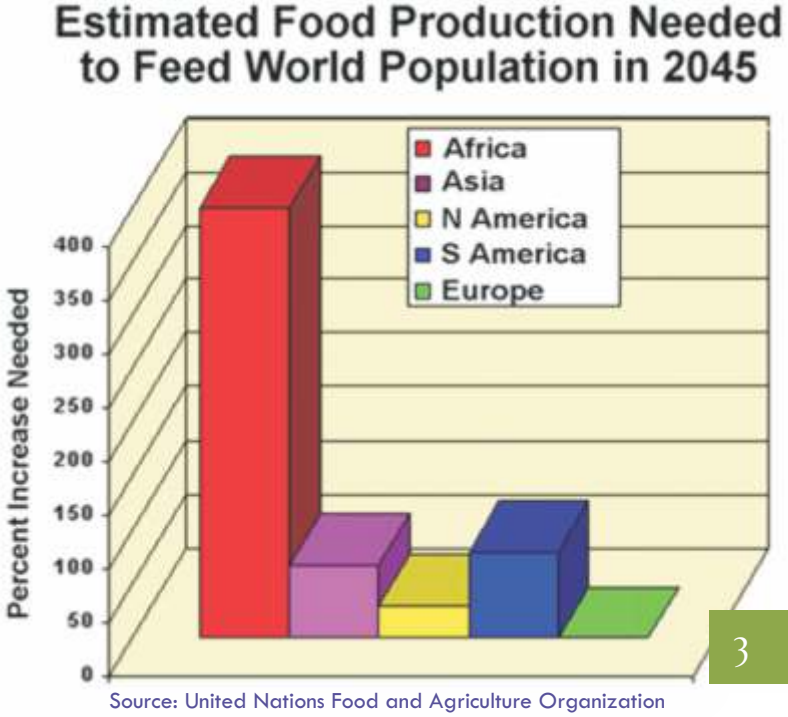
By **Pranjal Jyoti Goswami,**
Head Sustainability,
Novozymes South Asia Private Limited

Food is essential to life and forms the foundation of human civilization. Food supplies energy and nutrients that human beings need to live, and as a result plays a key role in determining human health. Food is also associated of cultural significance and an integral part of social value system.

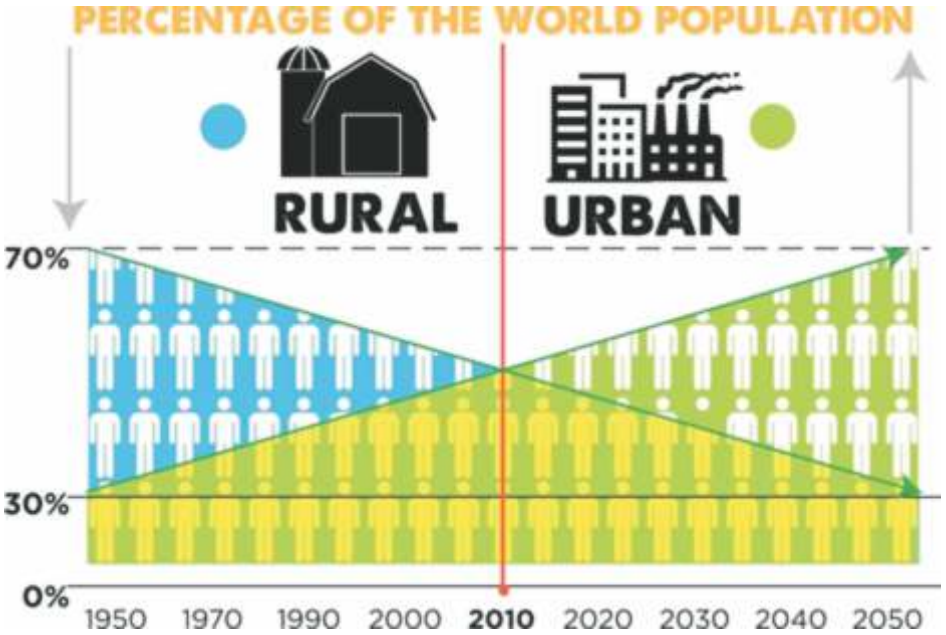
Given its significance to human survival, food production and consumption also play a key role in driving the global economy, and have a large impact on the environment. Currently, the world is facing a number of challenges related to food, including food security, food quality and socio-environmental impact of agricultural production.

One of the biggest challenges the globe is facing is 'feed the world' or in other words, providing the world population with enough food. Reverend Thomas Malthus, writing in the late 18th Century, warned that global population would exceed the Earth's capacity to grow food. Malthus suggested that population grows exponentially, while food production grows only arithmetically.

Industrialized agriculture practices have tremendously improved the agriculture output; still there is a huge gap in meeting the long term demand of the growing population in the future. According to United Nations Food and Agriculture Organization (FAO) estimation, global crop production has expanded threefold over the past 50 years, largely through higher yields per unit of land and crop intensification. Cereals occupy more than half of the world's harvested area and are the most important food source for human consumption.



Source: United Nations Food and Agriculture Organization



Source: Michigan State University

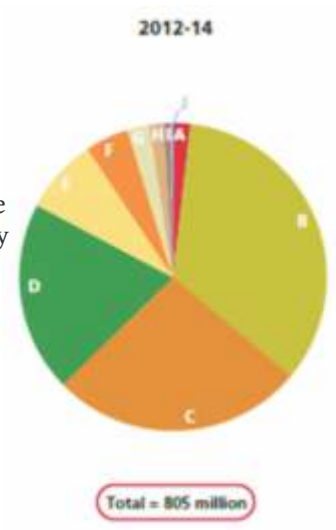
But current rate of increased production capacity may not be sufficient to ensure food security for the global population which is expected to increase to nearly eight billion by 2030 and more than 9 billion by 2050.By 2050, food production must increase by 70% to keep pace.

Food security is a complex condition with various dimensions like availability, access, utilization and stability. FAO states, "Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life." Continuous decline of agriculture productivity in developing countries, growing scarcity of available water and adverse impact of climate change have been making the situation more challenging. Economic growth and rapid urbanization have also been creating a huge demand for food including meat or protein. According to a report by Michigan State University, 2010 onwards the world would have more people living in urban areas than rural areas. The growth of urban population in developing countries is significantly higher and will continue to grow faster.

Enough production of food does not necessarily indicate uniform access of food by all. Several well-known famines in history, such as the Irish Potato Famine and several Indian famines in the late 19th century, were caused not by lack of food, but by lack of political will to distribute the food to the starving poor. In the present day context, economically marginalized section of the society is facing real difficulty in ensuring access to the available food. Though it is expected that approximately three billion people will come out of poverty by 2030, economic disparity will remain high. Many trade, commercial and environmental factors are driving food prices higher globally. Consistent underinvestment in agriculture over the decades and poor governmental policies around promoting agriculture are contributing significantly towards ever rising food prices. The FAO have classified the current time as a "new era of rising food prices and spreading hunger," noting that "food supplies are tightening everywhere and land is becoming the most sought-after commodity as the world shifts from an age of food abundance to one of scarcity."

One of the major functions of food is to provide energy and nutrients in the form of carbohydrate, protein, fat, vitamins, minerals etc. The global is facing two opposite spectrum of challenges related to nutrition. In one hand there a significant proportion on population suffering from malnutrition predominantly in developing countries and on the other hand, many in developed countries are facing the problem of obesity, resulted due to over consumption. According to latest FAO estimates, about 805 million people were chronically undernourished in the period of 2012-14.

Undernourishment in 2012-14



Source: FAO

	Number (millions)	
	1990-92	2012-14
Developed regions	20	15
Southern Asia	292	276
Sub-Saharan Africa	176	214
Eastern Asia	295	161
South-Eastern Asia	138	64
Latin America and the Caribbean	69	37
Western Asia	8	19
Northern Africa	6	13
Caucasus and Central Asia	10	6
Oceania	1	1
Total	1015	805

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Novel Ingredients for Nutrition Solution

By Tirtha Gala,
Sr. Exe., Nutrition & Regulatory Affairs,
Roquette Riddhi Siddhi Pvt Ltd

Economic development especially in India has allowed people to have modern lifestyle which provides effort- and time-saving devices that have not only made life more comfortable but have cut down many essential physical activities.

Indeed, diets today contain alarming proportions of hypercaloric foods, lacking in dietary fiber and having more starches and sugars. This together with higher fat and salt, with lack of physical activity, has adverse effects on body weight and many other ailments including GI tract and dental problems. A growing concern is the alarming rise in the number of Indian people with type 2 diabetes in 2010 has increased from 50.8 million to 62.4 million people in 2011 according to the International Diabetes Federation (IDF) and the Madras Diabetes Research Foundation (MDRF). According to a study in Lancet, emerging countries like India, Mexico, Brazil and China will soon be facing double burden of nutrition. At one extreme, there is a set of population suffering from under nutrition and at the other end there is an ever-increasing rate of obesity amongst the population. Moreover, the rate of obesity is rising rapidly in urban areas than rural areas.

To combat the rising epidemic of obesity the World Health Organization (WHO) has identified a set of dietary recommendations (WHO Technical Report Series 916); 55 to 65% energy from carbohydrates (with 10% maximum simple sugars), 15-30% of energy from fat and 10-15% energy from protein. Unfortunately, little has been achieved with regards to adhering to these guidelines, and hence the outcome is epidemic of lifestyle diseases. It is known fact that India is at the verge of becoming the global capital for diabetes and cardiovascular diseases.

Taking cues from the emerging trends in health, manufacturers are concentrating on new innovation efforts towards sugar and fat reduction in the packaged foods. In order to make prepackaged foods healthy, the objective is always to reduce or eliminate the sugar and fat without compromising on the taste and the overall pleasurable experience with which it is identified.

Maintaining Sweetness - Without Sugar

In the above context, sugar alternatives which are low in calories as well as of low Glycaemic Index (GI) are in great demand. In frozen desserts, baked foods, chocolate confectionery, Indian traditional sweets, typical sugar content is between 14-35 percent by weight and therefore sugar provides not only the sweetness but also bulk to the product. Intense sweeteners are also known as non-nutritive or artificial sweeteners. Intense sweeteners such as acesulfame K, aspartame, neotame, saccharin, cyclamate, sucralose are difficult to be used as the right choice for sugar

Table1. Comparison of maltitol and sugar (sucrose).

Sweeteners	Sweetness
Sugar (sucrose)	1.0
Xylitol	1.0
Maltitol	0.9
Erythritol	0.6
Sorbitol	0.6
Mannitol	0.5
Isomalt	0.4
Lactitol	0.3

(From: Sweeteners & Sugar Alternatives in Food Technology, ed. Mitchell, 2006)

reduction or elimination in ice cream, baked foods, Indian sweets like product. The intensity of sweetness provided by intense sweeteners varies between 100 or 1000 times more than that of sugars, or even more. Therefore only a very small quantity (ppm level) of intense sweeteners singly or in combinations is used to replace sugar as far as the sweetness is concerned in a product, but not the bulk/volume in a formulation. As intense sweeteners do not provide the volume of sugar replaced in formulations in ice creams and frozen desserts, intense sweeteners therefore have limitations. After-taste, throat irritations, astringent, off-flavour, bitterness, metallic aftertaste are a few undesirable characteristics associated with many of the intense sweeteners.

On the other hand, bulk sweeteners such as polyols are proven worldwide as sugar alternatives for a wide range of applications for instance bakery products (biscuits, cookies, muffins, cakes), ice creams/frozen desserts, sweet spreads, confectionery products (chewing gums, chocolates, sweet panning) to replace or eliminate the added sugar. Polyols have inherent sweetness like sugar and mostly derived from cereal based product. A comparison of sweetness level of polyols is shown in Table 1.

The choice of polyol (singly or combination) depends to various characteristics other than the sweetness, for instance xylitol and sorbitol have inherent cooling effect which is desirable for mint compressed tablets as mouth fresheners. In this respect, frozen desserts require a polyol which has the almost same solubility and can provide same level of depression in freezing point as sugar. These two characteristics greatly define the texture (hardness) and the melting behavior of frozen desserts and ice creams. The depression in freezing point in a system depends on molecular weight and since molecular weight of sugar molecule is 342 daltons, a polyol which is nearest to this can be the best sugar alternative as far as ice cream and frozen desserts are concerned. As shown in Table 2, maltitol is very close to sugar compared to any other polyol. The similarity in physicochemical properties of maltitol to sugar allows the manufacturer to utilize the same recipe without making any change in processing parameters and steps to process ice-cream and frozen desserts.

Table 3: Comparison of caloric value of various foods containing sugar and maltitol

Product	Calorie (kcal/100g)	
	Sugar	No-added sugar (% calorie reduction)
Chocolate(45-55% sugars)	520	432 (17%)
Biscuits (15-25% sugars)	450	421 (6%)
Candies (70-85% sugars)	392	264 (33%)
Cake mix (35-50)	410	250 (39%)
Gulab Jamun	322	239 (26%)
Boondi Laddoo	444	368 (17%)

(From: Sweeteners & Sugar Alternatives in Food Technology, ed. Mitchell, 2006)

Maltitol - A Healthier Alternative to Sugar

At nutritional front, maltitol has only 2.4 kcal/g (in EU) compared to sugar's 4.0 kcal/g. Replacing sugar completely in various foods will help reduce the calorific value of foods from 10% - 40%. A comparison of various foods demonstrates the reduction in calories in various foods which includes chocolates, biscuits, gulab jamun and boondi ladoo (Table 3). This can prove to be a boon for the weight watchers who are constantly looking for options to satisfy the urge to have "something sweet" without getting bogged down with guilt.

Table2. Comparison of maltitol and sugar (sucrose)

Characteristics	Sugar (Sucrose)	Maltitol
Molecular weight	342	344
Sweetness	1.0	0.9
Energy (kcal/g)	4.0	2.4 (EU)
Solubility @ 22°C	67%	65%
Melting point (°C)	168-170	144-152
Equilibrium relative humidity (ERH) for water uptake (20°C)	84%	89%

(From: Sweeteners & Sugar Alternatives in Food Technology, ed. Mitchell, 2006)

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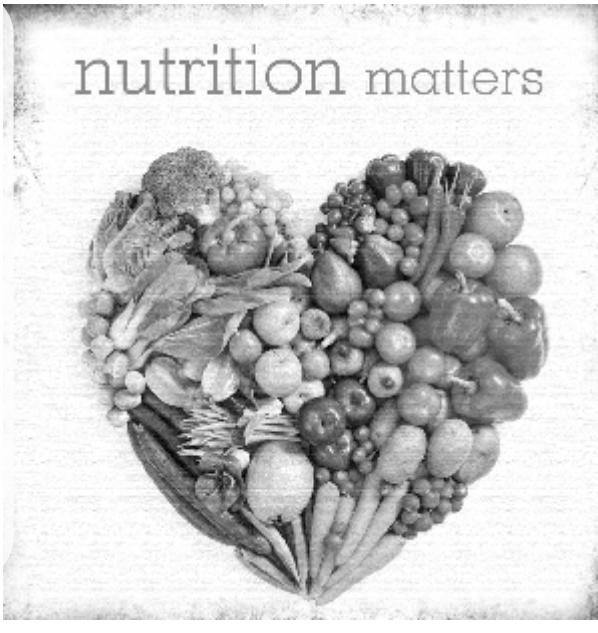
Since 1990–92, the prevalence of undernourishment has fallen from 18.7 to 11.3 percent in 2012–14 for the world. Despite this progress, the number of hungry people in the world is still unacceptably high. Children are the most affected section of the population.

Malnutrition and deficiencies of micronutrients are considered as one of the primary reasons behind the global burden of diseases. It is estimated that globally, there are more than 1 billion overweight adults, at least 300 million of them clinically obese. Obesity rates that have risen three-fold or more since 1980 in some areas of North America, the United Kingdom, Eastern Europe, the Middle East, the Pacific Islands, Australasia and China.

The global food system makes a significant contribution to ecosystem with all stages in the supply chain, from agricultural production to the end user consumption. The entire production process exerts tremendous stress on the climate, natural resources and the ecosystem. Green-house gas emissions, the use of land and water resources, pollution, depletion of phosphorus, and chemical products such as herbicides and pesticides have been creating the significant impact on the health and environmental sustainability aspects. The negative impact on the environment is going to increase as the demand for more food grows.

The global challenge is to increase food production through improving agricultural productivity efficiently, whilst minimizing environmental footprint in the food value chain, by adopting sustainable development approach. A "sustainable food" system consists of a variety of issues such as production of food, supply of food, health, safety, affordability, quality, viable food industry and sustainability issues such as climate change, biodiversity, water etc. An integrated approach of management, governance and innovative technology application is expected the deliver desired outcome in mitigating the challenges around food. Capacity of technological innovation alone is not a solution to all difficulties of sustainable development; it is just one constituent in a large and complex socio-economic system. Application of biotechnology has a significant potential to increase production and productivity, preserve the environment, and improve food safety and quality.



The Convention on Biological Diversity (CBD) defines biotechnology as: "any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use". Biotechnology applications provide powerful tools for the sustainable development of agriculture and the food industry. When appropriately integrated with other technologies for the production of food, agricultural products and services, biotechnology can be of significant assistance in meeting the needs of an expanding and increasingly urbanized population in the future.

The scope of potential benefits from the application of biotechnology to food crops in agriculture practices ranges from diagnostic aids (disease prevention), improved seed varieties (higher yield), and the improvement of food quality (high nutritional value).With biotechnological methods it is possible to produce more food from the land with less energy input (fertilizers) and less problematic plant protection.

Sustainable agricultural practices can be achieved through implementation of innovative biotechnological products, which can increase nutrient water absorbing capacity, stress tolerance, and can significantly reduce amount of chemicals such as fertilizers and pesticides. Such applications have the ability to minimize ecological impact of crop cultivation.

Biotechnology, especially Enzyme technology plays an important role in food processing activities. Application of enzymes technology in food processing adds tremendous value to the entire process both commercial, health as well as sustainability angles. Shelf life of processed food without compromising nutritional values can be enhanced by use of enzymes.

Enhanced shelf life of food material contributes significantly towards reducing food wastage. Similarly with enzyme technology, food can be made healthier either by removing harmful elements from the food or making nutrients bioavailable food products. Enzymes applications in food processing activities also contribute towards making the process more environmentally sustainable by reducing or replacing usage of chemicals in the process and reducing energy consumption during the process.

More people need to be fed better, with less environmental impact. Ensuring food for all at a time of climate change, environmental degradation, increasing human population and demand for natural resources demands sustainable ecosystem management and equitable governance.

Poverty and hunger alleviation has been a major global focus area for a long time, and will continue to be the most important issue in the world. To achieve this objective requires a sustainability integrated approach, which would include: public and private investments to raise agricultural productivity; better access to inputs, efficient services, innovative technologies and better livelihood opportunities.

This article is reproduced from **Souvenir of Seminar on Sustainability** in **February 2015** in **Mumbai**

Novel Ingredients for Nutrition Solution

Cont'd from Pg 6

The Glycaemic response of maltitol powder is very low (29). Maltitol induces lower post prandial glycaemic and insulinaemic response than sugar containing foods/beverages. Maltitol is proven to be good for dental health, because it does not create cavities and prevents the tooth surface pH from falling below the "critical pH" 5.7. By preventing the fall in pH, sugar replacers like maltitol maintain the tooth mineralisation compared to sugar containing foods.

Flavour Release and Mouthfeel of Maltitol

As far as functional benefits are concerned, products made with maltitol have extraordinary flavour release and mouthfeel, and this is the reason it is has become the benchmark ingredient for no added sugars chocolates and sugar-free chewing gums. Maltitol is therefore suitable for all those who wish to restrict their sugar intake and keep control of calories as well as blood glucose response while keeping the same level of indulgence and guilt-free satisfaction.

Reducing Fat – An Achievable Dream

Cutting down on dietary fat is goal that consumers set up for themselves for reducing weight or for that matter leading a healthy life. As a goal, reducing high fat food from ones diet is quite a challenge considering the fact that it lends to taste, texture and aroma of food making it palatable and appetizing. At 9 kcal per gram, fat is the most concentrated source of energy, whereas carbohydrates and proteins contribute to 4 kcal per gram. As per the National Sample Survey (2004-5), the fat consumption of urban India is approximately 48 gm., whereas the nutrient recommendation of WHO/FAO, Diet and Nutrition for Prevention of chronic Diseases, the visible fat content of an adult sedentary man must be 25 gm per day. This revelation is a cause of concern considering the fact that India is the diabetes capital of the world and a growing number of people are falling prey to early signs of metabolic syndrome, a precursor to heart disease. Growing number of animal, human as well as epidemiological studies provide strong evidence providing relationship between high saturated fat, trans fatty acid intake with high blood cholesterol and increased risk of coronary artery diseases. Looking at the growing trends, it becomes imperative for food product developers to provide similar foods with reduced fat content, without compromising on the sensorial attributes.

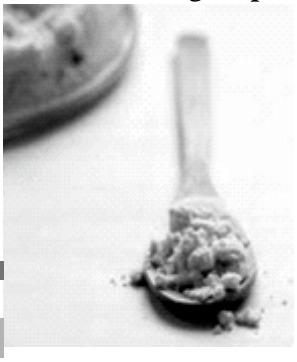
Fat Replacers - A Possible Solution

Many fat replacers available are reformulations of original food ingredients. However advances in science and technology have led to the formulation of new generation fat replacers. Fat replacers generally

fall under three main categories; carbohydrate based, protein based and fat based. Carbohydrate based fat replacers (cellulose, maltodextrins, gums, starches, fibre and polydextrose), are effective in formulated foods including heat applications. However, they are not suitable for frying food.

Protein based fat replacers have tremendous potential for frozen and refrigerated foods. Although they may not be suitable for frying, they can be used in heat applications (cream soups, pasteurized products, baked foods etc.). Fat based fat replacers are chemically altered fatty acids with few or no calories. Some of them actually pass through the body without contributing to any calories (e.g. olestra). These ingredients have the advantage of heat stability and excellent versatility. Some may be used in frying; or as cocoa butter substitutes.

High Lipid Algal Flour



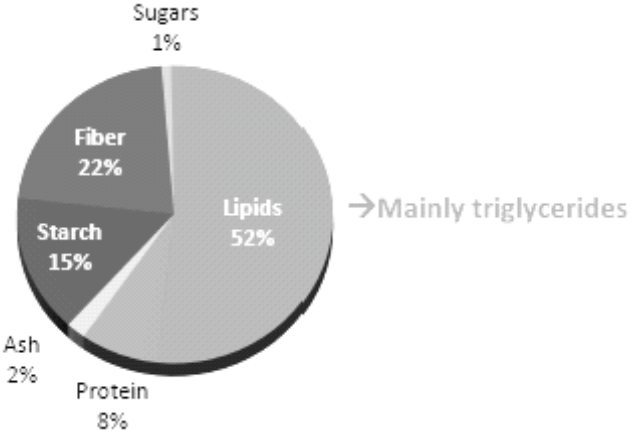
High Lipid Algal Flour is a new ingredient derived from microalgae. Microalgae has been in existence in nature for millions of years, been recognized for nutritional qualities, but remain little used until recently. A heterotrophic cultivation method has been developed that selects pure strains of certain species of Chlorella and grows them in light-free, stainless steel fermentation tanks. Dried to a golden-yellow powder, the finished ingredient is easy to use in many food and beverage applications.

A Nutritional Breakthrough

With experience in drawing value from agricultural based raw materials, the scientists have uncovered a unique ingredient with its macronutrient composition that not only paralleled whole food ingredients like dairy and eggs, actually went a step further and improved upon them.

Unlike the animal derived dairy and egg products, the microalgae contain a reasonable amount of fibre. In addition to presence of micronutrients like calcium, phosphorus, vitamins and fibre, the most striking feature of High Lipid Algal flour is its lipid component (Fig.1). Although the fat content stands at 50%, it is the high amount of "good" monounsaturated fatty acids and little saturated fat which makes it unique and healthy. In addition it is Trans free, and therefore the fatty acid composition closely resembles olive oil.

Fig 1: Composition of High Lipid Algal Flour



Innovating with the Sensory Profile

The earlier generation of better-for-you products relied heavily on fat replacers and emulsifiers which simply acted as thickeners and could not replicate the texture and mouthfeel of fat. But with High Lipid Algal flour, formulators can revamp a full fat product, into a healthier, indulgent version without compromising the sensory attributes.

It is thanks to its impressive nutritional, functional and organoleptic properties, it is now possible to make a brioche without eggs, butter or allergens and with 70% less fat, yet with gustatory qualities similar or even better than those of a conventional brioche.

The innovation is not only limited to bakery products, High Lipid Algal flour has made it possible to recreate hollandaise sauce without eggs or butter. An example of recipe for Brioche is given in Table 5.

Cont'd on Pg 34

Table4: Typical Composition of high lipid algal flour (Dry Matter)

Fatty acid composition	Algae oil
Mono-unsaturated	**67%**
C18:1	64-70%
Saturated	**19%**
C14:0	<2%
C16:0	13-16%
C18:0	1-6%
>C20:0	<2%
Poly-unsaturated	**14%**
C18:2 (w6)	10-16%
C18:3 (w3)	0,5 – 2,5%

Fatty Acid Profile of High Lipid Algal flour

Research in Health & Nutrition

High-energy breakfast with low-energy dinner helps control blood sugar in people with type 2 diabetes

Science Daily February 24, 2015

A small new study shows that, in people with type 2 diabetes, those who consume a high-energy breakfast and a low-energy dinner have better blood sugar control than those who eat a low-energy breakfast and a high-energy dinner.

A small new study published in Diabetologia (the journal of the European Association for the Study of Diabetes) shows that, in people with type 2 diabetes, those who consume a high energy breakfast and a low energy dinner have better blood sugar control than those who eat a low energy breakfast and a high energy dinner. Thus adjusting diet in this fashion could help optimise metabolic control and prevent complications of type 2 diabetes. The authors of the study include Professor Daniela Jakubowicz and Professor Julio Wainstein, Wolfson Medical Centre, Tel Aviv University, Israel, Professor Bo Ahren, Lund University, Sweden and Professor Oren Froy Hebrew University of Jerusalem, Israel.

Previous work by this group has shown that high energy breakfast with low energy dinner (the B diet) reduced post-meal blood glucose spikes (post-prandial glycaemia) in obese non-diabetic individuals, when compared with a low energy breakfast and high energy dinner diet (the D diet). This new randomised study included 18 individuals (eight men, 10 women), with type 2 diabetes of less than 10 years duration, an age range 30-70 years, body mass index (BMI) 22-35 kg/m2, and treated with metformin and/or dietary advice (eight patients with diet alone and 10 with diet and metformin). Patients were randomised to either the B diet or the D diet daily for 1 week. The B diet contained 2946 kilojoule (kj) breakfast, 2523 kj lunch, and 858kj dinner. The D diet contained the same total energy but arranged differently: 858 kj breakfast, 2523 kj lunch, and 2946 kj dinner. The larger of the two meals included milk, tuna, a granola bar, scrambled egg, yoghurt and cereal, while the smaller meal contained sliced turkey breast, mozzarella, salad and coffee.

Breakfast was taken at 0800H AM, lunch at 1300H PM, and dinner at 1900H PM. Patients consumed their diets at home for 6 days before the sampling day. On the 7th day (sampling day), each group consumed their assigned meal plan in the clinic, and blood samples were collected just before breakfast (0 min) and at 15, 30, 60, 90, 120, 150 and 180 min after eating commenced. Blood sampling was repeated at the same time points after lunch and dinner. Post-meal levels of glucose were measured in each participant, as well as levels of insulin, c-peptide (a component of insulin), and glucagon-like-peptide 1 hormone (GLP-1 and also known as incretin: an indicator of glucose metaobilsm that stimulates insulin release). Two weeks later, patients were crossed over to the other diet plan, and the tests repeated.

The results showed that post-meal glucose levels were 20% lower and levels of insulin, C-peptide and GLP-1 were 20% higher in participants on the B diet compared with the D diet. Despite the diets containing the same total energy and same calories during lunch, lunch in the B diet resulted in lower blood glucose (by 21-25%) and higher insulin (by 23%) compared with the lunch in the D diet.

"These observations suggest that a change in meal timing influences the overall daily rhythm of post-meal insulin and incretin and results in a substantial reduction in the daily post-meal glucose levels," says Professor Froy. "A person's meal timing schedule may be a crucial factor in the improvement of glucose balance and prevention of complications in type 2 diabetes and lends further support to the role of the circadian system in metabolic regulation."

Professor Jakubowicz adds: "The mechanism of better glucose tolerance after high-energy breakfast than after an identical dinner may be in part the result of clock regulation that triggers higher beta cell responsiveness and insulin secretion in the morning, and both a

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lower rate of breakdown of insulin by the liver and the increase in insulin-mediated muscle glucose uptake in the morning. Thus, recommending a higher energy load at breakfast, when beta cell responsiveness and insulin-mediated muscle glucose uptake are at optimal levels, seems an adequate strategy to decrease post-meal glucose spikes in patients with type 2 diabetes."

She concludes: "High energy intake at breakfast is associated with significant reduction in overall post-meal glucose levels in diabetic patients over the entire day. This dietary adjustment may have a therapeutic advantage for the achievement of optimal metabolic control and may have the potential for being preventive for cardiovascular and other complications of type 2 diabetes."

It's tough to shift that weight, studies show

Science Daily February 24, 2015

Hundreds of recent studies about overweight and obesity have been published in the past decade. The last of its five related papers has been recently published.

New studies by McMaster University researchers, published in CMAJ Open, have confirmed that people of all ages find it difficult to prevent weight gain; that it is terrifically difficult to get rid of it later and to keep it off once lost. However, even small weight losses can mean better health.

The McMaster Evidence Review and Synthesis Centre reviewed hundreds of recent studies about overweight and obesity published in the past decade. The last of its five related papers has been published. "This is an important area to investigate, as we know that overweight and obesity are public health problems impacting a growing proportion of the Canadian population, and that this is related to many health problems," said Leslea Peirson, lead author and study co-ordinator.

The reports reviewed studies about the prevention and treatment of overweight and obesity among children; the prevention and treatment of overweight and obesity among adults and about keeping lost weight off.

• Regarding prevention of overweight/obesity among children and youth, a review of 90 studies found: There were small improvements in weight outcomes. The programs that work best targeted school-aged children and youth, were delivered in educational settings, included both diet and exercise and lasted 12 weeks to a year.

• Regarding treating overweight/obesity among children and youth, a review of 31 studies found: Evidence showed that enrolment in a program that focuses on changes in diet, exercise and lifestyle can help reduce weight and, more importantly, enrolment in such a program also improves health and quality of life in children and adolescents. However, the permanence of this weight loss has not been well studied.

• Regarding prevention of overweight/obesity among adults, a search of more than two decades of research literature found: Almost no trials have been conducted to investigate programs that help normal-weight adults maintain their normal weight. A single small study conducted in the U.S. in the 1980s showed benefits from a 12-month education and incentive-based program.

• Regarding treating overweight/obesity among adults, a review of 68 studies found: Doing some activity is better than doing nothing. Adults who took part in some form of treatment had, on average, a three kilogram (or seven pound) greater weight loss than adults who did not. Weight loss results did not differ whether treatments involved diet, exercise, lifestyle changes or drugs (orlistat or metformin), but the drugs had side effects that the other strategies did not. A clinically meaningful weight loss of five to 10 per cent of body weight, which was found in this review, can positively impact the health of adults who lose weight.

• Regarding keeping that weight off once lost, a review of eight studies since 2011 found: Doing something to keep that weight off, either through diet, exercise, lifestyle changes or even drugs, can help, at least in the short term. There just weren't any studies addressing the long-term sustainability of weight maintenance strategies. o Use of drugs along with behavioural changes may help maintain a loss of five percent body weight, but this combined strategy did not make a difference in maintaining a loss of 10 per cent of body weight.

"We know that more research is needed that looks at programs designed to prevent weight gain in normal weight adults, youth and children," said Peirson. "Future research should look at the longevity of weight loss and study the health consequences of repeated cycling of weight loss and gain."

These systematic reviews provide the evidence behind the Canadian Task Force on Preventive Health Care's Adult Obesity Guidelines (released last month) and Child Obesity Guidelines, which are scheduled to be released in CMAJ at the end of March.

Peanut consumption in infancy prevents peanut allergy, study finds

Science Daily February 24, 2015

Introduction of peanut products into the diets of infants at high risk of developing peanut allergy was safe and led to an 81 percent reduction in the subsequent development of the allergy, a clinical trial has found.

"Food allergies are a growing concern, not just in the United States but around the world," said an expert. "For a study to show a benefit of this magnitude in the prevention of peanut allergy is without precedent. The results have the potential to transform how we approach food allergy prevention."

Introduction of peanut products into the diets of infants at high risk of developing peanut allergy was safe and led to an 81 percent reduction in the subsequent development of the allergy, a clinical trial has found. The study was supported by the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, and was conducted by the NIAID-funded Immune Tolerance Network (ITN).

The results appear in the current online issue of the New England Journal of Medicine and were presented today at the annual meeting of the American Academy of Allergy, Asthma and Immunology. Researchers led by Gideon Lack, M.D., of King's College London, designed a study called Learning Early About Peanut Allergy (LEAP), based on observations that Israeli children have lower rates of peanut allergy compared to Jewish children of similar ancestry residing in the United Kingdom. Unlike children in the UK, Israeli children begin consuming peanut-containing foods early in life.

The study tested the hypothesis that the very low rates of peanut allergy in Israeli children were a result of high levels of peanut consumption beginning in infancy. "Food allergies are a growing concern, not just in the United States but around the world," said NIAID Director Anthony S. Fauci, M.D. "For a study to show a benefit of this magnitude in the prevention of peanut allergy is without precedent. The results have the potential to transform how we approach food allergy prevention."

LEAP compared two strategies to prevent peanut allergy--consumption or avoidance of dietary peanut--in infants who were at high risk of developing peanut allergy because they already had egg allergy and/or severe eczema, an inflammatory skin disorder.

"The study also excluded infants showing early strong signs of having already developed peanut allergy. The safety and effectiveness of early peanut consumption in this group remains unknown and requires further study," said Dr. Lack. "Parents of infants and young children with eczema or egg allergy should consult with an allergist, pediatrician, or their general practitioner prior to feeding them peanut products."

More than 600 high-risk infants between 4 and 11 months of age were assigned randomly either to avoid peanut entirely or to regularly include at least 6 grams of peanut protein per week in their diets. The avoidance and consumption regimens were continued until 5 years of age. Participants were monitored throughout this period with recurring visits with health care professionals, in addition to completing dietary surveys by telephone.

The researchers assessed peanut allergy at 5 years of age with a supervised, oral food challenge with peanut. They found an overall 81 percent reduction of peanut allergy in children who began early, continuous consumption of peanut compared to those who avoided peanut.

"Prior to 2008, clinical practice guidelines recommended avoidance of potentially allergenic foods in the diets of young children at heightened risk for development of food allergies," said Daniel Rotrosen, M.D., director of NIAID's Division of Allergy, Immunology and Transplantation. "While recent studies showed no benefit from allergen avoidance, the LEAP study is the first to show that early introduction of dietary peanut is actually beneficial and identifies an effective approach to manage a serious public health problem."

A follow-up study called LEAP-On will ask all LEAP study participants to avoid peanut consumption for one year. These results will determine whether continuous peanut consumption is required to maintain a child's tolerance to peanut.

Too many food choices exacerbate the battle against obesity, researchers find

Science Daily February 24, 2015

Researchers found that having too many food choices increases the obesity problem. In fact, researchers found

that having a choice of a high-fat and low-fat diet does not help -- offspring in this situation tended to eat even more.

Some scientists say that when mothers eat poorly during pregnancy, they pass along traits to their children that make them more likely to have poor diets and have related health problems.

But a new study in mice by researchers in the Virginia Tech College of Agriculture and Life Sciences and the Edward Via College of Osteopathic Medicine has shown that the environment in which a child lives may be an equal if not stronger force in determining obesity than their mother's diet. In other words, nurture, not nature, could be a larger issue when dealing with the obesity epidemic.

The researchers found that having too many food choices increases the obesity problem. In fact, researchers found that having a choice of a high-fat and low-fat diet does not help -- offspring in this situation tended to eat even more. Their findings were recently released in the journal Endocrinology.

"We like variety," said Deborah Good, an author of the paper and an associate professor of human nutrition, foods, and exercise at Virginia Tech. "But when there is a choice, we eat more than when there is not any variety."

Though the study was done using mice, it can help inform researchers of how human's natural environment can affect food choices and ultimately a person's weight. In a country where one-third of adults and 17 percent of children are obese, understanding the root causes of the problem is imperative.

It is the first study of its kind to look at the issue in terms of mimicking a real world environment in which people have the choice between eating fattening foods or healthy low-fat ones. Previous mice studies investigating the role of a mother's diet in offspring obesity have limited the offspring's food choice to only high-fat or low-fat diets, but anyone who has walked past the candy aisle to get to the produce section can tell you that is not an accurate representation of life in America. We are constantly faced with making choices and that's not necessarily a good thing when it comes to obesity.

"We have found that environmental factors are just as important if not more so than a mother's diet when it comes obesity," said George Davis, professor in both the Department of Human Nutrition, Foods, and Exercise and the Department of Agricultural and Applied Economics at Virginia Tech. Renee Prater, the associate dean for curriculum, assessment and medical education at the Edward Via College of Osteopathic Medicine, was also an author.

In this study, the team had two sets of mothers -- those given a high-fat diet, and those given a low-fat diet. The offspring were then given a diet that was high fat, low fat, or one in which they had a choice of foods. The offspring that had a choice of high- or low-fat foods had an increase in body weight, body fat, and glucose levels. Those on a low fat diet showed no such negative impacts. They did, however, have a higher energy expenditure compared to those on low- or high-fat diets. Essentially, the mice burned more energy as they wandered around and evaluated which food they were going to eat.

But having a choice of either a high-fat or low-fat diet can lead to overeating, the experiment found. It is not unlike if someone had the choice of healthy and fatty foods in a grocery store -- they may pick both, which leads to a higher daily fat intake.

Though the study was done on mice, the researchers believe the results are telling and could apply to humans. The authors hint that if low-fat foods are more readily available, or priced competitively with high-fat and unhealthy foods, even babies born to overweight mothers could counter their prenatal environment and avoid being overweight themselves.

Prater said that this study is central to the philosophies of osteopathic medicine, which promote wellness and preventive care in medicine. "This helps to show that if you make good choices, you can overcome some of your natural tendencies and be healthier in the long-run," she said.

Diet high in red meat may make kidney disease worse

Science Daily February 23, 2015

An estimated 26 million people in the United States have chronic kidney disease, which can lead to complete kidney failure. Once the kidneys fail, patients either need to undergo dialysis treatments three times a week or have a kidney transplant to remain alive.

"Our study found that patients with chronic kidney disease who consumed diets high in animal protein were three times more likely to develop kidney failure than patients who consumed diets high in fruits and vegetables," the lead author says.

An estimated 26 million people in the United States have chronic kidney disease, which can lead to complete kidney failure. Once the

kidneys fail, patients either need to undergo dialysis treatments three times a week or have a kidney transplant to remain alive. In 2013, more than 47,000 Americans died from kidney disease.

Diet can play a key role in whether kidney disease progresses to kidney failure, according to research conducted at the Texas A&M Health Science Centre College of Medicine. Donald Wesson, M.D., was among the authors of a study that was recently published online by the Journal of the American Society of Nephrology. The study suggests that a diet high in animal proteins -- especially red meat -- can worsen the progression of kidney disease.

"Our study found that patients with chronic kidney disease who consumed diets high in animal protein were three times more likely to develop kidney failure than patients who consumed diets high in fruits and vegetables," Wesson says.

The findings were based on data collected from 1,486 adults with chronic kidney disease who were participating in the National Health and Nutrition Examination Survey III. The study is believed to be the largest one to look at the long-term impact of diet on kidney disease in humans.

Wesson explains that when humans eat animal proteins such as red meat, the body metabolizes these proteins into acids. The kidneys produce substances to help the body rid itself of this acid, but these substances can hurt kidney function if they remain at high levels in the body over long periods of time. "It's like a double-edge sword," Wesson says. "In the short term these substances can help the kidneys get rid of acid, but in the long-term they can reduce kidney function."

Wesson has spent more than 30 years studying the impact of diet on kidney disease. His studies have shown that when animals or humans switch from a diet high in animal protein to one high in plant proteins such as fruits and vegetables, kidney function is protected. This is because the body metabolizes plant proteins into bases, not acids. Wesson currently is a co-investigator on a multi-centre, $2 million grant from the National Institutes of Health to conduct a national study to confirm if reducing dietary acid slows or prevents worsening of kidney disease.

Wesson says that while studies have yet to prove that eating a diet high in fruits and vegetables can prevent kidney disease, such diets have already been shown to help to maintain overall good health. He notes that diets high in fruits and vegetables reduce blood pressure, which is very beneficial to patients with chronic kidney disease because most of these patients have higher than normal blood pressure without treatment.

"We know that fruits and vegetables are 'heart friendly' and these ongoing studies will help confirm if they are also 'kidney friendly'," Wesson says. "Stay tuned."

Individuals with type 2 diabetes should exercise after dinner

Science Daily February 18, 2015

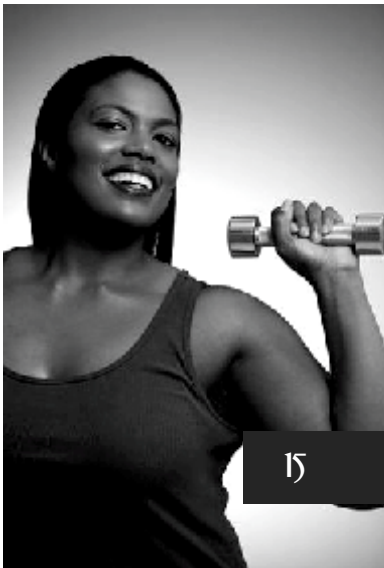
Individuals with type 2 diabetes have heightened amounts of sugars and fats in their blood, which increases their risks for cardiovascular diseases such as strokes and heart attacks.

Exercise is a popular prescription for individuals suffering from the symptoms of type 2 diabetes. Now, researchers have found that individuals with type 2 diabetes can lower their risks of cardiovascular diseases more effectively by exercising after a meal.

Individuals with Type 2 diabetes have heightened amounts of sugars and fats in their blood, which increases their risks for cardiovascular diseases such as strokes and heart attacks. Exercise is a popular prescription for individuals suffering from the symptoms of Type 2 diabetes, but little research has explored whether these individuals receive more benefits from working out before or after dinner. Now, researchers at the University of Missouri have found that individuals with Type 2 diabetes can lower their risks of cardiovascular diseases more effectively by exercising after a meal.

"This study shows that it is not just the intensity or duration of exercising that is important but also the timing of when it occurs," said Jill Kanaley, professor in the MU Department of Nutrition and Exercise Physiology. "Results from this study show that resistance exercise has its most powerful effect on reducing glucose and fat levels in one's blood when performed after dinner."

Kanaley and her colleagues studied a group of obese individuals with Type 2 diabetes. On one occasion, participants performed resistance exercises before eating dinner. During another visit, participants exercised 45 minutes after eating dinner. Participants performed resistance exercises such as leg curls, seated calf raises and abdominal crunches. Compared to levels on a non-exercise



day, Kanaley found that the participants who exercised before dinner were able to only reduce the sugar levels in their blood; however, participants who exercised after dinner were able to reduce both sugar and fat levels. Participants consumed a moderate carbohydrate dinner on the evenings of the study.
Kanaley said her research is particularly helpful for health care providers who have patients who exercise every day but are not seeing benefits. "Knowing that the best time to exercise is after a meal could provide health care professionals with a better understanding of how to personalize exercise prescriptions to optimize health benefits," Kanaley said.

Kanaley also found that improvements in participants' blood sugar and fat levels were short-lived and did not extend to the next day. She suggests individuals practice daily resistance exercise after dinner to maintain improvements. "Individuals who exercise in the morning have usually fasted for 10 hours beforehand," Kanaley said. "Also, it is natural for individuals' hormone levels to be different at different times of day, which is another factor to consider when determining the best time to exercise."
In the future, Kanaley said she plans to research how exercising in the morning differs from exercising after dinner and how individuals' hormone levels also affect exercise results.

Experts question value of current obesity treatments

Science Daily February 11, 2015

The mantra in obesity treatment is 'eat less and move more'. But a leading group of obesity experts question the belief that this is sufficient to treat obesity. They argue that obesity is a chronic disease with largely biological causes that cannot be cured with just diet and exercise.

The mantra in obesity treatment is 'eat less and move more'. But a leading group of obesity experts writing in a comment in The Lancet Diabetes & Endocrinology journal question the belief that this is sufficient to treat obesity. They argue that obesity is a chronic disease with largely biological causes that cannot be cured with just diet and exercise.

Many people with obesity can lose weight for a few months, but 80%-95% regain their lost weight eventually. One explanation for this limited long-term success is that reducing caloric intake triggers several biological systems that drive us to eat high-calorie foods and gain weight. These biological systems evolved when humans needed to survive times of food scarcity. But in modern humans who have had obesity for some time, these biological adaptations encourage calorie consumption and the storage of fat to protect an individual's highest sustained weight. Overriding this fat-loss defence does not appear possible for most individuals through just lifestyle changes, say the authors, particularly in a 21st century environment that promotes the consumption of calorically dense, high-fat foods along with low energy expenditure.

"Although lifestyle modifications may result in lasting weight loss in individuals who are overweight, in those with chronic obesity, bodyweight seems to become biologically 'stamped in' and defended", explains Dr Christopher Ochner, lead author of the comment and Assistant Professor of Pediatrics and Psychiatry at the Icahn School of Medicine at Mount Sinai in New York, USA. "Therefore, the current advice to eat less and exercise more may be no more effective for most individuals with obesity than a recommendation to avoid sharp objects for someone bleeding profusely."

Moreover, he point outs, recent evidence suggests that these biological adaptations could persist indefinitely, even in formerly obese individuals who achieve a healthy bodyweight through dieting. "Few individuals ever truly recover from obesity; rather they suffer from 'obesity in remission'. They are biologically very different from individuals of the same age, sex, and bodyweight who never had obesity."

The authors argue that if weight loss is to be sustained in the long-term, at least some of these biological factors need to be addressed. However, current biologically based interventions are limited to anti-obesity drugs, weight-loss surgery, and intra-abdominal vagal nerve blockage,* which do not permanently correct the biological factors that undermine weight-loss effort. To date, only Roux-en-Y gastric bypass, a common surgical procedure for extreme obesity, has been shown to reverse obesity-induced changes in appetite hormones and the brain's response to food. This, say the authors, might explain why bariatric surgery is the only treatment showing long-term effectiveness in individuals with sustained obesity.

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Food Science & Industry News

Scientists, consumers differ on their views of science in food

IFT Weekly February 4, 2015

A new Pew Research Centre survey of citizens and a representative sample of scientists connected to the American Association for the Advancement of Science (AAAS) reveals crosscurrents that both recognize the achievements of scientists and expose stark fissures between scientists and citizens on a range of science, engineering, and technology issues. Among the findings is that despite broadly similar views about the overall place of science in America, citizens and scientists often see science-related issues through different sets of eyes. There are large differences in their views across a host of issues.

One key example is the topic of genetically modified (GM) foods. A majority of the general public (57%) says that GM foods are generally unsafe to eat, while 37% says such foods are safe; by contrast, 88% of AAAS scientists say GM foods are generally safe. The gap between citizens and scientists in seeing GM foods as safe is 51 percentage points. This is the largest opinion difference between the public and scientists. In addition, there is a 40-percentage point gap on the question of whether it is safe to eat foods grown with pesticides—68% of scientists say that it is, compared with 28% of citizens.

Overall, the American public tends to see the effects of science on society in a positive light. In fact, 79% of citizens say that science has made life easier for most people, while just 15% say it has made life more difficult. However, the balance of opinion is slightly less positive today than in 2009 when positive views outpaced negative ones by a margin of 83% to 10%. When it comes to food, 62% of Americans say science has had a mostly positive effect, while 34% say science has mostly had a negative effect on the quality of food. The balance of opinion is a bit less rosy on this issue compared with 2009 when positive views outstripped negative ones by a margin of 66% to 24%.

Examining alternative methods to deep fat frying

IFT Weekly February 4, 2015

A study published in the Journal of Food Science examines the quality and sensory characteristics of air fried French fries versus those that have been deep fat fried.

In air frying, the raw potato sections are essentially heated in hot air containing fine oil droplets, which dehydrates the potato and attempts to impart the characteristics of traditionally produced French fries, but with a substantially lower level of fat absorbed in the product. The aim of this research is to compare the process dynamics of air frying with conventional deep fat frying under otherwise similar operating conditions and the products formed by the two processes in terms of colour, texture, microstructure, calorimetric properties, and sensory characteristics.

The researchers found that although air frying produced products with a substantially lower fat content and with similar moisture contents and colour characteristics, it required much longer processing times. Air frying typically took 21 min compared to 9 min for deep fat frying. The slower evolution of temperature also resulted in lower rates of moisture loss and colour development reactions.

Differential scanning calorimetry (DSC) studies revealed that the extent of starch gelatinization was also lower in the case of air fried product. In addition, the two types of frying also resulted in products having significantly different texture and sensory characteristics. The texture of the air fried French fry was harder and mouthfeel and appearance were dryer—more akin to puffed/baked products.

Orange juice might provide more nutrients than whole oranges

IFT Weekly February 4, 2015

A study published in the Journal of Agricultural and Food Chemistry shows that the body may be able to better absorb orange's beneficial nutrients when it has been juiced as

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compared to whole fruit.

The researchers analyzed five orange products: fresh unprocessed orange segments, homogenized (pureed) orange segments, freshly squeezed juice, pasteurized juice, and flash-pasteurized juice. They found that levels of vitamin C and carotenoids were basically the same in the juice and the unprocessed fruit, while levels of flavonoids were significantly lower.

The researchers then used a test tube model designed to mimic digestion to evaluate the bioaccessibility—how easily the body can absorb the nutrient. Interestingly, the researchers found that much more of the carotenoids and flavonoids were released from the orange juice than from the fruit slices or puree. In fact, carotenoid release went up from nearly 10.8% in the fruit to 28.3% in the fresh juice, and up to 39.5% in the pasteurized juice. Meanwhile, flavonoids were boosted nearly five-fold to 96.5% in juice compared to fruit.

Black rice bran may offer better antioxidant activity than BHT in foods

IFT Weekly February 11, 2015

Black rice bran contains phenolic compounds of a high antioxidant activity. A study published in the Journal of Food Science shows that extracts of black rice bran are a rich source of naturally occurring phenolic compounds and have potential for use as functional food additives in breakfast cereals, snacks, breads, beverages, cakes, cookies, and other foods.

The researchers sequentially fractionated the 40% acetone extract of black rice bran to obtain five fractions. Out of the five fractions, ethyl acetate fraction was subfractionated using chromatography. They then were able to use different radical assays to determine the antioxidant activity of phenolic compounds in the extracts.

The researchers found that the subfraction 2 from ethyl acetate fraction had the highest total phenolic contents (816.0 μg/mg) and the lowest half maximal effective concentration (EC50) values (47.8 μg/mL for DPPH radical assay, 112.8 μg/mL for ABTS radical cation assay, and 49.2 μg/mL for reducing power). These results were 3.1, 1.3, and 2.6 times lower than those of butylated hydroxytoluene (BHT), respectively. The major phenolic acid in subfraction 2 was identified as ferulic acid (178.3 μg/mg).

The researchers concluded that ferulic acid is the major phenolic compound in black rice bran. In addition, the ethyl acetate fraction and subfraction 2 of black rice bran have stronger antioxidant activity than BHT. Given that some consumer groups have concerns surrounding the safety of BHT, black rice bran's components may offer a potential replacement for products such as breakfast cereals.

Low pressure cooking may enhance flavours, colours, aromas

IFT Weekly February 11, 2015

A study published in the Journal of Agricultural and Food Chemistry shows that cooking food at high altitude, where pressure is lower, may intensify the flavours, colours, and aroma, as well as potentially improve the nutrient quality of food.

A group of scientists from the Nestlé Research Centre (NRC) in Lausanne, Switzerland, travelled to the world's highest revolving restaurant—the Three Sixty in Saas-Fee, Switzerland—for a day's cooking at high altitude, some 3,600 m above sea level. Back in the lab, at 833 m above sea level, they repeated the cooking process and scientifically compared the results.

The researchers prepared three identical recipes for vegetable broths, one cooked high in the mountains, and two others in the lab—one at ordinary pressure and the other at high pressure—and discovered that the recipe prepared at the restaurant had a very different flavour profile.

"Flavour is a key driver of food acceptance and consumer preference," said Candice Smarrito, the NRC scientist who led the study. "So we prepared vegetable broths consisting of exactly the same quantities of turnip, carrot, leek, and celeriac cooked at high, low, and ambient pressure. The results were then analyzed both in the laboratory using a range of analytical processes, and by a panel of tasting experts to see how the different combinations of pressures and cooking times impacted on the culinary quality and molecular and sensory profile of the preparations."

The lower boiling point of water at high altitude and low pressure allows food to cook more gently, at a lower temperature. At 3,600 m, for example, water boils at just 85°C.

Cont'd on Pg 32

PROPRIETARY FOODS – BALANCING DIVERSITY WITH SAFETY

Dr. J. I. Lewis, Chairman, Regulatory Affairs, PFNDAI

A recent spate of advisories requiring proprietary foods to be approved prior to grant of license once again raised the prejudice with which these foods are viewed.

It reiterates the over 40 year presumption that proprietary foods are in some way of inferior quality, dubious composition and unwittingly unsafe. Never mind that there isn't any published evidence of how these foods compare with standardized foods.
Proprietary foods are not a 'category of foods' sharing certain common attributes (like food supplements) or marketed to certain target groups (e.g. foods for special dietary uses) – it represents an enabling 'provision' in food law to develop and market food products in an unencumbered manner within the applicable regulations. It is therefore important to understand why proprietary foods are kept away from standardization. There is some historical wisdom – which may be worthwhile, a revisit.

Certain statutes in food law provide the regulator the power to promulgate a definition and standard of identity for foods and enforce the same. Some such standards are found under the erstwhile Appendix B now transposed in to the Food Safety and Standards (Food Products and Food Additives) Regulation 2011. During the war period control on food products was focussed on preventing economic fraud and to ensure that products using certain names meet a specified compositional requirement – e.g. jam (minimum fruit content), margarine (minimum fat content), chocolate, milk etc.

Standardization as a provision in law has twofold effects – it freezes product value and secondly it creates a mindset of exclusive appropriation. How does this happen? Every member of Industry will have an experience of these two phenomena as we read on.
Once a product standard is promulgated it freezes for all time what the product can contain and locks out any form of innovation or improvement. It creates an exclusion zone effect that prevents any other food ingredient, nutrient or additive from being added, no matter how beneficial the improvement is to the consumer. For example the product name ''atta' in any labelled food will attract the attention of being violative of the standard if it did contain ingredients or additives not specified by regulation, even if the product is wholesome, nutritionally superior and labelled truthfully.

Seemingly while the regulator in the first place standardized the product atta to protect consumer interest – it disengages itself thereafter without updating itself of technological advancements or population health issues that the product may be able to deliver.

For example in the case of fortified atta, if you were to add another vitamin (say Vitamin D) which may be nutritionally more beneficial to children instead of those specified in the standard, and you labelled the product ' Fortified Atta' you run the risk of being in contravention of the law. As a result no nutritional or improved dough rheology additive may be added unless the regulation permits the same. The standard freezes product atta for all time until the regulator changes it - and herein lies the vice-like control on food innovation and product development. And the premise of the regulation namely protecting consumer interest fades into oblivion.

When a food is not standardized (read proprietary food) and if a manufacturer wished to improve

his product by adding a new ingredient he could do so as long as the ingredient was safe for use and declared on the label. However with the existence of a standard the manufacturer would not do so regardless of the benefit to the consumer unless or until the standard is changed – a long and laborious process.

Another reason why product standards remain cast in stone is because neither the regulator nor the manufacturer attends to its improvement. For example if the manufacturer applies for an amendment it is viewed as insignificant if the same is not supported by the trade to which he belongs or chambers of commerce. Why would an innovative manufacturer wish to disclose his art or patent well in advance to his competitors rather than being first to the market?

In most cases it is impractical, impossible and inadvisable to seek amendments considering an ambiguous, discouraging and slothful process. When there is no guarantee of a responsive process, no Food R & D would want to spend time, effort and money in developing a product (let alone a fast track development) when the road to market is fraught with uncertainty and high probability of rejection. An unresponsive regulatory process kills the spirit of new product development.

Another implication of the standardization process is the creation of the 'exclusive appropriation' mindset. A full understanding of this implication of the 'standardization effect' can be appreciated from another applicable rule that a food is misbranded if it purports to be or is represented to be or is being sold by a name which belongs to another article of food (FSSA 2006, 3zf).

What is being elaborated here is how the so called 'exclusive appropriation' mindset extends beyond the construct of the standard. A standard may "illegalize" a perfectly good and honestly labelled product. If a product is developed within the proximity of a standardized food, the developed food runs the risk of being misbranded if it 'purports to be or is represented' as a food for which a standard has been promulgated, no matter how clearly the ingredients or name is stated on the label. The contradiction in terms is evident when proprietary foods are required to provide the name and/or category of the food – obviously the manufacturer's product must bear a name from which the consumer can readily recognise the consumption occasion (like breakfast cereal, carbonated beverage) or usage (like atta, or salt).

Some years back the name protein rich (paushtik) atta could not be used if soy flour was used as the protein source instead of groundnut flour until the standard was amended. Soy flour has a better amino acid profile and yet this benefit is denied to consumers in a standardized food. Similarly 'caffeine' is appropriated to carbonated beverages and 'iodized' to salt. If any other product no matter how truthfully it is labelled will be held in violation despite the fact that consumers assign same values to "caffeine" and "iodized" in which ever food product they find the ingredient labelled and are not concerned about the exclusivity of standardization.

In reality this is how the 'exclusive appropriation' plays out with every industrial food research and development department. If an innovative ingredient were discovered or developed and as a result a new product is created for the market and is entirely wholesome, delicious, distinctly labelled and superior to anything in the market, you have to be sure and at your own risk that it will not be held as 'purporting to be or as representing a food' for which a standard has been promulgated.

Let us look at a hypothetical example - mayonnaise and salad dressing. Assume that mayonnaise is a standardized product under the rules and a manufacturer seeks to place a product called 'salad dressing' on the market. Because both products are similar in appearance, taste, flavour, presentation, packaging and purpose of use, it could well be held that 'salad dressing' purports to be or is represented as mayonnaise.

Therefore under this hypothetical case, since salad dressing purports to be mayonnaise and mayonnaise is a standardized product, you could be in violation.

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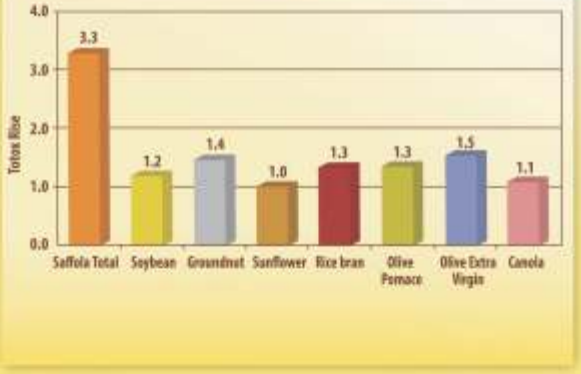
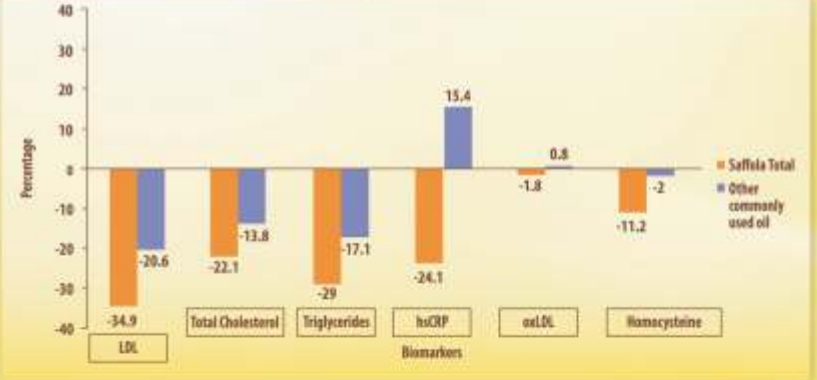
SAFFOLA TOTAL

WITH DOUBLE THE ANTIOXIDANT POWER*

Antioxidant Power*



Moderation of Important Biomarkers in CVD^



2X
DOUBLE THE ANTIOXIDANT POWER*

NUTRIENT LOCK TECHNOLOGY

DESIGNED FOR INDIAN COOKING

MULTI SEED TECHNOLOGY#^

*Disclaimer: *Based on frying studies in comparison to commonly consumed oils as tested on June 11, 2013.*
#Blending oil technology. ^Based on clinical study done in 2014 with some important biomarkers to assess the risk of CVD.

Cont'd from Pg 16

According to Dr Ochner, "Many clinicians are not aware of the reasons individuals with obesity struggle to achieve and maintain weight loss. Obesity should be recognised as a chronic and often treatment-resistant disease with both biological and behavioural causes that require a range of medical interventions including biologically based interventions such as pharmacotherapy or surgery as well as lifestyle modification." He adds, "Ignoring these biological factors and continuing to rely on behavioural modification will surely result in the continued inability to treat obesity effectively and the premature death of millions of individuals each year."
*Intra-abdominal vagal nerve blockage uses an implanted pacemaker-like device to alter the brain-gut signalling associated with appetite.

Iodine daily serving now recommended in multivitamin/mineral supplements for pregnant and lactating women

Science Daily February 10, 2015

The American Thyroid Association (ATA) has championed the effort to include a daily serving of iodine in multivitamin/mineral supplements intended for pregnant and breastfeeding women, and it applauds the new guidelines released by the U.S. Council for Responsible Nutrition (CRN) advising manufacturers to include 150 micrograms of iodine to these daily supplements.

The American Thyroid Association (ATA) has championed the effort to include a daily serving of iodine in multivitamin/mineral supplements intended for pregnant and breastfeeding women, and it applauds the new guidelines released by the U.S. Council for Responsible Nutrition (CRN) advising manufacturers to include 150 micrograms of iodine to these daily supplements. This recommendation is based on scientific evidence that iodine is critical in early pregnancy to support fetal brain development. Pregnant and lactating women who do not get sufficient iodine in their diet may put their children at risk for decreased cognitive function.

The ATA had taken a leadership role in petitioning for a change in the Dietary Guidelines for Americans, according to Alex Stagnaro-Green, M.D., Dean, University of Illinois College of Medicine, Rockford. It coordinated the development of a joint proposal urging that iodine be included in all prenatal vitamin and mineral supplements, which was supported by five leading organizations: the Endocrine Society, American Association of Clinical Endocrinologists, Iodine Global Network (formerly the International Council for the Control of Iodine Deficiency Disorders), the Teratology Society, and the ATA.

"Pregnant and breastfeeding women in the United States are at risk for mild iodine deficiency," says Dr. Stagnaro-Green. "The addition of 150 mcg of iodine in all prenatal vitamins will ensure that the developing brain of the baby during pregnancy and early infancy will have sufficient iodine to develop to its maximal potential."

Beating high blood pressure with a combination of coconut oil and physical exercise: Animal study

Science Daily February 9, 2015

Researchers set out to test the hypothesis that a combination of daily coconut oil intake and exercise training would restore baro-reflex sensitivity and reduce oxidative stress, resulting in reduction in blood pressure.

Coconut oil is one of the few foods that can be classified as a "superfood." Its unique combination of fatty acids can have profound positive effects on health, including fat loss, better brain function and many other remarkable benefits.

Researchers working at the Biotechnology Center at the Federal University of Paraiba in Brazil set out to test the hypothesis that a combination of daily coconut oil intake and exercise training would restore baro-reflex sensitivity and reduce oxidative stress, resulting in

reduction in blood pressure. They published their findings today in the journal Applied Physiology, Nutrition, and Metabolism.

Their experiments were performed in spontaneously hypertensive rats. They found that both coconut oil and exercise training were able to reduce weight gain compared to rats that were given saline and were not exposed to the exercise training protocol along the 5 weeks of study.

Either coconut oil supplementation or exercise training was shown to reduce blood pressure. However, only combined coconut oil and exercise training were able to bring the pressure back to normo-tensive values. The reduction in blood

pressure caused by the combination of coconut oil supplementation and exercise training might be explained by the improvement of the reduced baro-reflex sensitivity and by the reduction in oxidative stress in the serum, heart and aorta.

"This is an important finding as coconut oil is currently being considered a popular "superfood" and it is being consumed by athletes and the general population who seek a healthy life style," explained Dr. Valdir de Andrade Braga, co-author of the study. "The possibility of using coconut oil as an adjuvant to treat hypertension adds to the long list of benefits associated with its consumption. Our next step is to start some clinical trials in order to verify whether we can reproduce those findings in hypertensive human patients."

Strategies to Meet Increased Global Demand for Animal Protein

January 29, 2015 Food Product Design

With the global population projected to reach more than 9 billion by 2050, global demand for food will essentially double, which could significantly increase carbon dioxide and nitrogen levels in the environment and lead to the extinction of numerous species agricultural practices.

The National Research Council released a new report that found meeting the expected growth in global demand for animal protein in a way that is economically, environmentally and socially sustainable will require a greater investment in animal science research. The report identified research priorities and recommends that governments and the private sector increase their support for this research.

According to the United Nations' Food and Agriculture Organization (FAO), by 2050 there will be a 73-percent increase in meat and egg consumption and a 58-percent increase in dairy consumption over 2011 levels. While models indicate that North America and Europe will see little growth in per capita animal protein consumption, per capita consumption in Asia and Africa will more than double, and it will rise significantly in Latin America and the Caribbean.

"Animal agriculture is facing substantial challenges, including a steep projected increase in demand and the need to adapt to changing environmental conditions," said Bernard Goldstein, chair of the committee that wrote the report and professor emeritus in the department of environmental and occupational health at the University of Pittsburgh Graduate School of Public Health. "Animal science research needs to be reinvigorated if our agricultural system is to meet these challenges in a sustainable way."

Increasing efficiency while reducing the environmental impact and cost of animal protein production is essential to achieving a sustainable, affordable, and secure animal protein supply, the report noted. Three criteria of sustainability should guide funding decisions about animal science research and technology development: reducing animal agriculture's environmental footprint, reducing the financial cost per unit of animal protein produced, and recognizing societal values and impacts as an essential component in defining sustainable global animal agriculture.

Specific research areas deemed high priority for reinvigorating the science of animal agriculture and its associated infrastructure in the United States, include:

• Breeding technology and genetics. These have been major contributors to past increases in animal productivity, efficiency in production, and environmental and economic advances, and further development of these approaches is needed, the report says. Research is also needed to understand societal concerns about these technologies and to develop effective ways to respectfully engage and communicate about them with the public

• Environmental changes. Environmental changes, including climate change, will impact animal agriculture in diverse ways, from affecting the quality and quantity of feed to causing environmental stress in animals. Strategies to adapt animal agriculture to climate change and to mitigate its effects on climate change are often interrelated and should be considered together. Research should also explore how to more precisely quantify greenhouse gas emissions and pollutants from agriculture and the economic and social viability of mitigation strategies.

• Animal health. Sub-therapeutic use of medically important antibiotics in animal production practices is being phased out and may be eliminated in the United States in an effort to combat the rise of antibiotic resistance in humans consuming the animal protein. Research should explore alternatives to these antibiotics that provide the same or greater benefits in terms of improved feed efficiency, disease prevention, and overall animal health.

• Animal welfare. Compared with Europe, less research currently focuses on animal welfare in agricultural production systems in the United States, and funding for this research should increase. Research should include the development of alternatives and refinements for painful management procedures like beak trimming and dehorning; improvements in handling, transportation, and slaughter methods to reduce injury and distress; and new or modified production systems that provide animals with more opportunities to express natural behaviours.

In terms of global research priorities, the report said stakeholders at the national level should be involved in establishing animal science research priorities to sustainably meet increasing demands for animal protein in developing countries. It also recommended that research be devoted to understanding barriers to the adoption of new technologies, such as lack of access to credit, production resources, markets, information, and training and strategies to overcome them. Efforts should focus on the education and communication role of local extension personnel in supporting successful adoption of the technology, with particular emphasis on the training of women. Research is also needed to alleviate the problems of animal and zoonotic diseases that result in enormous losses in animal health, livelihoods, national and regional economies, and human health.

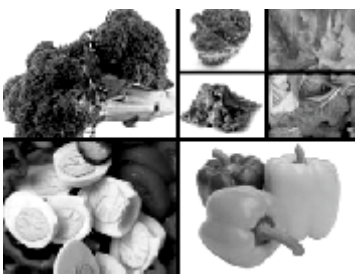
Lutein, zeaxanthin may enhance visual performance

IFT Weekly February 25, 2015

A study published in Investigative Ophthalmology & Visual Science shows that lutein and zeaxanthin—compounds contained naturally in green, leafy vegetables, such as kale and spinach—supplementation may improve the ability for young, healthy people to see under glare conditions. The randomized, double-blind and placebo-controlled study took place at the University of Georgia in Athens over the course of 12 months.

In the study, approximately 100 young and healthy subjects were assessed and received daily dosage levels of 10 mg of FloraGLO lutein and 2 mg of Optisharp zeaxanthin, or a placebo over a one-year supplementation period. Macular pigment optical density (MPOD) and serum levels of lutein and zeaxanthin increased significantly in the supplemented group, while no changes were noted in the placebo group. The macula is the yellow spot in the central retina that is responsible for detailed central vision and the yellow color is the result of high concentrations of lutein and zeaxanthin. Macular pigment optical density is a measure of the amount of macular pigment present in the macula and has been shown to have a major impact on visual performance.

The study looked at three aspects of visual performance: glare disability, photostress recovery time, and contrast enhancement. Glare disability is the amount of glaring light that can be tolerated by a person before vision is severely impaired. Photostress recovery time determines how fast the eye can recover sight after experiencing a flash of bright light, while contrast enhancement is the ability to detect chromatic borders that allow discrimination of an object from its coloured surroundings. The results of the study demonstrate significant improvement in these aspects of visual performance and add to the growing body of evidence to support the role of lutein and zeaxanthin in helping to achieve optimal visual performance and comfort.



"Showing lutein and zeaxanthin improve function in normal healthy individuals widens its applications, as we continue to investigate the potential of nutrition to support both eye health and visual performance," said Billy Hammond Jr., the principal investigator of the study, University of Georgia in Athens.

Plant-Based Diet Good for Heart Health in Obese Kids

February 20, 2015
Food Product Design

Obesity impacts many areas of health, one being the heart. A new study published in The Journal of Pediatrics took a deeper look at obese children, diet and heart disease risk.

Researchers out of Denver compared two diets'—a plant-based, no–added-fat diet and the American Heart Association's (AHA) diet—impact on cardiovascular disease (CVD) risk reduction in obese children (Feb. 11, 2015).

The randomized study was conducted over a four-week period (April 20, 2013 to May 18, 2013) in a large Midwestern hospital system's predominantly middle class outpatient pediatric practices. A total of 30 obese children, ages 9 to 18, with high cholesterol were randomized to plant-based diet or AHA's diet with weekly two-hour classes of nutrition education. One parent of each kid was also assigned to a diet plan.

Children on the plant-based had nine and children on AHA had four statistically significant beneficial

changes from baseline: BMI, systolic blood pressure, total cholesterol, low-density lipoprotein (LDL) cholesterol, high-sensitivity C-reactive protein (CRP) and insulin were impacted from the plant-based diet; myeloperoxidase, mid-arm circumference and weight were impacted by both diets; and waist circumference was impacted by the AHA diet. Adults on the plant-based and AHA diets had seven and two, respectively, statistically significant beneficial changes.

The significant change favouring AHA was a 1-percent difference in children's waist circumference. Difficulty shopping for food for the plant-based diet was the only statistically significant acceptability barrier. Based on these results, the researchers said a plant-based diet and the AHA diet in both children and adults demonstrated potentially beneficial changes from baseline in risk factors for CVD.

The frozen aisle can help make these types of diets more convenient. Lots of vegetarian-based dishes and "imitation foods," such as vegetarian burgers and nuggets, are chock full of good-for-you ingredients like kale, spinach and more.

Drinking beer could help ward off dementia

Nutra Ingredients 02-Feb-2015

Drinking beer could slow the development of forms of degenerative diseases such as Alzheimer's and Parkinson's, according to a study in the Journal of Agricultural and Food Chemistry.

Xanthohumol, a flavonoid present only in hops, has been identified by researchers from Lanzhou University in China as a 'potential candidate for the prevention of neurodegenerative disorders.' Previous studies have suggested oxidative damage to neuronal (ie brain) cells contributes to the development of such diseases. Researchers now believe xanthohumol could protect these cells from oxidative damage and help slow the development of brain disorders.

Hops and Chinese medicine
Hops are widely used in beers. In traditional Chinese medicine, hops have been used to treat a number of ailments for centuries.
"Xanthohumol has attracted considerable interest because of its multiple pharmacological functions, including anti-oxidation, cardio-vascular protection, anti-cancer and cancer chemoprevention, antivirus, anti-obesity, and anti-inflammation," said Jianguo Fang, one of the researchers. "The presence of a high concentration of xanthohumol in beers might be linked to the epidemiological observation of the beneficial effect of regular beer drinking."

115.4m cases of dementia by 2050
Dementia – the deterioration in cognitive function – is 'one of the major causes of disability and dependency among older people worldwide,' according to the World Health Organisation. It projects there will be 115.4m people worldwide suffering from dementia by 2050.

Alzheimer's disease is the most common cause of dementia and may contribute to 60-70% of cases. Oxidative-stress occurs when a cell is exposed to more reactive oxygen compounds than it can degenerate. This can damage the cell. Oxidative-stress is linked to a number of diseases including Alzheimer's. The researchers synthesized xanthohumol and studied its neuroprotective function against oxidative-stress-induced neuronal cell damage in the neuronlike rat pheochromocytoma cell line Pc12.

"Increasing evidence has supported that oxidative stress is a causal, or at least an ancillary, factor in the progressive degeneration of a subset of neurons (which is the pathologic hallmark of adult-onset neurodegenerative diseases)," said Fang.

"Surgical operation to replace the dying or dead neurons in these diseases has been demonstrated only with limited success. Therefore, pharmacological management intended to assuage the oxidative stress is one promising strategy to protect loss of neurons. We demonstrated that xanthohumol, as low as 0.1 μM, could significantly protect neuronal cells from oxidative insult. This concentration could be easily reached in vivo by daily intake of xanthohumol -containing products, such as beers."

Butein Potential: Research review outlines case for butein as a 'modern nutraceutical'

Nutra Ingredients 10-Feb-2015

The simple polyphenol butein has strong nutraceutical value and is a 'promising candidate' for incorporation into health products geared at preventing and supporting a variety of health conditions, say researchers.

Writing in the journal Phytochemistry Letters, the research team noted that butein – which is a natural dietary chalcone – is a common ingredient of botanicals used in herbal medicine formulations, particularly in Asian

countries, and suggested that there is a great potential to translate this traditional use in to use as a modern nutraceutical ingredient in functional foods.

Led by Ruchi Badoni Semwal from Tshwane University of Technology in South Africa, the team suggested that although butein is a simple polyphenol, it exhibits 'a range of pharmacological properties' – "most notably acting as a potent protein tyrosine kinase inhibitor and as an antineoplastic agent."

"Although this molecule is endowed with an impressive list of biological properties, which have acted as scientific support for its commercialization, there are no review articles that coherently discuss various aspects of this chalcanoid," wrote the authors. "Although butein and butein-rich plants have a rich history of use as food additives in various countries … it is clear that the compound has not been fully exploited in western countries. Butein is a promising candidate for incorporation into health products geared at preventing and supporting a variety of conditions," they concluded.

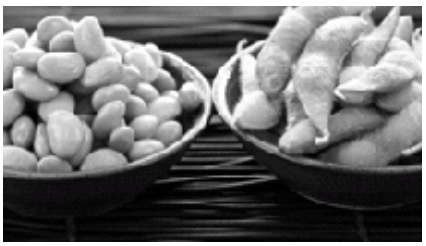
Semwal and colleagues noted that butein (2 ,3,4,4 - tetrahydroxychalcone) is naturally found in a wide variety of unrelated plant genera including Butea Dahlia, Coreopsis and Searsia. According to the review, the compound has a long history of use as a food ingredient and is 'widely' used in traditional herbal remedies in Asia.

While research has suggested that the polyphenol has potentially beneficial effects on a number of conditions and physiological systems, there is a current lack of data from human intervention studies to back up these claims, they warn. "Butein is an important dietary polyphenol. It has been recognised for its ability to inhibit the enzyme protein tyrosine kinase, thereby preventing phosphorylation and affording protection against some cancers and inflammatory diseases," said the team.

In addition, they suggested that a variety of in vivo research has shown that butein also exhibits promising anti-inflammatory, antidiabetic, antinephritic, antithrombin, anti-angiogenic and hepatoprotective activities. "Despite these reports, it is evident from the literature that pure butein has never been tested in humans in a full clinical trial," said the authors. "Such a trial is crucial," said the team - who noted repeated that the compound has 'strong' nutraceutical value and is a promising candidate for use in modern nutraceutical supplements and functional foods.

Changing diets: plant protein sustainability crucial for food security

Food Navigator 21Jan2015



Meeting demand for sustainable plantbased protein is set to be a key challenge for future food security, according to a new report.

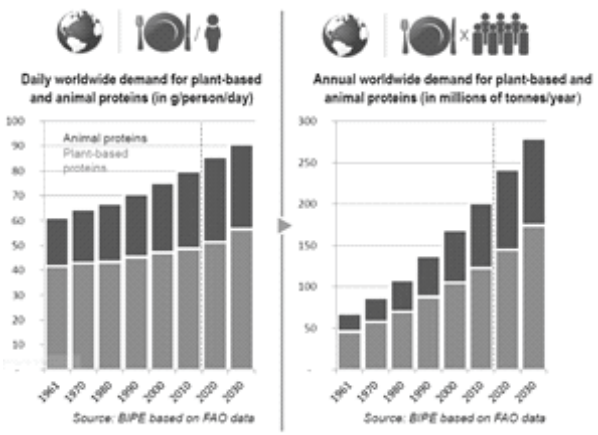
While meat consumption is on the rise in much of the developing world, it is beginning to fall in developed economies. In fact, average meat intakes in Western Europe fell by 9% from 1990 to 2009, FAOSTAT figures show. But demand for meat is set to tail off sharply from 2020 because of a major shortage of oilseed meal for feed, claims a report from Paris-based consultancy BIPE and Sofiprotéol, which represents the French vegetable oils and proteins sector. And in wealthy nations, it argues that falling meat consumption is also part of a wider dietary transition.

"Ensuring the availability of the protein supply while protecting resources means increasing the crop yield on a sustainable basis," said Sofiprotéol deputy CEO Michel Boucly.

Two dietary transitions

The report suggests that regions like Sub-Saharan Africa, North Africa, the Middle East and India are just at the beginning of a first dietary transition, characterised by a shift toward more protein, initially from plant sources and then from animal sources – particularly meat. Plant protein sources increasingly are replaced by animal protein sources, and demand for oils also increases.

Developed economies went through this first transition during the 20th century, and now are entering a second transition, the report's authors say. "The second dietary transition is characterised by an increase in the percentage of plant protein sources, either by reducing the level of demand for animal proteins, as seen in France over the past ten years, or increased consumption of plant proteins, as is currently the case in North America," they wrote, adding that



vegetable oil demand also falls during this phase.

Health awareness
"This second transition is the result of societal and environmental factors, such as growing awareness of the importance of a balanced diet."

Indeed, there is a mounting body of research highlighting the health benefits of a vegetarian diet (or even a reduced-meat diet), including lower BMI, increased fibre intake, and lower risk of cardiovascular disease, cancer and diabetes. And researchers increasingly are asking questions about how to address the dual issues of health and environmental sustainability through dietary patterns.

According to the BIPE Sofiprotéol report, demand for plant-based proteins from 2010 to 2030 will grow by 43%, driven by Sub-Saharan Africa and India, which are likely to be at the beginning of the first transition phase during this period.

Animal protein demand, meanwhile, will grow by a third – and a third of that growth is expected to come from China. However, dietary transitions only account for 25% of the increase in meat demand, with the rest coming from population growth, the report predicts.

To meet the growing demand for plant protein – for both human and animal consumption – Sofiprotéol's Boucly said: "It is essential to develop seed research, to encourage the plant health and nutrition businesses, and to develop innovative crop systems. First and foremost, however, it is the sustainable structuring of agricultural sectors that will enable us to meet the challenges that we are facing."

Measuring the immeasurable? The challenges of researching mood and nutrition

Nutra Ingredients USA 04-Feb-2015

Mood is often assessed in nutrition research but it is 'hard to define' and 'inherently subjective', according to the researchers behind a review of mood-measuring methodology.

The researchers from the University of Hull in the UK and Weill Cornell Medical College in Qatar said their review was an attempt to improve practices in the assessment and understanding of mood in nutrition research, which they said could be easily influenced by non-nutritive factors.

"Despite its importance as a reinforcer of ingestion, mood is hard to define and is inherently subjective. Consequently it is not feasible to produce a definitive procedure for assessing it. However, it is important to distinguish mood from emotion, and in nutrition research it is important to be aware of the distinction between protracted and transient mood, because the problems of assessing the two are quite different, and because eating and drinking are more likely to affect transient mood," they wrote in the journal Nutrition Research Reviews.

They said research in this field largely focused on this longer term sense of mood, with rating systems developed to reflect this. Meanwhile transient mood was far more difficult to measure, meaning assessments needed to be

"theoretically considered, brief and administrable quickly, comprehensive, usable, fit for repetitive administration, and administrable under conditions where theoretically irrelevant cognitive factors that can influence mood rating have been considered and controlled".

Spot the difference
The researchers defined emotions as "strong affective responses" that usually had visible behavioural effects like changes to facial expressions. Moods, however, did not necessarily manifest themselves in such a visible way.
Likewise they said it was important to distinguish 'protracted mood' as occurring over a period of hours or days, and therefore easier to assess by questionnaires, from the fluctuating 'transient mood'.

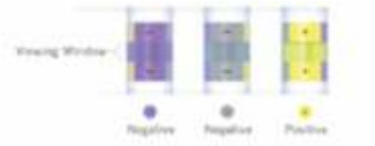
This fluctuation could be problematic when using assessments that reported mood retrospectively, since to recall recent feelings could mean distortion or simply see the individuals forgetting. As well as the rating system used, they said mood could be influenced by the psychological, social and physical environment around consumption.

And how does this nutrient make you feel?
Despite these challenges, they developed a ten-item questionnaire. This looked at the main dimensions of arousal (tired/energetic; restless/relaxed), the main emotions (happy/sad; angry/calm; anxious/composed; disgusted/satisfied), plus feelings relating to physical condition (hungry/full; thirsty/not thirsty; intoxicated/sober; ill/well). Pain could also be added if relevant.

Regulatory & Safety News

Hygiena unveils environmental Salmonella test kit

Food Quality News 21-Jan-2015



Hygiena has launched a Salmonella environmental monitoring test which delivers a presumptive positive within 24 hours.

InSite Salmonella is a swab test which contains a medium formulated with growth enhancers and chromogenic compounds which changes colour when Salmonella species are present in the sample. A color change from purple to bright yellow in 24 hours is considered a presumptive positive. Results cannot be considered presumptive negative until 48 hours incubation and presumptive positives can be confirmed using selective Salmonella agar plates or a recognized confirmatory method.

Quicker results, quicker reaction

Lauren Roady, marketing manager at Hygiena, said by knowing results sooner, processors can react to environmental contamination earlier, preventing lot contamination or product recall. "Also, InSite Salmonella is much easier to use than other kits because it doesn't require any measurement, mixing, or pipetting to run the test," she told FoodQualityNews. "The media is all pre-measured and self-contained within the environmental sample collection device, so there is virtually no room for operator error."

Hygiena's InSite Salmonella test

The test device eliminates sample preparation items, saving material and labour costs, said Hygiena. Other environmental Salmonella species test kits require steps including measurement and mixing of media, sample enrichment, and transfer of enriched sample to the test device, said the firm. It features a large 2.5 inch foam swab for maximum sample pickup and is sensitive to 1-10 CFU.

ATP tests to monitor environment

Roady said most food processors regularly monitor the environment for general cleanliness using adenosine triphosphate (ATP) tests. "Monitoring for environmental pathogens is part of risk-based preventive control monitoring program, so the frequency and volume of environmental pathogen testing depends on risk, budget, and quality commitment," she said.

"However, the rules proposed by the FDA for FSMA suggest that there may be a greater emphasis on preventive control monitoring for high-risk food processors, such as Ready-to-Eat, dairy, meat, produce and others."

The user swabs a 12x12 inch surface after cleaning, replaces the swab in the tube, and then incubates the device. After pre-enrichment, the device is activated, releasing the pre-measured selective media into the tube and incubation is continued.

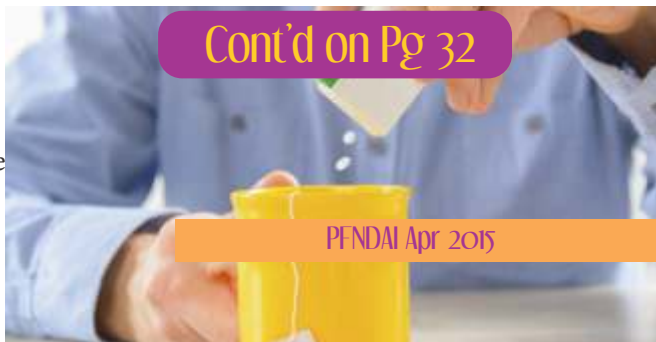
If Salmonella species is present in the sample, the medium in the test will change from purple to bright yellow. If there is no colour change by 48 hours, the sample is presumptive negative. For environmental monitoring, food processors are looking for rapid tests that are easier to use, said Roady. "I think most food safety and sanitation professionals will agree, the most simple and easy-to-use environmental monitoring tools are ATP monitoring systems," she said. "New test kits for microbiology testing, that are just as easy to operate as an ATP test, are making environmental microbiology more approachable for in-house food labs."

No danger from low calorie sweeteners

Food Manufacture UK 22-Jan-2015

Low calorie sweeteners do not increase appetite, have no discernible effect on satiety and can enhance weight-loss, leading food scientists have claimed.

Their conclusion follows recent research from consumer research firm Marketing Sciences that claimed consumers were demanding more naturally sweet products and associated artificially sweet products with poor health. However, independent experts, such as Professor Adam Drewnowski from the University of Washington's department of epidemiology and Professor James Hill from the University of Colorado's school of medicine, slammed such claims.



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Safety and efficacy
"The consensus amongst experts in their field is that, yes, low calorie sweeteners do work," said Drewnowski. "All the toxicological and safety work done by international agencies has repeatedly attested to their safety and efficacy." The toxicological and safety work referred to by Drewnowski included the European Food Safety Authority's (EFSA's) recent safety statement for the artificial sweetener aspartame.

Aspartame posed no threat to consumers at current recommended levels of consumption, according to the EFSA's risk assessment, which was released at the end of 2013.

There was also a wealth of research and evidence that suggested low calorie sweeteners were capable of helping consumers lower their weight, Hill claimed. "Weight management is one of the primary reasons people use low calorie sweeteners, and I think we now have a tremendous number of studies that show low calorie sweeteners are positive – not negative – tools for the management of weight," he added.

Is it possible to change the belief that unhealthy food is tastier?

Food Navigator 27Jan2015

Efforts to shift food choices toward healthier options often fail because there is a perceived conflict between health and taste, according to a new study.

The research, published in The Journal of Public Policy & Marketing, found that most people consider taste the most important attribute when choosing foods – and unhealthy food is widely considered to be tastier than healthier options. The authors point out that policymakers often have tried to encourage healthier food choices by raising consumers' health consciousness, but this has fallen short of expectations.

"Changing a belief to which consumers subscribe at an implicit level is difficult," they wrote. "…Policy planners must instead find ways to make healthy foods more appealing, by improving the actual taste as well as the packaging and marketing, and by investing in social campaigns which work on consumer's emotions and encourage a sense that healthy eating is 'cool' and prestigious." In a series of experiments, the researchers gave participants various yoghurts with differing amounts of fat and sugar, and provided different levels of information. Even when given nutritional information intended to steer them toward the healthier choice, most consumers still chose the less healthy option. And whether they were informed or not, most considered the less healthy yoghurt to be tastier.

"The studies jointly demonstrate that the UTI (unhealthy = tasty intuition) partly works implicitly and independently of health consciousness. Hence, the obesity epidemic should be addressed through concerted actions that include policy makers' health communication and the food industry's product development," the study's authors wrote.

They acknowledged that the focus of this research was the role of taste vs. health, while there are a range of other factors that influence food choice, including price, brand, packaging, convenience, variety seeking, social influences and norms. "Our findings suggest that a holistic and positive approach in food marketing is needed to foster healthy food choices," they concluded.

Cont'd from Pg 20

According to the Nestlé scientists, this process maintains the food's natural amino acids, carbohydrates, and organic acids, as well as volatile compounds, such as aromas. Having these elements preserved in the components of a finished dish makes the flavours, colours, and aromas more intense, without the addition of a single flavour enhancer or additive, or even salt.

In particular, the team noticed an enhancement of sulphur volatile compounds when boiling at lower pressure, which correlates with a greater leek aroma. In this way, the researchers established that imitating the conditions of mountain cooking through low-pressure boiling might be used to enhance the flavour profile of culinary preparations.

Global frozen food market to reach $156 B by 2020

IFT Weekly February 18, 2015

According to a new market report "Global Market Study on Frozen Food: Frozen Ready Meals to be the Largest Segment by 2020" published by Persistence Market Research, the global frozen food market was valued at $122.1

billion in 2013 and is expected to grow at a CAGR of 3.6% from 2014 to 2020, to reach an estimated value of $156.4 billion in 2020.

Busy lives are influencing consumers to shift their dietary preferences towards ready-to-eat food products. Hence, frozen foods have become an important part of the modern diet.

Freezing or refrigeration allows consumers to have access to foods which were either unavailable or available only during a particular season. Also, freezing helps consumers to preserve their food products for future use.

Availability of a wide range of frozen food products in different food categories is the factor driving the global frozen food market. Other driving factors are changing customer purchasing patterns and increasing urban population. Additionally, increasing numbers of working women are driving the global frozen food market. The majority of working women in Western countries don't cook food at home.

Europe has the largest market share for frozen food, followed by North America and Asia Pacific. In Asia Pacific, economic developments paired with increasing urbanization and disposable income are some factors driving the frozen food market. Owing to these factors, Asia Pacific is expected to witness the highest growth in the forecasted period.

Algae and plant protein potential limited by scale

Food Navigator 02 Feb 2015

Lack of scalability still prevents algae and plant proteins from being used as major food sources, according to Mars chief agricultural officer Howard Yana Shapiro. Discussion of algae's potential as a major source of food rises and falls on a seven to ten year cycle, Shapiro said in an online forum.

"The issue is scale," he said. "To date, no one has figured out how to deal with issues such as drying the material efficiently, how to extract the protein and not have it be a green colour (which is not necessarily desirable to many people), the water use issues, and do we know what the best varieties to grow that offer the most promise for the future of food?"

He added that he was aware of people who were pushing the boundaries but said it was still not financially viable. "I hope it is one day," he said.

Algae have varied food and nutrition potential, including as a source of omega 3, beta-glucans and as a source of the food colouring and antioxidant astaxanthin. Algal ingredients can also be used to replace fats in certain products, and are rich in protein, which could be produced with far less water than protein from plants like soy, for example.

The algae discussion was part of a Science AMA Series on the social media site Reddit. AMA stands for 'ask me anything' and the science series connects scientists looking to improve understanding of their area of research with forum users.

From discovery to daily diets

Asked about other ways to eat more sustainably, Shapiro said scale was also a challenge for plant-based proteins. "There will always be a desire for animal protein. What we really need to do is understand how vegetative protein can take the pressure off the production of animal protein."

He suggested that plants' protein content could be increased, plants could be made more resilient to particular climate conditions and saline-type soils, and plant-based proteins could satisfy a large portion of the population with textures, flavours and attributes that mimic animal-based protein – but discoveries in these areas needed to be scaled up and financed "to get this to a place where plant-based protein in every region of the world is an integral part of the daily diet".

"Very little work has been done to date that answers the call for plant-based protein," he said. "…What is the potential to double or triple the protein and nutrient content of most of these plants with modern plant breeding? We have to imagine it's very high, but this is intentional. We have to make our minds up to be intentional about plant-based protein. That effort is just beginning and it will gain traction very, very quickly."

He said that Mars was working with researchers on many of these issues, and finding solutions was dependent on collaboration.

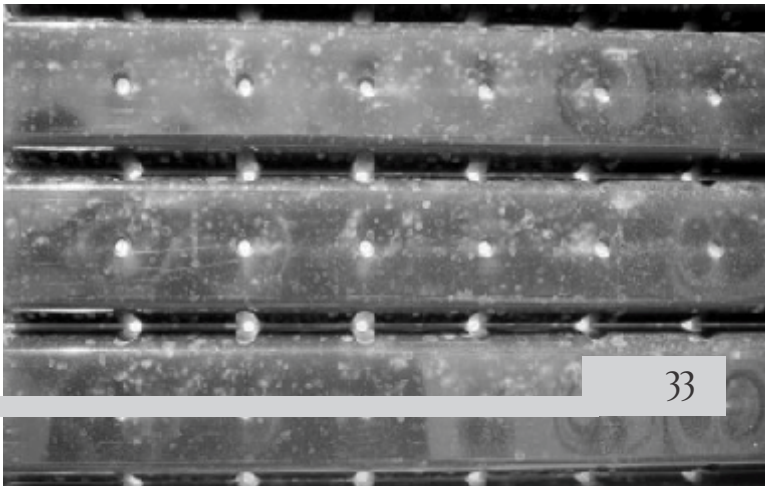

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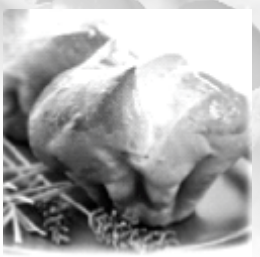
Table 5: Composition of Brioche Prepared with Conventional Recipe and High Lipid Algal Flour

Ingredient	Control Product %	New Product %
Wheat Flour	47.9	48.9
Wheat gluten	1.5	1.5
High Lipid Algal flour	0	5.4
Sucrose	4.9	4.9
Glucose syrup	3.5	3.5
Salt	1	1
Maltodextrin (DE=2)	1.5	1.5
Dry yeast	0.7	0.7
Improvers	1	1
Butter	13.3	0
Whole eggs	12.1	0
Water	12.4	31.4
Total	100	100



Taking Health Forward

It is because of its ability to challenge conventional approach of preparing food, High Lipid Algal flour has made it possible to reduce fat and replace egg, giving benefits to producers as well as consumers in sustainability, health, functionality and costs. This impressed the jury members of Food Ingredients 2013, presented High Lipid Algal flour as the most "Innovative Ingredient of the year."

Regulatory Forum

Cont'd from Pg 22

One can see the sweeping effect such an interpretation of a standardized food can have on other foods. The "standardization mindset" has created such a menacing proposition to product development that even if a company's food R&D developed an exciting product, the legal or regulatory affairs department will inform it of the treacherous road ahead and that no time commitment can be given on the date to market if an amendment is required.

Even the testing of the product in the market place raises apprehensions of being in violation. Freedom to innovate is stifled at birth. At every step a regulatory hurdle looms primarily because of the standardization mindset. Many food product developers feel that the standardization effect has definitely slowed down or prevented progress and improvements which in turn has not been to the consumers' advantage.

Proprietary foods as a provision in law enable initiative and improvement and allow consumers to receive the benefits of innovations. The provision must retain its entity in law if the food industry is to prosper and grow.

(This article is reproduced from Souvenir for Seminar on Sustainability in February 2015 in Mumbai)

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Seminar on 'SUSTAINABLE SOLUTIONS IN THE FOOD INDUSTRY'

ON 27 FEB 2015

Organised by PFNDAI and Sponsored by Novozymes South Asia Pvt. Ltd.

Report by **Ms. Ummeayman R.**, Nutritionist, PFNDAI

It is the need of the hour to look at issues relating to sustainability, not only in the terms of products but in all aspects of production. Indian government has been promoting the idea of 'Make in India' and industry has been very happy with the prospects of getting a big boost.

All the signs are good for a rapid growth in all industries including food industry. People are spending more for better quality safer foods and would not mind spending extra for taste and nutrition. Industry has always been talking about their products being just that. Agricultural production has been growing steadily and also raw material quantity and quality needed by industry could be produced. Whether in the long run this growth can be sustained will depend on several factors. Sustainable solutions are needed to maintain the growth with high quality production.

There have been examples of rapid growth causing depletion of resources such as water, raw materials and power. Thus the growth in food industry needs to be balanced and sustainable so the growth could be continued for long. It is not just governments but even consumers are becoming aware of the needs.

One definition of sustainability states it as the practice of maintaining processes of production indefinitely without degrading or endangering natural bio-systems so it meets the needs of present without compromising the ability of future generations to meet their own needs. In case of food industry, it will mean use of resources, equipment, processes and packaging as well as manpower and waste management in a sustainable manner.

With this thoughts, the delegates from Food industry were welcomed by Mr. G.S. Krishnan , MD, Novozymes. He gave an insight into the need of sustainability in today's world and importance of sustainability in food. The world's population is predicted to increase to 9 bn by 2050 and so food production needs to increase by 70% to cope". Roughly one third of the food produced in the world for human consumption every year, approximately 1.3 billion tonnes - gets lost or wasted". Here, biotechnology can play a major role in terms of food security as it increases access to healthy food by increasing shelf life of breads and cakes. Biotechnology is also helpful in food safety as it reduces acrylamide in potato-based snacks, french fries, and coffee. It also plays a role in managing food waste as it increases juice yield by up to 85-90% by using Advanced Food Processing (AFP) techniques, thereby reducing waste.

Mr. Krishnan, MD, Novozymes, welcoming


Mr. Siva Nagarajan, MD, Mother Dairy inaugurating

Inaugural the Address on 'Context of Food industry in India (Make in India)' Mr. Siva Nagarajan, MD, Mother Dairy, stated that we need to protect the available resources as we don't inherit the earth from our ancestors, we borrow it from our children and so it is our duty to repay for what we have utilised. Thus the baseline study of sustainability is 'Meet the needs of the present without


Chairman and Vice Chairman, PFNDAI

compromising the ability of future generation to meet their needs, this is sustainable development. All our endeavours need to be to gap assessment in every aspect and fill the gap. There is to be a synergy between vision and sustainability. Mr. Siva shared the Sustainability goals of Mother Dairy i.e.20% water efficiency, at least 1 zero discharge unit and 100% water recharge, reduction of carbon footprint by 20% over 3yrs, Roof top solar systems in all processing units.

Mr. Asim Parekh, Vice President, Technical, Coca Cola in his Key Note Address on 'Innovation and food industry' brought the focus on one of the important concern for food industry , which is scarcity of water and water pollution. NGO's are trying to solve the problem but the pace of the solution is slow. Industry is trying and would like to combine and ensure environment and economic sustainability. Taking steps towards sustainability, the challenges that are normally faced by industry is sustainable sourcing, increase in operating efficiency,


Mr. Bhupinder Singh, Chairman, PFNDAI, giving Special Address

sustainable offering. Innovation is all about new and sustainable product. Pulp that was once considered to be a waste is now used in juices to make them pulpy drinks and this has increased the cost of pulp which was once considered a waste product. Thus it would be wise to say that there is no waste, we call it waste as long as we don't know its appropriate use.

Special Address on 'Future prospects' by Mr. Bhupinder Singh, CMD, Vista Processed Foods & Chairman, PFNDAI , presented some on hand experience and projects that he has undertaken. He also shared the model of Sustainable 'Consolidated' Farming by Vista (OSI) India. The company has undertook consolidated farming to enable small farms to adopt the best practices. Consolidators were helped to recruit technically qualified agriculture professionals. The farmers, with the help of consolidators have been tied up with Agriculture Universities, Research Institutes, Input Companies, Banks, Govt Institutions, etc for extending the industry benefits. This model ensures even spread of risk between farmers – to – consolidators – to - processor – to – supplier leading to sustainable farming practices.

Session 1-Importance and Application of Technology in Food Industry: Chair: Dr. Danielsen, Novozymes

Dr. Danielsen, Head R&D, Novozymes presented


Dr. Danielsen, Novozymes

'Innovation for ensuring sustainability'. He stated that the aim of any company should be to produce more by increasing the efficiency, decrease the energy consumption and decrease the waste system. In most of the cases, the conventional methods are followed but it's time to look at innovative methods with enzyme assistance. Bio-innovation is a solution for food and beverage.

Importance of Biotechnology applications in driving food industry and food processing industry was presented by Dr. Gurmeet Singh, R&D Director for Refreshment Discover, HUL. To improve the production the area to intervene are – raw materials, manufacturing ,transport, retail, consumer disposal. For tea- energy, water, and resources has to be invested to double the output. Thus tea colour, taste, brewing and other physical properties of the product can be improved. But there is a much simpler way to achieve the similar results of quality improvement, it is by Genotype isolation.

Mr. Asim Parekh, VP, Coca Cola, giving Keynote Address


Mr. Gurmeet Singh, HUL


Dr. Malathy V., PFNDAI

Dr. Malathy V., Food Technologist, PFNDAI presented General introduction to sustainability issues in the food sector. She presented some of the examples of innovative technologies in food industry. Some of the simple applications are as sensors in detection of salmonella in the production line and maintain the quality and Nano Barcode- where the product and atmosphere in the package is detected- oxygen in the packet is detected by the bar code in the package .There are innovative processes for utilization of waste and by-products, some examples are production of potato protein from potato processing waste water, production of vegetable or fruit juices from cutting residues and whey permeate is a success story.

Dr.Indu S Sawant, Principal Scientist, & I/c Director, ICAR-NRCG. She presented the two Indian bred grape varieties that are highly suitable for juice makingOne of the variety is a new grape juice variety ' MEDIKA', which is hybrid of Pusa Navrang x Flame Seedless. These varieties are developed at ICAR-NRC for Grapes, Pune. It is a teinturien variety with coloured pulp. The juice from this is well appreciated due to its attractive color, sweet taste and no foxy flavor. Also the neutraceutical compounds in Medika are very high with Quercetin-3-glucoside being 12 – 34 mg/kg and resveratrol being 1 – 1.5mg/kg.


Dr. Indu Sawant, PR Scientist, NRC for Grapes, Pune

Session 2: Food and Nutrition was chaired by Mr. Sridhar Kameswaran, GSK.


Mr. Kameswaran, GSK

Affordability and access to Food is an important aspect. Mr. Kameswaran stated that there is a need for network building for nutrition and more emphasis and awareness is to be created towards physical activity. Right balance is extremely required.

How to address global issues/needs related to hunger and nutrition was addressed by Prof. Shobha Udipi, Director, Research in Food & Nutrition, SNDT Women's University. The four pillars of food security are availability, access, utilization and stability. Undernutrition one of the world's most serious but least addressed socioeconomic and health problems. Human and socioeconomic costs of undernutrition are enormous and there is greatest impact on the poorest, especially on women and children. In India, an estimated 35 - 40% of fresh produce lost because wholesale & retail outlets lack cold storage . Even rice grain which can be stored more readily, ~1/3rd of the harvest in Southeast Asia lost after harvest to pests and spoilage .When there is a glut of food crops, farmers often have to sell immediately to raise cash, may occur at a loss due to lack of storage facilities. Thus steps need to be taken and attend to disparities between different areas in a given country in terms of food supply and access, challenges of distribution of food across areas and countries.


Dr. Shobha Udipi, SNDT

Snacking and India presented by Ms. Devishree Murty, Nutrition and Health Leader, South Asia, HUL, showed how have changing lifestyles affected snacking trends?. Snacking today is mostly about eating not so healthy food, which includes fried snacks, chips, biscuits, chat etc. One of the important factors of snacking is late dinners, this increases the hunger gap and gives space for snacking. It is not only a concern for kids but the trend for snacking is seen in mothers too, biscuits/khari, fruits & appam/dosa/uttapa are the most frequently consumed pre dinner snacks among mothers .Thus is it wise to consume healthy snacks such as nuts, as they are rich in proteins, fibre and essential fats or consume dairy foods that are rich in proteins, calcium, vitamins A/D, or consume eggs as they are


Ms. Devishree Murty, HUL

good source of proteins, vitamin A/D .

Session 3: Food and sustainability was chaired by Mr. Asim Parekh, Coca Cola

'Sustainability Considerations in Food Manufacturing – A GSKCH journey' was presented by Mr. Sridhar Kameswaran, Exec. VP,R&D- Nutritionals, GSK. Mr. Kameswarangave an insight into the sustainability efforts taken by GSK through the use of raw materials. He also stated some of the environment strategies for 2015.

'Issues and challenges in the food sector' were discussed in his presentation Dr. Vijay Sachdeva, Procurement Manager – Supplier Dev., S. Asia & Africa, HUL. The

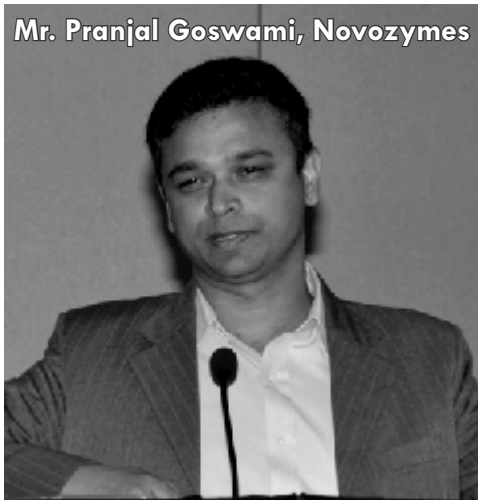

Dr. Vijay Sachdeva, HUL

goal of company is to double the size of the company's sale but with reduction in the environmental impact. He gave an insight into the case study of Tomatoes cultivation whereby the farmers are made aware of the various technologies and were trained, they are provided with seeds and this gave a positive result.

Mr. Pranjal Goswami, Head, Sustainability, Novozymes stated the 'Important issues about sustainability & waste'. One of the biggest challenges the globe is facing is 'feed the world' or in other words, providing the world population with enough food. The FAO has classified the current time as a "new era of rising food prices and spreading hunger," noting that "food supplies are tightening everywhere and land is becoming the most sought-after commodity as the world shifts from an age of food abundance to one of scarcity."

The global challenge is to increase food production through improving agricultural productivity efficiently, whilst minimizing environmental footprint in the food value chain, by adopting sustainable development approach. A "sustainable food" system consists of a variety of elements such as production of food, supply of food, health, safety, affordability, quality, viable food industry and sustainability issues such as climate change, biodiversity, water etc.

An integrated approach of management, governance and innovative technology application is expected the deliver desired outcome in mitigating the challenges around food. Capacity of technological innovation alone is not a solution to all difficulties of sustainable development; it is just one constituent in a large and complex socio-economic system. Application of biotechnology has a significant potential to increase production and productivity, preserve the environment, and improve food safety and quality.


Mr. Pranjal Goswami, Novozymes


Mr. Venkatesan, Mead Johnson

Closing Session: Way forward for food industry in India was chaired by Mr. Sailesh Venkatesan, MD, Mead Johnson.

'He stated some of the problems that are faced by industry and how regulation is a concern and one of the hindrances to innovation.

Presenting his ideas on 'Possible steps required to bridge the gap to bring competitive advantage for the industry', Mr. Naveen Kumar, Head R&D, Britannia stated 'Innovations in India are tactical , India needs more sustainable and radical innovations, innovate around consumer occasions and check consumer mindset, innovate around unmet consumer needs. Innovation can be in ingredients, inputs, processes, around consumer occasions. It is an enabler for growth'.

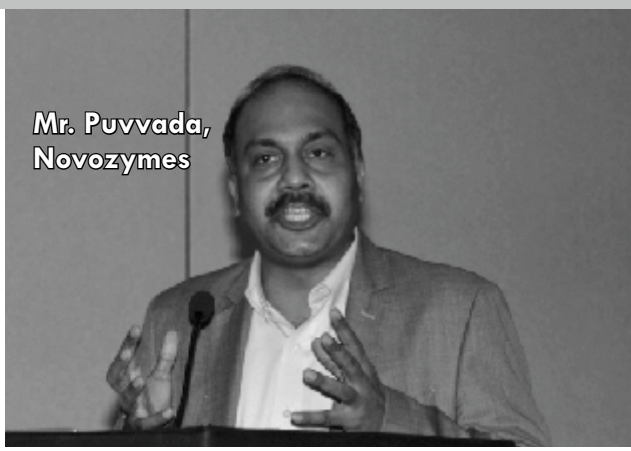

Mr. Naveen Kumar, Britannia

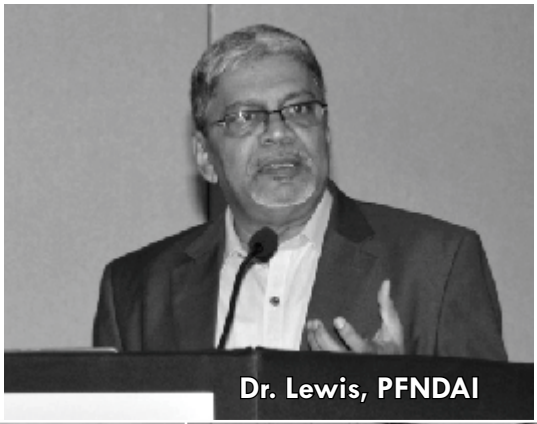
Way forward with food innovation, Dr. Manish Paradkar, Manager Quality, ITC R&D Centre presented the ways of Food Processing Innovations. He stated that it is


Mr. Paradkar, ITC

important to develop new processing technologies. Some of the processes like cold plasma processing and pulsed electric processes are being utilized. These help to reduce production losses, to enhance nutritional values, to increase hygiene level, reduce D&D (damaged and destroyed stock) .Wet Polishing of pulses decreases nutritive value and addition of bran to Atta increases nutritive value.

'Regulatory Challenges', presented by Dr. J.I. Lewis , Chairman-Regulatory Affairs, PFNDAI, gave a wider view of the regulatory scenario in India. The concept of less government and more governance is good but the term governance needs to be understood, it is not liberty with control but it is responsibility with control.


Mr. Puvvada, Novozymes


Dr. Lewis, PFNDAI

Closing Remarks & Vote of Thanks by Mr. Krishna Mohan Puvvada, Sales Director, Novozymes, stated that this is just a step towards sustainability.
There is need to look at the environment issues with greater concern and more need to be done not only by food industry but other sectors too to get some sustainable solutions.


Dr. Adhikari thanking Ms. Pooja Bera of Novozymes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