



MAR 2016

# PFNDAI Bulletin

## HOLDING FOOD SAFETY REGULATOR ACCOUNTABLE



Also Inside

**Shelf Life Study:**  
Understanding the Basics

**Research in**  
Health & Nutrition

PROTEIN FOODS AND  
NUTRITION DEVELOPMENT  
ASSOCIATION OF INDIA

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Cover Design & Bulletin Layout by Ms. Leena Shanbhag

# Editorial

Vitamin D is very essential for bone health. It is available free as it can be formed in our body when we are exposed to sunlight and so it is also called sunlight vitamin. Everyone knows that vitamin D is needed for promoting absorption of calcium which is needed for strong bones. However, it is known now that this vitamin is needed for many health benefits.

Vitamin D is useful in reducing blood pressure and lowering chances of heart disease as well as lowering the risk of diabetes. It has been shown that it also reduces risk of rheumatoid arthritis or multiple sclerosis. It has also been shown to be an inhibitor of cancer cell growth. It is also helps in providing immunity.

One of the best and cheapest source is of course as was mentioned earlier the sunlight. However, exposure of skin to sunlight to make enough vitamin D depends on many conditions, such as time of exposure, skin colour, angle of sun rays etc. To complicate the matters many people are now using sunscreen lotions to prevent sunburn and skin cancer. This will prevent the UV rays to be absorbed by skin for formation of vitamin D.

There are many who hardly get any exposure to sun as they are either too busy or live in cities where there is hardly any chance of exposure to sun rays. Earlier people used to walk on streets but now they travel in cars. Kids hardly play in sun. All this necessitates people to take supplement or consume foods that are fortified with vitamin D.

There are two types of vitamin D, one is produced in our body that is D3 or cholecalciferol which is also obtained in fish oils such as cod liver oil. The other is vitamin D2 ergocalciferol which is commonly made by UV radiation of ergosterol in yeast. Although traditionally oral formulations of vitamin D2 and D3 were regarded equivalent in clinical activity, it is now shown that D2 is much less potent and has a shorter duration of action than D3. Cholecalciferol is more than 3 times effective than ergocalciferol in elevating the vitamin D levels in body and maintaining those levels for a longer time.

In India, we have started labelling everything as vegetarian and non-veg. Even vitamin D enriched food has been labelled vegetarian if D2 is added and non-veg. if D3 is added as food inspectors started taking actions against those who do not. Actually scientists feel that veg or non-veg differentiation should not exist at molecular level.

In Northern Ireland, since vitamin D3 obtained from sheep wool wax is considered as vegetarian as sheep is not killed while shearing wool. We also consider milk as vegetarian. There are differences of opinion about eggs though, hence the term "eggetarian". Anyway, we need to make some distinction or exception so D3 enriched foods will still be vegetarian and people will get the benefit of superior form of the vitamin.

. With season's greetings,

Prof. Jagadish S. Pai,  
Executive Director  
executivedirector@pfn dai.org



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# HOLDING FOOD SAFETY REGULATOR ACCOUNTABLE



By **Dr. P.I. Suvrathan**

## 1. Why a Road Map for FSSAI?

FSSAI has completed five eventful years of its existence and it is time for the Government to take stock of its performance, in relation to the objectives originally laid down by Parliament. It is also necessary to outline a road map for the next five years so that the food safety regulator comes up to the expectations of the Parliament which passed the Food Safety and Standards Act in 2006. As the main stakeholder, Government now has an opportunity and responsibility to review the regulator's performance and lay down the operative framework, short and medium term deliverables and timelines as well as priorities which it expects the regulator to follow in the area of food safety. The test of a good law is the way it is implemented. We have any number of excellent laws which remain in the statute book

without being implemented.

The following could be the contours of such an accountability framework.

## 2. Risk Assessment

FSSAI Act has laid down that risk assessment will be the principle which FSSAI will follow while laying down safety standards so that keeping in view the availability of resources and risk perception as well as scientific evidence, the most optimum and feasible set of measures are adopted by the regulator.

### DELIVERABLE

a. FSSAI will lay down the procedure to be followed in drawing up safety standards as well as the responsibilities of various functionaries for the same. The objective is to assure the stakeholders that they

can expect a definite response to their requests for fixation of standards within a clear time period. The procedure for clearance of requests for approval of products will also be clarified and as intended by the Act, the period for response laid down. The timelines for each step will be specified as well as the mechanism for public consultations and obtaining scientific evidence. After a period of public consultations, these will be notified and implemented. FSSAI will also draw up a simplified set of guidelines in plain English and other languages for easy understanding of stakeholders without the need for obtaining the services of a consultant.





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- b. The procedure and formats for referring scientific issues to the Scientific Panels and Committee will be drawn up, inputs of stakeholders obtained and finalized.
- c. Adequate number of scientific staff will be trained for undertaking risk assessment and provide support services to the Scientific Panels and Committee

### 3. Safety and quality of milk

The most critical food item and ingredient which is subject to widespread contamination is milk. Every year there are a multitude of incidents and enquiries about the consequences of such contamination both inside and outside Parliament. It is essential that FSSAI draws up an action plan to periodically monitor the safety of milk in various parts of the country through systematic sampling procedures, and for addressing the issues involved. It is necessary to review the existing safety standards for milk and put out an annual report on safety of milk for the information of consumers.

#### DELIVERABLE

- Develop an arrangement for periodic surveillance of safety of milk in the country.
- Review the existing safety standards for milk and suggest modifications in the light current science and technology.
- Put in place a set of measures including sampling, testing and

corrective action.

### 4. Organic Food

There are very good opportunities for development of organic food in different parts of the country because, India is by default, organic and many areas depend solely on non chemical inputs in agriculture. But for this

potential to be utilized, it is necessary that standards are developed and the transition to fully organic status is clarified. In its absence, false claims regarding organic food may be encouraged and the consumer cheated.

#### DELIVERABLE

- Develop standards for organic food, and specify the various stages of transition to organic as well as the claims which can be made by the manufacturer.
- Identify and notify the agencies which are competent to certify organic and the skill requirements for such agencies.

### 5. Water Quality

Water is the most common and critical ingredient in all types of food. Minimum safety standards for all types of water and water based drinks need to be laid down. This will apply to drinking water, bottled water and various types of flavoured water. Gradually we need to work towards higher safety standards in all types of water available to the consumer and supplied through various agencies.

#### DELIVERABLE

- Review the existing water safety standards and update them in the light of science and latest technology. Put out the draft standards for public consultation at the earliest.
- Lay down the requirement of safe water to be observed by various suppliers and the hygienic

requirements for their manufacture.

- Institute a n annual survey of water quality in different states and the issues involved.

### INTRODUCTION

Soy protein is a high-quality, complete, plant protein that is comparab 5.

### 6. Fortification

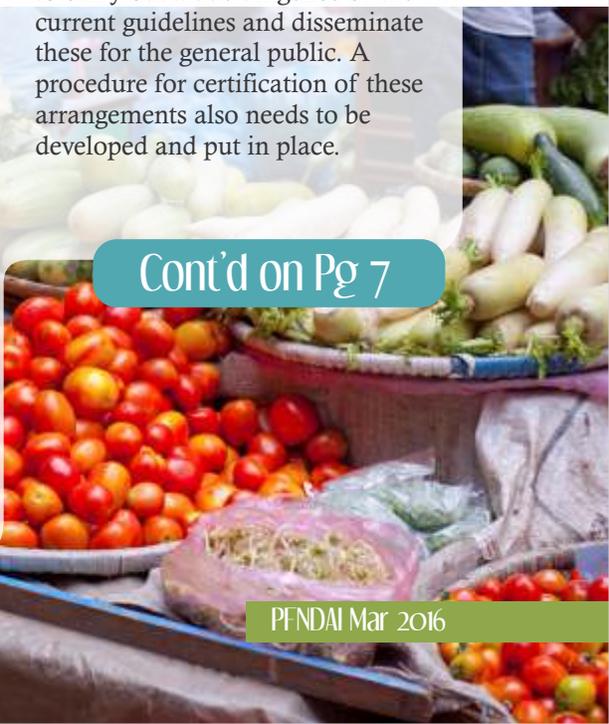
Nutrients and ingredients are often added to food to increase their effectiveness or special characteristics. Norms need to be laid down for such addition so the required effectiveness is ensured and safety is not compromised. Government may also need to fortify particular foods to ensure availability of essential nutrients to deprived sections.

#### DELIVERABLE

- Develop guidelines and norms for safe addition and fortification of nutrients in various foods.
- Issue guidelines in plain English and other languages for the manufacturers for fortification. .

### 7. School Meals

Government has already laid down safety requirements for school meals. Courts have also mandated guidelines for unhealthy foods in and around schools. It is necessary to carry out a due diligence of the current guidelines and disseminate these for the general public. A procedure for certification of these arrangements also needs to be developed and put in place.



Cont'd on Pg 7

# Shelf Life Study: Understanding the Basics



By

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Image © iStock.com / tarabee123

‘Food safety and quality’ awareness is picking up fast in India. As a conscious buyer nobody would like to buy a food product- say fried chips that has passed its ‘Best Before’ date fearing that the product might have become rancid or stale. A best before date thus helps the consumer to select a product with acceptable quality. Declaration of ‘Best Before’ date on all packed food items is a mandatory requirement for all food producers, manufacturers and retailers.

## How to decide ‘Best Before’ date of a food product?

Best before date of a food product can be determined by carrying out what is called as ‘Shelf life study’ of the product. A shelf life study is an objective means to determine how long a food product can reasonably

be stored and used, without any appreciable change in quality. A product that has passed its shelf life might still be safe, but quality can no longer be guaranteed. The shelf life of a product begins from the time the food is prepared or manufactured.

The responsibility of carrying out shelf life study entirely lies with the food producer/manufacturer. Shelf life study is beneficial to producers since it gives the food producers an insight into their formulation and processing variables. A methodical shelf life study can certainly benefit the manufacturers in terms of packaging improvements, additive additions or any other process developments that would help their product to retain its quality over a longer period of time.

## What affects shelf life of food products?

Factors affecting the shelf life of a product include following

- Water activity, pH and initial microbial load of the product
- Increase in temperature, moisture/humidity and light of the storage environment

- Improper storage and handling conditions
- Inappropriate packaging material of the product

These factors eventually lead to either microbial or non microbial spoilages.

**Microbial Spoilage:** Microbial growth at higher humidity and temperature is fast. Growth of yeast, moulds, and bacteria may lead to food spoilage or in some cases even poisoning. The time required for microbial growth and subsequent food spoilage depends on temperature and storage conditions of the product, handling conditions and packaging material of the product. Microbial spoilage due to pathogenic organisms also needs to be considered.

**Non Microbial Spoilage:** Light induced change can cause rancidity, vitamin loss or colour loss of the product. Increase in temperature can cause the product to lose its nutrients, flavour/aroma or consistency. Some packaging materials like paper bags are permeable to gases, water vapour etc. which may lead to oxidation of



Image © iStock.com/Wavebreakmedia

the product.

## How to carry out Shelf-life studies?

Shelf life study is carried out by two methods

**1. Real Time Method:** This is a direct method and involves storing the product under preselected or ideal conditions for a period of time more than the expected shelf life of the product. In reality however, once the product reaches the end user, it may get tampered or may not be stored under the recommended conditions. This may accelerate the spoilage. Thus, the shelf life estimated by real time study should still allow a 'safe' margin for the product to compensate for the tampering that the product may have to undergo.

**2. Accelerated Study:** This is an indirect method and attempts to predict the shelf life of a product without running a full length real time storage study. This kind of study is useful especially for new products and products having a long shelf life. The method involves storing the product under accelerated storage conditions like high temperature, agitation and humidity. As a result the end of shelf life is achieved quickly and the product is ready for sale in a relatively short period.

carried out it is generally recommended that a 'conservative' shelf life should be reported at first which can then be modified, once the real time shelf life data becomes available. Thus food manufactures are advised to run real time study along with accelerated study to arrive at an appropriate shelf life for their product.

During both types of studies the product is tested at periodic intervals to check when the spoilage begins. It is advisable to make a neat calendar schedule of the shelf life study plan with the sampling carried out at the beginning (zero day), at the end and between regular intervals. Selection of a season which would most likely harm the product should be chosen. In a country like India, the study should be started and run throughout the summer and rainy season. Any product that passes the study at these seasons, will most likely pass the shelf life study done at any time throughout the year.

The results obtained from the accelerated studies are extrapolated to get the real time shelf life.

However it has been proved that accelerated studies may under-predict or over-predict the real shelf life.

Therefore when such studies are

## How to decide the sampling intervals?

The sampling interval should typically be 20% of the expected or estimated shelf life.

## How often one needs to do shelf life study for a product?

As long as the composition and source of raw material, processing conditions and packaging materials remain unchanged, the study need not be repeated.

## What test parameters should be chosen for shelf life study?

Selection of appropriate test parameters is very important and decides the success of shelf life study. For example, a bakery product like bread is susceptible to yeast growth and can lead to either surface spoilage or fermentative spoilage of the product depending on the water activity of the product.

Thus this product has to be tested for water activity and yeast during the shelf life study. Identification of any food poisoning organisms present is important for food safety. Tests required will depend on the particular product. Microbiological standards and guidelines give guidance on the types of organisms and their number that can be considered acceptable, or unsafe, in a food.

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**DELIVERABLE**

- a. Review the existing safety standards for food served in schools and finalise the optimum and implementable standards.
- b. Develop arrangements for certification of schools and the minimum requirements for the certifying agencies.
- c. Release an annual report on the safety of food served in the nation's schools.

**8. Food Testing Laboratories**

Without a network of reliable food testing laboratories, it is impossible to implement the provisions of the food law, initiate prosecution where warranted and evaluate the effectiveness of programmes. FSSAI should work with state authorities, and central government agencies to build such a network and put in place a mechanism for continuously upgrading the capability of these laboratories and provide training to the staff to operate them. A mechanism for obtaining and utilising in real time the findings of such laboratories will also be put in place, with a view to develop standards, evolve suitable policies and initiate preventive measures.

**DELIVERABLES**

- a. Identify in consultation with state governments and other agencies the

laboratories which will be designated as such for implementation of the provisions of the Act. Draw up time bound plans for upgrading their capabilities and arrange resources, both financial and human, for each of these laboratories.

- b. Develop and initiate a scheme for upgrading and skill building in such laboratories to be completed at the earliest possible. This should also include laboratories in both governmental and nongovernmental sectors. Priority will be given to laboratories in the governmental sector which have to perform statutory responsibilities under the Act.

- c. Identify and finalise adequate number of, but not less than five, institutions which can provide training to the personnel in government laboratories so that they can perform their statutory functions with reliability and efficiency.

- d. Develop and initiate a set of courses and agencies for such training which will be continuously updated keeping in view the emerging technological developments and testing methods.

**9. Surveillance**

Unless regular monitoring of the safety parameters, health indicators and consumer feedback is built into the standard setting process, it will not be possible to ensure that food safety measures are in line with the realities on the ground. Many such sources of information are already available with various agencies inside and outside the government and need to be accessed by FSSAI. It would also be necessary to track the safety developments in other countries because any safety hazard can spread in real time with the open borders and millions of transiting passengers. Institutions may be identified

which can carry out such surveillance in different states.

**DELIVERABLE**

- a. FSSAI will develop a surveillance framework specifying the sources of data, responsibilities for obtaining them, processing and highlighting the points where action is required and the format in which it will be made available to stakeholders. To start with, the first such surveillance report should be made available within a year. Such surveillance need to be organized for each main sector and food category keeping in view the potential for hazards.

- b. A State of Food Safety Report for the nation will be brought out by FSSAI within a period of one year and to be released each year thereafter. In due course, such reports should be prepared for each state. This effort can be decentralized utilising the capabilities of states, other central agencies and academic institutions.

- c. FSSAI should identify national Centres of Excellence in areas such as milk, water, food technology, Meat and Fish, Nutraceuticals, epidemiology, contamination etc. whose expertise can be drawn upon for determination of safety standards and surveillance as well as other technical inputs.

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## 10. Training

FSSAI will develop and put in place a training programme for upgrading the skills of regulatory staff, state regulators, and provide training in such critical areas as risk assessment, food testing, regulatory action, consumer education and emergency response management. Curriculum for these courses will be developed and adequate number of training agencies/institutions identified to make such inputs available across the country.

### DELIVERABLE

a. Each officer should be required to undergo regular refresher annual training to update their skills in the absence of which they may not be allowed to exercise regulatory powers.

b. The content for such training should be developed in association with industry and consumers so that it can be organized through a network of training institutions both in public and private sectors.

c. Certification of agencies for providing such training may be organized to widen the training network.

## 11. Accreditation and Certification

The large number of food business operators in the country can be effectively regulated only through accrediting and certifying them through agencies whose

performance is continuously monitored. FBO should be enabled to get themselves certified for safety practices so that they can demonstrate

compliance of regulations without having to be inspected. Food law provides protection to such FBOs who have put in place safety practices in accordance with law.

### DELIVERABLE

a. FSSAI will put in place a reliable mechanism for accrediting agencies for certifying food safety and steps to ensure the capability of such agencies on a continuous basis. There should also be a mechanism for monitoring the performance of these agencies through testing and common evaluation methods.

## 12. Imports

100% inspection of food imports is neither feasible nor necessary when effective scientific tools are now available for risk based inspections and sampling. FSSAI should ensure safety of imports through risk based sampling, quick testing and real time reporting.

### DELIVERABLES

a. FSSAI will establish a set of guidelines for assessing the risk of imported food items based on scientific risk analysis, accreditation of agencies, recognizing equivalent standards in other countries and verifying the reliability of such safety standards.

b. Laboratories will be designated for quick testing of the relevant parameters to enable faster decision on consignments. Clear instructions need to be issued to such

laboratories for testing. An electronic system of communication needs to be put in place for expediting testing results.

c. FSSAI will carry out a risk analysis of food categories and calibrate testing and sampling in accordance with such risk categorization. This will be regularly reviewed to ensure that only importers with established safety record are given the green channel.

d. There is need for a system of evaluating the safety of a consignment even before the consignment reaches the port. The required documents could be made available electronically well in time to enable quick decisions. Importers may also be classified on the basis of their safety record for less onerous procedures.

## 13. Regulations and standards for Recall, Labelling, Nutraceuticals, Alcohol etc

a. Draft regulations which are at various stages of preparation in FSSAI will be finalized and notified. The drafts will be placed in the public domain for comments before they are given final shape.

### DELIVERABLES

a. Draft regulations will be put in the public domain for discussions and feedback.

b. Regulations will be finalised and notified without delay.

## 14. Pesticide and insecticide residues

a. The data available with various agencies on agricultural residues in different crops will be accessed and the current position regarding presence of residues will be disseminated so that appropriate steps can be taken to reduce the migration of such contamination to

food items.

b. FSSAI will undertake a risk assessment of pesticide and insecticide residues in various food crops and the likelihood of their migration to food items.

c. Based on the risk assessment FSSAI will identify a set of good agricultural and processing practices for wide dissemination. Parameters will be laid down for monitoring such contamination in various foods.

### 15. Emergency Response Management

An Emergency Response Plan to be implemented at the town, state and central levels will be drawn up and put out for consultation. This will be further discussed in regional meetings to incorporate inputs from stakeholders and state governments. The objective will be to respond with the minimum of delay to incidents of food safety, anticipate oncoming hazards and update the skill level of all concerned to meet such eventualities.

#### DELIVERABLES

a. An Emergency Control Manual will be developed and implemented. This Plan will contain the details of officials who will be responsible for

implementation at various levels and the steps they are expected to take.

b. Copies of such plans will be widely disseminated and periodically updated. The readiness of staff will be reviewed at least once a year at each level.

### 16. Research Agenda

FSSAI will, in consultation with relevant academic and research institutions, Scientific Panels and Committee, develop a Research Agenda which will address the scientific requirements of food safety policy and emerging areas of concern.

#### DELIVERABLE

a. Institutions will be identified to undertake such research both in the public and private sectors. Results of such research will be discussed in open fora and disseminated.

### 17. Licensing and Registration procedures

FSSAI is mandated to streamline the procedures for licensing and registration. Currently each state has its own procedure for licensing and registration, and this prevents comparison and coordination between states. A common platform and format for such licensing and

registration should be developed by FSSAI. This should be IT enabled so that it can be easily accessed by the regulator for prompt response.

#### DELIVERABLES

a. An electronic procedure for registration and licensing will be drawn up, tested and introduced both at the central and state levels. The hardware and software requirements will be assessed and budgeted for.

b. FSSAI will set up a Control Room in its Head Quarters to monitor in real time food safety developments in all states and take corrective action. Such a Control Room will also be in touch with similar agencies abroad to anticipate and respond quickly to hazards sourced from abroad.

c. An easy to understand and operate booklet will be prepared to help small food business operators to get themselves registered and apply for license without obtaining services of consultants.

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#### Vitafoods Europe

May 10-12, 2016

Geneva, Switzerland

W: [www.vitafoods.eu.com](http://www.vitafoods.eu.com)

#### Fi Vietnam 2016

May 18-20, 2016

Saigon Exhibition and Convention Centre

W: <http://fi-vietnam.net/PR>

Institute of Food Technologists (IFT)

#### Annual Meeting & Expo 2016

July 16-19, 2016

Chicago, Illinois, USA

W: [www.ift.org](http://www.ift.org)

#### Dairy Tech India 2016

August 26-27-28, 2016

BIEC, Bangalore

T: 011-65655264

W: [www.dairytechindia.in](http://www.dairytechindia.in)

E: [dairytechindiamtp@gmail.com](mailto:dairytechindiamtp@gmail.com)

#### AAHAR - The Food & Hospitality Fair 2016

September 15 - 17, 2016

Chennai Trade Centre, Chennai

T: 044 - 28587297

#### International FoodTec India

September 22-24, 2016

Hall 1 & 5, Bombay Exhibition Centre, Mumbai

Contact: Ms. Ummeayman R., Nutritionist, PFNDAI

T: 040-65594411

E: [m.pathan@koelmesse-india.com](mailto:m.pathan@koelmesse-india.com)

#### Indian Ice Cream Congress & Expo 2016

September 28-29, 2016

Expo Centre, Sector-62, Noida, Delhi NRC

W: <http://indianicecreamcongress.in>

## COMING EVENTS

# Research in Health & Nutrition

children underwent tests of their cognitive abilities and Asperger Syndrome traits to assess their neuropsychological development.

On average, the women had consumed about 500 g, or three servings, of seafood per week while pregnant. But with every additional 10 g per week above that amount, children's test scores improved, up to about 600 g. The link between higher maternal consumption and better brain development in children was especially apparent when kids were five. The researchers also saw a consistent reduction in autism-spectrum traits with increased maternal fish consumption.

Importantly, it was shown that even when women averaged 600 g of fish weekly during pregnancy, there was no sign that mercury or other pollutants associated with fish were having a negative effect that offset the apparent benefits. There didn't appear to be any additional benefit when women ate more than 600 g of fish per week.

## Aged garlic extract may prevent heart disease

IFT Weekly January 27, 2016

**A study published in the Journal of Nutrition shows that aged garlic extract may prevent the progression of heart disease by reversing the buildup of plaque in arteries.**

Previous studies have shown that the supplement can inhibit progression of coronary artery

calcification, but it's unclear whether there is an effect on non-calcified plaque.

For one year, 55 patients aged 40 to 75 years old with metabolic syndrome (obesity, hypertension, and other cardiac risk factors) received either 2,400 mg of aged garlic extract each day or a placebo. The patients were screened at the start of the study to measure total coronary plaque volume, including total plaque volume, dense calcium, non-calcified plaque, and low-attenuation plaque.

At the end of the trial, follow-up screenings found that the aged garlic extract group had slowed total plaque accumulation by 80%, reduced soft plaque, and demonstrated regression for low-attenuation plaque. The researchers concluded that "further studies are needed to evaluate whether AGE [aged garlic extract] has the ability to stabilize vulnerable plaque and decrease adverse cardiovascular events."

## High fish consumption in pregnancy may benefit children's cognition

IFT Weekly January 20, 2016

**A study published in the American Journal of Epidemiology shows that when mothers eat three sizeable servings of fish each week during pregnancy it may benefit children's brains for years to come.**

The researchers analyzed data from the Spanish Childhood and Environment Project, a large population study that recruited women in their first trimester of pregnancy, in four provinces of Spain, between 2004 and 2008. The nearly 2,000 Spanish mother-child pairs were followed from the first trimester of pregnancy through the child's fifth birthday. The researchers focused on records of the women's consumption of large fatty fish such as swordfish and albacore tuna, smaller fatty fish such as mackerel, sardines, anchovies, or salmon, and lean fish such as hake or sole, as well as shellfish and other seafood.

The women were tested for blood levels of vitamin D and iodine, and cord blood was tested after delivery to measure fetal exposure to mercury and PCB pollutants. At ages 14 months and five years, the

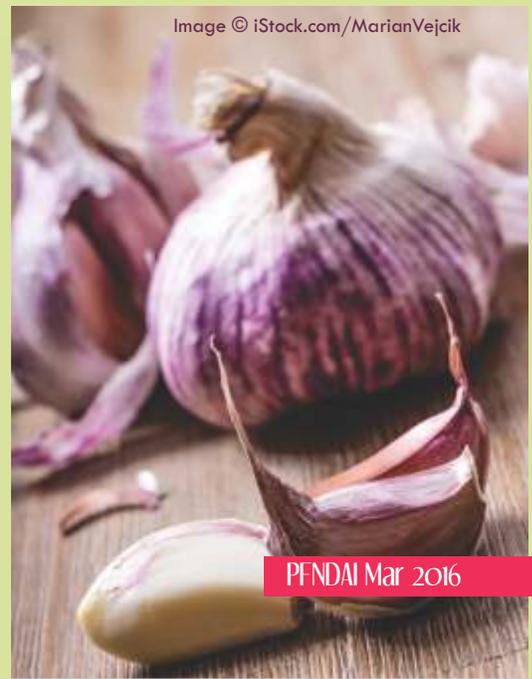


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## Taking vitamin D may benefit people with multiple sclerosis

January 4, 2016 Science Daily

**Taking a high dose of vitamin D3 is safe for people with multiple sclerosis and may help regulate the body's hyperactive immune response, according to a pilot study published by Johns Hopkins physicians in the Dec. 30 online issue of Neurology, the medical journal of the American Academy of Neurology.**

"These results are exciting, as vitamin D has the potential to be an inexpensive, safe and convenient treatment for people with MS," says study author Peter Calabresi, M.D., director of the Johns Hopkins Multiple Sclerosis Center and professor neurology at the Johns Hopkins University School of Medicine. "More research is needed to confirm these findings with larger groups of people and to help us understand the mechanisms for these effects, but the results are promising."

Low levels of vitamin D in the blood are tied to an increased risk of developing MS. People who have MS and low levels of vitamin D are more likely to have greater disability and more disease activity.

For the study, 40 people with relapsing-remitting MS received either 10,400 international units or 800 international units of vitamin D3 supplements per day for six months. Patients with severe vitamin D deficiency were not included in the study. The current recommended daily allowance of

vitamin D3 is 600 international units. Blood tests at the start of the study and again at three and six months measured the amount of vitamin D in the blood and the response in the immune system's T cells, which play a key role in MS.

While researchers are still determining the optimal level of vitamin D in the blood for people with MS, a suggested range of 40 to 60 nanograms per milliliter (ng/ml) has been proposed as a target. Participants taking the high dose of vitamin D reached levels within the proposed target, whereas the group taking the low dose did not reach the target.

Side effects from the vitamin supplements were minor and were not different between the people taking the high dose and the people taking the low dose. One person in each group relapsed. The people taking the high dose had a reduction in the percentage of inflammatory T cells related to MS severity, specifically IL-17+CD4+ and CD161+CD4+ cells. When the increase in vitamin D levels in the blood over base line levels was greater than 18 ng/ml, every additional 5 ng/ml increase in vitamin D led to a 1 percent decrease in the percentage of IL-17+CD4+ T cells in the blood. The people taking the low dose did not have any noticeable changes in the percentages of their T cell subsets.

"We hope that these changes in inflammatory T cell responses translate to a reduced severity of disease," says Calabresi. "Other clinical trials are underway to determine if that is the case."

## Exercise, diet improves ability to exercise for patients with common type of heart failure

January 5, 2016 Science Daily

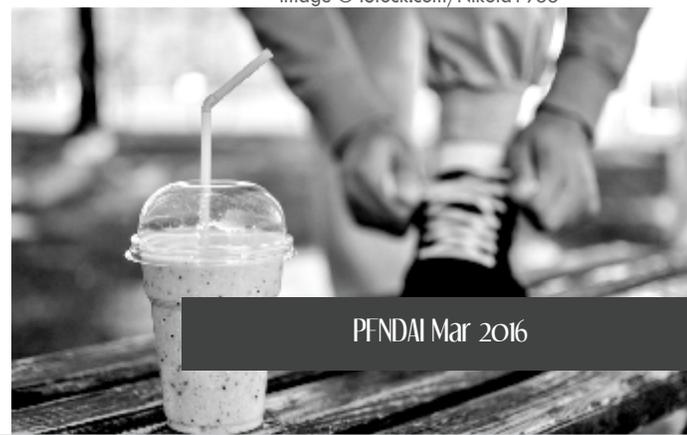
**Among obese older patients with a common type of heart failure, calorie restriction or aerobic exercise training improved their ability to exercise without experiencing shortness of breath, although neither intervention had a significant effect on a measure of quality of life, according to a study in the January 5 issue of JAMA.**

Heart failure with preserved ejection fraction (a measure of how well the left ventricle of the heart pumps with each contraction) is the most rapidly increasing form of heart failure, occurs primarily in older women, and is associated with high rates of illness, death, and health care expenditures. More than 80 percent of patients with heart failure with preserved ejection fraction (HFPEF) are overweight or obese. Exercise intolerance is the primary symptom of chronic HFPEF and a major determinant of reduced quality of life (QOL).

Dalane W. Kitzman, M.D., of the Wake Forest School of Medicine, Winston-Salem, N.C., and colleagues randomly assigned 100 older obese participants (average age, 67 years) with chronic, stable HFPEF to 20 weeks of diet, exercise, or both, or a control group. The researchers measured exercise capacity (peak oxygen consumption [Vo2]) and QOL (with the Minnesota Living with Heart Failure Questionnaire; MLHF).

Of the study participants, 26 were assigned to exercise; 24 to diet; 25 to exercise + diet; 25 to control.

Image © iStock.com/Nikola1988



Of these, 92 completed the trial. The authors found that peak Vo<sub>2</sub> was increased significantly by both exercise and diet, and the combination of diet with exercise produced an even greater increase in exercise capacity. The change in peak Vo<sub>2</sub> was positively correlated with the change in percent lean body mass. Body weight decreased by 7 percent in the diet group, 3 percent in the exercise group, 10 percent in the exercise + diet group, and 1 percent in the control group.

There was no significant change in the MLHF score with exercise or diet.

The researchers note that because of the reported "heart failure obesity paradox" (lower mortality observed in overweight or obese individuals), before diet can be recommended for obese patients with HFPEF, further studies likely are needed to determine whether these favorable changes are associated with reduced clinical events.

"This innovative report by Kitzman et al provides applicable evidence that dietary intervention (caloric restriction) alone or complemented by aerobic exercise training improves peak Vo<sub>2</sub>, increasing exercise capacity," writes Nanette K. Wenger, M.D., of the Emory University School of Medicine, Atlanta, in an accompanying editorial.

"The largest increase in exercise capacity was associated with a combination of the exercise + diet interventions. The hypothesis tested is intriguing, and worthy of further investigation in a community population, with longer follow-up, either with or without specific provision of meals to effect caloric restriction, although translation of this type of intervention to the community will be challenging. Whether nonprofessionally administered diet and nonmedically

supervised exercise could safely attain similar benefit is uncertain but worthy of exploration."

## Physical activity may help keep overweight children fit

January 13, 2016  
Science Daily

**A recent Finnish study shows that high body adiposity, low physical activity, and particularly their combination are related to poorer physical fitness among 6-8 year old children.**

The results also suggest that physically active overweight children have better fitness compared to their inactive peers. The results published in *Journal of Sports Sciences* are part of the Physical Activity and Nutrition in Children (PANIC) Study conducted at the University of Eastern Finland in collaboration with the University of Cambridge and the University of Jyväskylä.

The study investigated the associations of body fat percentage and moderate-to-vigorous physical activity with neuromuscular fitness in a population sample of 404 children aged 6-8-years. The results of 50 m shuttle run, 15 m sprint run, hand grip strength, standing long jump, sit-up, balance, manual dexterity, and sit-and-reach tests were used as measures of physical fitness. Higher body fat percentage was associated with slower 50 m shuttle run and 15 m sprint times, shorter distance jumped in standing long jump test, fewer sit-ups, more errors in balance test and less cubes moved in box-and-block test. Higher levels of moderate-to-vigorous physical activity were related to

faster 50 m shuttle run and 15 m sprint times.

In addition, children who had a combination of a higher body fat percentage and lower levels of physical activity had the poorest performance in 50 m shuttle run, 15 m sprint run and standing long jump tests.

The study concludes that especially a higher body fat percentage but also lower levels of physical activity were related to poorer neuromuscular fitness in children. Moreover, higher levels of physical

activity were related to better fitness levels also in children with higher levels of body adiposity. These findings emphasise preventing overweight and particularly increasing physical activity to prevent impaired neuromuscular performance in children.



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## Higher dietary nitrate, green leafy vegetable intake associated with lower risk of glaucoma

January 14, 2016  
Science Daily

**Greater intake of dietary nitrate and green leafy vegetables was associated with a 20 percent to 30 percent lower risk of primary open-angle glaucoma, according to a study published**



Image © iStock.com/khorzhevskia

online by JAMA Ophthalmology.

Elevated intraocular pressure and impaired autoregulation of optic nerve blood flow are implicated in primary open-angle glaucoma (POAG; optic nerve damage from multiple possible causes that is chronic and progresses over time). Evidence suggests that nitrate or nitrite, precursors for nitric oxide, is beneficial for blood circulation.

Jae H. Kang, Sc.D., of Brigham & Women's Hospital and Harvard Medical School, Boston, and colleagues evaluated the association between dietary nitrate intake, derived mainly from green leafy vegetables, and POAG. The researchers followed up participants biennially in the prospective cohorts of the Nurses' Health Study (63,893 women; 1984-2012) and the Health Professionals Follow-up Study (41,094 men; 1986-2012).

Eligible participants were 40 years or older, were free of POAG, and reported eye examinations. Information on diet was updated with questionnaires.

During follow-up, 1,483 incident cases of POAG were identified. Participants were divided into quintiles (one of five groups) of dietary nitrate intake (quintile 5, approximately 240 mg/d; quintile 1, approximately 80 mg/d). The researchers found that greater intake of dietary nitrate and green leafy vegetables was associated with a 20 percent to 30 percent lower POAG risk; the association was particularly strong (40 percent-50 percent lower risk) for POAG with early paracentral visual field loss (a subtype of POAG linked to dysfunction in blood flow autoregulation).

"These results, if confirmed in observational and intervention studies, could have important public health implications," the authors write.

## What you eat can influence how you sleep

January 14, 2016 Science Daily

### Daily intake of fibre, saturated fat and sugar may impact sleep quality

A new study found that eating less fibre, more saturated fat and more sugar is associated with lighter, less restorative, and more disrupted sleep.

Results show that greater fibre intake predicted more time spent in the stage of deep, slow wave sleep. In contrast, a higher percentage of energy from saturated fat predicted less slow wave sleep. Greater sugar intake also was associated with more arousals from sleep.

"Our main finding was that diet quality influenced sleep quality," said principal investigator Marie-Pierre St-Onge, PhD, assistant professor in the department of medicine and Institute of Human Nutrition at Columbia University Medical Center in New York, N.Y. "It was most surprising that a single day of greater fat intake and lower fibre could influence sleep parameters."

Study results are published in the January issue of the Journal of Clinical Sleep Medicine.

"This study emphasizes the fact that diet and sleep are interwoven in the fabric of a healthy lifestyle," said American Academy of Sleep Medicine President Dr. Nathaniel Watson, who was not involved in the study. "For optimal health it is important to make lifestyle choices that promote healthy sleep, such as eating a nutritious diet and exercising regularly."

The study also found that



participants fell asleep faster after eating fixed meals provided by a nutritionist, which were lower in saturated fat and higher in protein than self-selected meals. It took participants an average of 29 minutes to fall asleep after consuming foods and beverages of their choice, but only 17 minutes to fall asleep after eating controlled meals.

"The finding that diet can influence sleep has tremendous health implications, given the increasing recognition of the role of sleep in the development of chronic disorders such as hypertension, diabetes and cardiovascular disease," said St-Onge.

The randomized, crossover study involved 26 adults -- 13 men and 13 women -- who had a normal weight and an average age of 35 years. During 5 nights in a sleep lab, participants spent 9 hours in bed from 10 p.m. to 7 a.m., sleeping for 7 hours and 35 minutes on average per night. Objective sleep data were gathered nightly by polysomnography. Sleep data were analyzed from night 3, after 3 days of controlled feeding, and night 5, after one day of ad libitum food intake.

According to the authors, the study suggests that diet-based recommendations might be used to improve sleep in those with poor sleep quality. However, future studies are needed to evaluate this

relationship.

## Intensive exercise with intervals 'more effective'

January 19, 2016 Science Daily

**Short bursts of intensive exercise provide a more "time-efficient" and realistic way of preventing, delaying and managing Type 2 diabetes and also losing weight, a study has found.**

Small amounts of vigorous activity in quick successions are more "effective" compared to longer forms of exercise optimising the body's ability to use and store blood sugar, the research by the University of Leicester and the NIHR Leicester-Loughborough Diet, Lifestyle and Physical Activity Biomedical Research Unit (BRU) has found.

The paper 'The effects of high-intensity interval training on glucose regulation and insulin resistance: a meta-analysis' has been published in the journal *Obesity Reviews*.

Obesity and Type 2 diabetes are linked, with over 80 per cent of people with the condition classed as overweight or obese -- diet and physical activity interventions are the cornerstones for management of both conditions.

The effects of exercise on Type 2 diabetes and improving the body's ability to use insulin to absorb blood sugar are well established, but its impact on weight regulation is more controversial.

The guidelines for weight loss suggest that 200 to 300 minutes of

moderate to vigorous activity per week are required for long-term reductions, but previous research found that only five per cent of people in some industrialised countries achieve this amount. Recently, however, effects of physical activity on health in the absence of weight loss, have emerged.

In response, the study has proposed high-intensity interval training (HIIT) as an alternative: "time-efficient exercise intervention that may bring about similar benefits to moderate-intensity aerobic exercise."

Researcher Charlotte Jelleyman said: "This study involved a meta-analysis of experimental research, allowing us to pull together evidence and establish cause and effect. We have demonstrated that HIIT conveys benefits to cardio-metabolic health which in the cases of insulin resistance and aerobic fitness may be superior to the effect of traditional continuous training.

"HIIT may therefore be suitable as an alternative to continuous exercise training in the promotion of metabolic health and weight loss, particularly in those with Type 2 diabetes or metabolic syndrome. However, given the identified limitations, more research is needed to determine both behavioural responses and clinical benefits over the longer term."

The NIHR Leicester-Loughborough Diet, Lifestyle and Physical Activity BRU is a national centre of excellence in diet, lifestyle and physical activity based in Leicester and Loughborough. It harnesses the power of experimental science to explore and develop ways to help prevent and treat chronic disease.

## Losing fat while gaining muscle: Scientists close in on 'holy grail' of diet and exercise

January 27, 2016 Science Daily

**Researchers at McMaster University have uncovered significant new evidence in the quest for the elusive goal of gaining muscle and losing fat, an oft-debated problem for those trying to manage their weight, control their calories and balance their protein consumption.**

Scientists have found that it is possible to achieve both, and quickly, but it isn't easy. For the study, 40 young men underwent a month of hard exercise while cutting dietary energy they would normally require by 40 per cent of what they would normally require.

"It was a gruelling affair," says Stuart Phillips, a professor in the Department of Kinesiology at McMaster and senior investigator on the study.

"These guys were in rough shape, but that was part of the plan. We wanted to see how quickly we could get them into shape: lose some fat, but still retain their muscle and improve their strength and fitness," he says.



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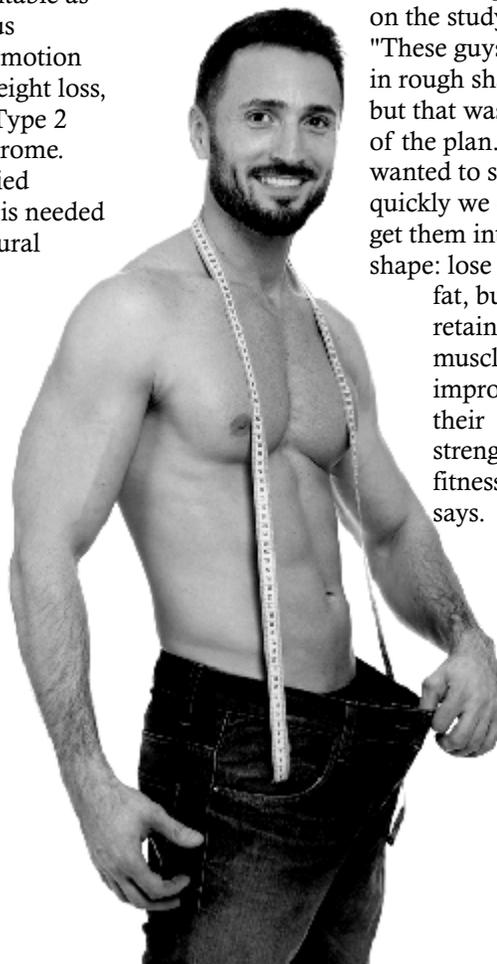


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The researchers divided their subjects into two groups. Both groups went on a low calorie diet, one with higher levels of protein than the other. The higher-protein group experienced muscle gains -- about 2.5 pounds -- despite consuming insufficient energy, while the lower protein group did not add muscle.

The lower-protein group at least had the consolation of not losing muscle, which is a predictable outcome of cutting calories and not working out, say researchers.

"Exercise, particularly lifting weights, provides a signal for muscle to be retained even when you're in a big calorie deficit," says Phillips.

Researchers were intrigued because the high-protein group also lost more body fat.

"We expected the muscle retention" said Phillips, "but were a little surprised by the amount of additional fat loss in the higher protein consuming group."

The results showed that the high-protein group lost about 10.5 pounds and the low protein group only eight pounds. All of the participants, by virtue of the demanding six-days-a-week exercise routines, got stronger, fitter, and generally were in much better shape.

However, researchers caution this regimen is not for everyone.

"We designed this program for overweight young men, although I'm sure it would work for young women too, to get fitter, stronger, and to lose weight fast. It's a tough program and not something that's sustainable or for those looking for quick and easy fix," says Phillips. "We controlled their diets, we supervised the exercise, and we really kept these guys under our 'scientific' thumb for the four weeks the participants were in the study."

Phillips and his team hope to conduct a follow-up study on women and also explore a different approach that he

says will be "a little easier and much more sustainable."

The study was published in the latest issue of the American Journal of Clinical Nutrition.

## Why children are more likely to develop food allergies

January 28, 2016 Science Daily

### Researcher identifies T cell population that renders normal food harmless

An estimated 15 million Americans suffer from food allergies, many of them children. These are non-trivial concerns, as food allergy or intolerance can cause symptoms ranging from a harmless skin rash to a potentially lethal anaphylactic shock. The good news is that many affected children outgrow their allergy, presumably as the immune system learns to tolerate food initially mistaken as "foreign."

A new study published in the January 28, 2016, online issue of Science by La Jolla Institute for Allergy and Immunology (LJI) researcher Charles Surh, Ph.D., may explain how food tolerance emerges over time in normal individuals.

Coupling molecular approaches with a long-forgotten model of "antigen-free" mice, the study is the first to demonstrate that consumption of a normal diet stimulates cells in the gut that suppress rejection of food by the immune system. Knowing this could explain why children, who have more limited exposure to novel foods than adults, are more susceptible to food allergies.

"The immune system evolved to protect us from things that are not ourselves, like viruses or pathogens, yet we consume nutrients, which are themselves foreign," says Surh, an adjunct professor in LJI's Division of Developmental Immunology.



Image © iStock.com/kvanchaichaidom

"Our work shows food tolerance is acquired and involves specific populations of T cells that develop following its consumption. Without them, we would mount a strong immune response to macromolecules contained in food."

Like pathogens, food displays macromolecular markers known as antigens that announce to the immune system that food is "foreign." Previous analysis of how the body distinguishes antigenic friend from foe revealed that feeding lab mice a novel test protein--for example, the egg protein ovalbumin--induced development of immunosuppressive T-regulatory, or "Treg" cells, in the gut, which then acted to block the immune response to that particular protein. What researchers didn't know was whether this happened in "real life" as young mammals--be they mouse pups or human toddlers--encountered new foods.

To address that question, Surh re-established "antigen-free" mouse models designed to represent an immunological blank slate. These animals were not only raised in a germ-free environment but were also fed an "elemental" diet of amino acids, the building blocks of proteins, rather than foods that contain intact proteins themselves.

Cont'd on Pg 24



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# Food Science & Industry News

## Umami may increase palatability, liking of food

IFT Weekly January 6, 2016

**A study published in the Journal of Food Science shows that umami ingredients may increase consumer acceptability of food and also enhance positive emotions without compromising the health perception of the item.**

The researchers specifically wanted to examine the umami ingredients monosodium l-glutamate (MSG) and 5'-ribonucleotides of inosine monophosphate (IMP) in a low sodium chicken noodle soup application.

The researchers prepared a total of six samples that differed in their concentration of IMP and MSG. Samples included two control samples (same formula), test 1 (0.1% MSG), test 2 (0.5% MSG), test 3 (0.1% IMP), and test 4 (0.1% IMP + 0.3% MSG). They recruited 119 females that were, for the most part, responsible for meal preparation in their household.

The researchers found that the addition of umami ingredients increased overall liking among the participants. All samples enhanced with either MSG, IMP, or a combination of IMP and MSG were significantly liked more than either of the two control samples. Within the umami-enhanced samples, test 4 (0.1% IMP + 0.3% MSG) was most liked overall, at parity with test 2 (0.5% MSG) and significantly more liked than test 1 (0.1% MSG) and test 3 (0.1% IMP).

Regardless of concentration of MSG and IMP, samples enhanced

in umami compounds were perceived as more savory, flavorful, and less bland while providing a more homemade, fresh, and healthy wholesome taste than a control sample. From a functional and emotional benefit standpoint, when consuming umami-rich samples, consumers reported feeling significantly higher general satisfaction (they felt more content, relaxed, satisfied, less disappointed) and heightened positive emotions (happy, excited, indulgent) than under the control condition.

The feeling of being healthy while consuming the dish was not compromised. When asked how they would feel if serving the soup sample to their family or friends, consumers projected feeling more positively under the umami-rich conditions (more happy, competent, loving, less dissatisfied or disappointed) compared to the control condition.

The researchers concluded that "this study suggests that the use of umami compounds may help consumers better balance both the physical and emotional satisfaction that they derive from food without compromising the perception that one is engaging in a healthy behavior."

## Wanted: a quick lab method for assessing RNGS shelf-life stability

**From Tetra Pak sponsored link on Dairy Reporter 25 Jan 2016**

**Beverages based on rice, nuts, grains and/or soybeans (RNGS) are**

**increasingly popular and gaining market share around the globe. A challenge for product developers and quality managers is how to predict the shelf-life stability of these products already in the lab. Until today there has not been a way to make that assessment, but a newly developed test method has shown promising results.**

The only completely safe way to determine a product's shelf-life stability is to simply put it on the shelf and wait. Repeated analysis will show whether the product can handle one, two, three months, or perhaps half a year on the shelf without deterioration. Of course this time-consuming process is not very practical, whether in product development or in continuous quality control.

RNGS beverages are marketed as simple and natural. But for the food processor the endless possibilities to combine different ingredients, as well as seasonal variations and differences depending on where raw materials are grown, mean that these products are anything but easy when it comes to tailoring and maintaining a consistent industrial process.

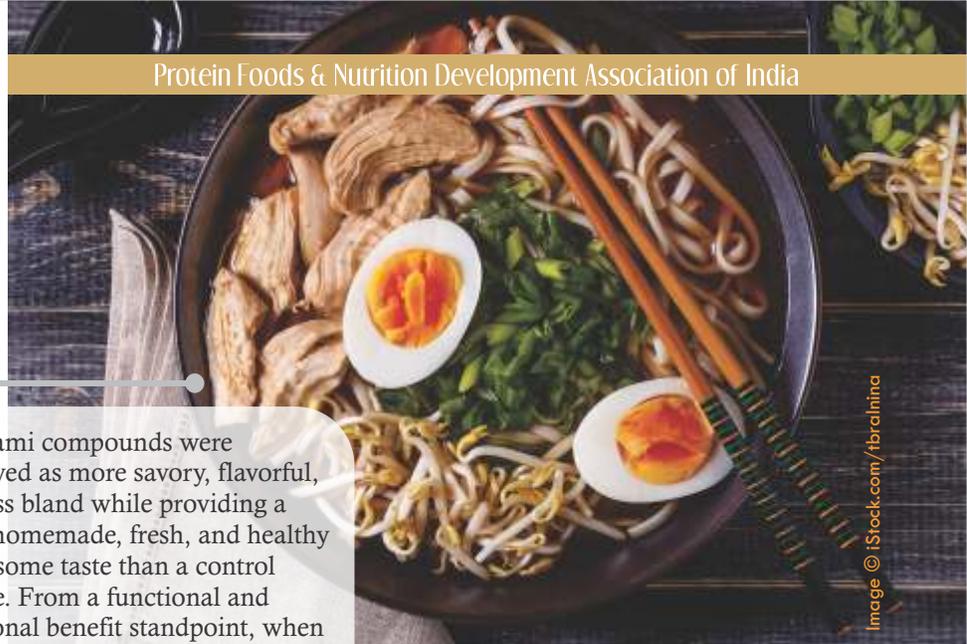
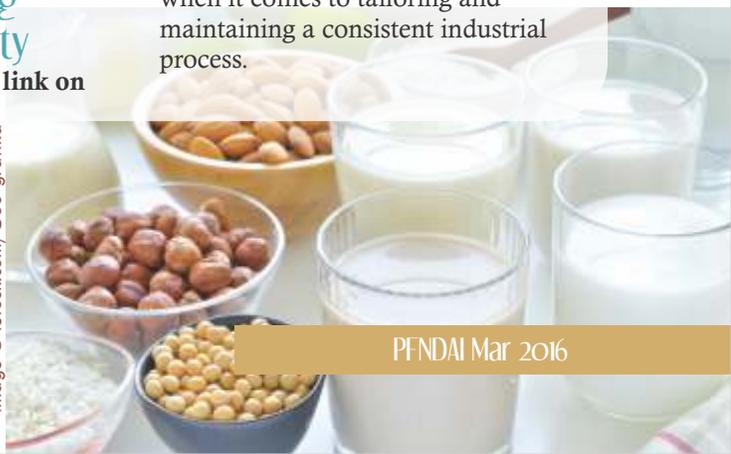


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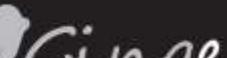
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One established way to predict shelf-life stability of dairy milk is to measure the homogenizing efficiency using the so-called NIZO method, which compares the fat content in different layers and provides a simple index. However, this method does not work for RNGS beverages, which are often milk-like.

But through a method developed in collaboration with two world-leading RNGS producers and where lab results have been correlated with real shelf-life tests, there is now a promising method to quickly and efficiently determine the shelf-life stability of RNGS beverages. The test, which we call the RNGS Stability Test, measures two very important parameters for shelf-life stability in these products: sedimentation and creaming.

By using this new method it might be possible to minimize the use of additives such as stabilizers and emulsifiers. Also, “over-homogenization” can be avoided, meaning both reduced energy costs and enhanced quality of the end product.

### Adding barley may enhance antioxidant, vitamin E content of bread

IFT Weekly January 27, 2016

**A study published in the Journal of Food Science shows that replacing a portion of the standard baking flour with barley flour may enhance the total antioxidant and vitamin E content of pita bread.**

Barley is typically polished (also known as pearling) before consumption because whitened grain is generally preferred by consumers and food manufacturers. The process of pearling removes the hull (also known as the husk) and the bran, both of which are rich in antioxidant capacity and vitamin E.

Hulless barley does not require pearling and is preferred in food production as less processing is required. In addition, the grain contains more protein, starch, and total soluble fiber, and can be added directly to food. Malt made from hulless barley is of particular interest because of these same advantages.

The barley varieties used in this study (the hull less genotype Finness and the covered genotypes WI2585 and Harrington) were previously identified as being high in antioxidant capacity and vitamin E content. Grain from each variety was used immediately after harvest to make flour, either from whole grains (0% pearling), or with 10%, 15%, or 20% pearling. Flour was also prepared from malt prepared from Finness and after storage at 10°C for 4 months.

The researchers made pita bread from either 100% baker's flour (control) or 50% malt flour, whole-grain flour, or flour from barley grains pearled at 10%, 15%, and 20% grain weight. Antioxidant capacity and vitamin E content of flours and pitas were determined by their ability to scavenge 2,2-diphenyl-1-picrylhydrazyl radicals and high performance liquid chromatography, respectively. The physical and sensory properties of the pitas were also assessed.

The researchers found that the pitas made from either whole grain or pearled barley flour had a higher antioxidant capacity and most also had higher vitamin E content than standard pita. The antioxidant and vitamin E levels were reduced in pearled compared to whole grains, but the extent of that reduction varied among genotypes. The greatest antioxidant and vitamin E levels were found in pita made from malt flour or Finness whole grain flour.

Furthermore, sensory analysis suggested these pitas were

acceptable to consumers and retained similar physical and sensory properties to those in the control pita.

### Proper storage of eggs

Food News Latam January 20, 2016

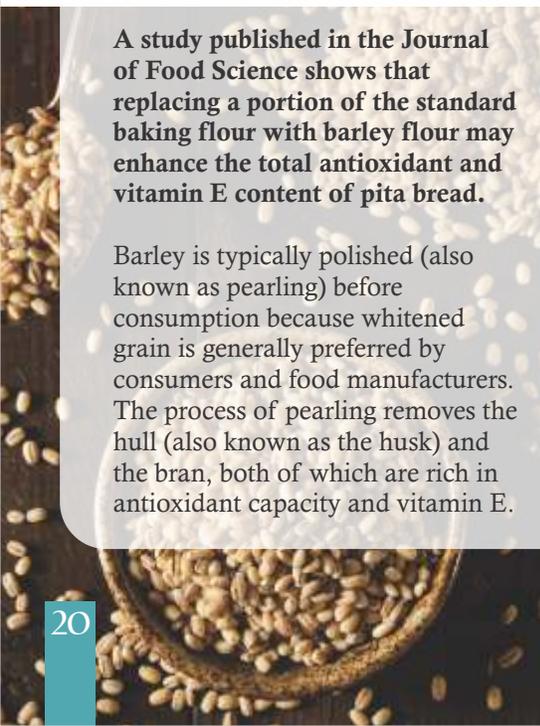
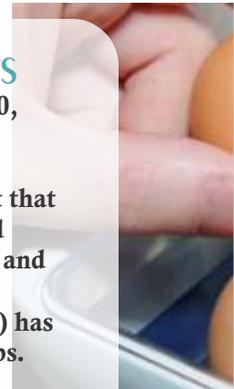
**Eggs are a perishable product that should definitely be benefited cooling in terms of freshness and life, the Australian Egg Corporation Limited (AECL) has reminded consumers some tips.**

Quality decreases with time and decreases more rapidly with very high temperatures. At room temperature of 25C, the deterioration of thickness albumin (Haugh units measure) is relatively fast.

The increase in temperature is the main factor affecting decreased albumen height, according to the associated Juliet Roberts University New England teacher. At any given temperature, the higher the humidity, the slower is the rate of loss of egg weight. In any given humidity, the higher the temperature, the greater the weight loss of the egg.

Egg farmers who produce most of the eggs in Australia invest significant funds to ensure compliance with the cold chain in the supply chain to delivery to retailers, wholesalers and food service companies. The quality assurance program EggCorp provides maximum storage temperatures farm eggs.

According to the Department of Primary Industries Queensland, eggs can lose much quality in one day at room temperature and 4-5 days in the refrigerator. Fresh eggs can be kept refrigerated in their carton for 6 weeks from the date on which they are purchased. Consumers should avoid leaving the



eggs in hot places and it is advisable to keep them in their carton in the refrigerator. The case provides



protection against damage, it slows moisture loss and helps prevent the absorption of food odors with a strong odor.

It is advisable to consume only those who are with their good clean shell

Image © iStock.com/Elizabeth Taylor

(without fecal matter) and never consume that are broken, because if this barrier is damaged, the entry of germs is assured. This is very important to consider, since the egg can carry pathogens such as salmonella (enteritidis), Escherichia coli and staphylococci, whose main symptoms in our bodies are those affecting the gastrointestinal tract.

## The effect of ohmic heating in sauce tsuyu

Food News Latam January 21, 2016

**Ethnic food consumption is increasing worldwide, driven by changes in migration, tourism and trade. The buckwheat noodles (soba) are a typical food of Japanese origin and served with sauce (tsuyu) consisting of a soy sauce and other natural extracts, such as dried anchovies, white radish, seaweed dark brown called kombu and other seasonings.**

Some of the raw materials used for the sauce tsuyu for example are dry cereals, vegetables, fish and shellfish that are often contaminated with *B. cereus*. Several regular exams sauce made from raw soybean revealed that *B. cereus* spores are often found in the final product, even in samples that had been treated with heat to eliminate spores.

The *Bacillus cereus* has adhesive properties which facilitate their attachment to food processing equipment and endospores are highly tolerant to different procedures for decontamination and / or sterilization, for example, disinfectants, heat, radiation, ultra pasteurization. Therefore, it is important to industry tsuyu sauces *B. cereus* eliminate the final product without deterioration in quality.

Ohmic heating (OH) has great potential to inactivate *B. cereus* spores compared to the energy costs of conventional heating, while at the same time minimizing loss of food quality. Several researchers have used laboratory-scale systems to test the effect of OH in nutritional and / or microbiological quality of food, by treating small amounts (25-60 g) of apple juice, lemon juice and tomato paste. Only a few studies have reported validation data on the performance of OH on an industrial scale.

In fact, the market share of ethnic food has grown as consumers have been inspired to try these foods in their own homes as reported by Mintel 2014. The Japanese food is very popular in many Western countries and a variety of commercial products they have been manufactured on a large scale and distributed worldwide.

Treatment efficacy OH depends on a number of factors, including the apparatus, the sample, system size, and processing conditions, for example, current frequency, the intensity of electric field, temperature, time and voltage. Therefore, it is necessary to obtain practical information for the food industry so that the manufacturing process for each food product can be specified in terms of devices and microorganisms.

Taekyung Nongsan Food Co., Ltd, Seoul Korea tsuyu studied sauce for testing, the sauce contained a total

of 15 ingredients, including hydrolyzed vegetable protein acid extract, anchovy paste, anchovies extract powder, sauce fermented soybeans, disodium 5'-ribonucleotide, disodium succinate, bonito extract powder, ginger extract powder, liquid candy, licorice extract powder, mirim (a typical natural seasoning, used in Korea and Japan, which is a fermented mixture of ethanol, lactic acid, non-glutinous rice and refined sugar), purified water, concentrated horseradish paste, refined salt, refined sugar and wasabi powder.

During the manufacturing process, each ingredient was homogenised at 70 ° C using a mechanical homogenizer to produce particles of micrometer size. The viscosity of the sauce tsuyu used in the study ranged from 8 to 10 mPa s (similar to orange juice). The pH ranged from 4 • 96-5 • 20.

Parts of sauce that had the presence of *B. cereus* in tsuyu sauce and treated with five electrodes OH sequentially industrial scale elbow type were separated. Empirical data on the sauce and tsuyu suggest that 1 sequential treatment with bacterial spores OH removes liquid food using a method that can be applied on an industrial scale.

The method achieves a reduction in the count of more than 5 log CFU ml<sup>-1</sup> of heat resistant spores *B. cereus* within 60 s to 105 ° C, a lethal effect stably maintained until the end of treatment without a perceptible deterioration in quality.

The method can be applied well in other areas of the food industry, such as sterilization of other liquid foods, such as juice and milk.

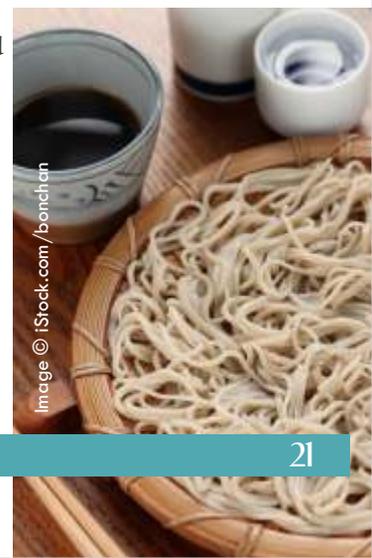


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## Indian food retail market will top Rs 61 lakh crore by 2020: Report

ET Bureau 23 January 2016

**The Indian food retail market is expected to cross Rs 61 lakh crore by 2020, according to India Food Report 2016.**

The report, compiled by Images Group, pegged the market size in 2014 at Rs 25 lakh crore, which accounts for 65% of the country's total retail market pie. "Indians spend more on food than on any other consumption category, and this is expected to continue in the coming decade," said Amitabh Taneja, chief convenor of India Food Forum and the CMD of Images Group. "India is already the largest global consumer of dairy, pulses, sugar and spices."

According to the report, there is an evolution in dietary habit along with rising demand for food and its growing consumption in India. Indians are becoming more welcoming towards processed, western food options like noodles, corn flakes, juices and oats - something, which was very nascent until 10 year ago, it said.

Of the total food market, packaged commodity products had 34.7% share while dairy accounted for 16%, it said. Among the seven broad components that make up the food basket, one-third of the total food market in 2014-15 was occupied by protein food, followed by cereals that covered 19%. On the other hand, edible oil is the smallest segment with a share of 7%, the report said.

## Medical foods based on amino acid/neuro-transmitter technology to be marketed in China

Food Navigator Asia, 19Jan2016

**Medical food specialist Targeted Medical Pharma has signed a Chinese distribution deal that bodes well for the long term health of the company. The Los Angeles-based company had hit a rough patch financially early last year that included a management switch, said marketing manager Marcus Charuvastra. But the deal announced recently with Healthy Focus Limited, a Hong Kong based company, will bring in significant revenue.**

The agreement grants Healthy Focus an exclusive three year renewable license for the marketing and sale of Targeted Medical Pharma's Theramine, Percura and Trepadone medical foods in Hong Kong and China. Under the terms of the agreement, Healthy Focus is responsible for registering all products in China, an initial licensing fee, as well as maintaining annual minimum purchase orders of \$500,000 for the first two years, and \$1 million in the third year.

"We are excited to partner with Healthy Focus Limited to introduce our products to the Chinese market," said Kim Giffoni, Chief Executive Officer at Targeted Medical Pharma. "The execution of this agreement represents a significant expansion of international sales of our proprietary line of health products, and positions us for sustainable growth over the next three years."

Product registrations are a tricky aspect of entering the Chinese market, something that Healthy Focus will handle, Charuvastra said. A

recent change in regulations makes marketing the company's products easier there, he said. "In China they expanded their 'foods for special dietary use' division of the regulations. We are going to be marketed as a protein-based food," he said.

### Patented amino acid technology

The company markets Theramine and Trepadone for pain management and Percura for peripheral neuropathy. All three are said to be meant to deal with the "dietary management of the altered metabolic processes associated with pain syndromes."

Targeted Medical Pharma's technology is based on a patented formulation that the company says allows reduced concentrations of amino acids and other ingredients in the milligram range to stimulate the production of neurotransmitters to treat the nutritional deficiencies associated with certain diseases and conditions.

"All of our products are based on this patented technology," Charuvastra said. A line of planned dietary supplements has been shelved. Charuvastra said that the company is optimistic that a "made in USA" halo will boost sales of the products in the Chinese market, and especially so since they are medical foods, not supplements. "Part of the appeal for American-made products in that market is a reputation for a quality, consistency and purity that is reliable. That's especially true coming from the medical foods category where we are held to a higher standard of manufacturing," he said.

Cont'd on Pg 37



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## **Food Emulsifiers Anti-Fungal/Anti Mold agents Speciality Additives Beverage Clouding Agent**

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Cont'd from Pg 16

The mice were, in essence, immunologically naïve, because the amino acid building blocks are too small to be recognized by the immune system. These mice therefore have little or no prior contact with antigenic proteins and other macromolecules.

Using molecular marker analysis, Surh and colleagues found that antigen-free mice were depleted of Tregs in the small intestine whereas a large number of these Tregs were present in germ-free counterparts fed a "normal" protein diet. That difference alone suggested that proteins contained in food stimulate Treg development. It also hinted that Tregs present in the gut of normal mice might suppress a potentially disastrous immune response to those proteins.

Surh says antigen-free mice are not new, just forgotten, as their prototypes were developed over 30 years ago to study nutrition. "We brought them back because we're no longer in the dark ages: We know a lot more about immunology!" he says. "Decades ago, researchers could monitor changes in lymphocyte numbers but couldn't distinguish between cell types like we can now."

The researchers took full advantage of these technical advances to also demonstrate that food and the beneficial bacteria in the intestine generate molecularly distinct populations of Tregs. Hence, germ-free mice only possess the food-dependent Treg, but not the Tregs that are induced by the healthy microbes. Intriguingly, germ-free mice are known to be highly susceptible to allergies. Hence, Surh hypothesizes that the presence of both food- and microbe-induced

populations of Tregs is required to prevent allergic symptoms.

Finally, the team revealed what happens when immune cells fail to ignore harmless antigens. To do so, they transferred "reporter" T cells designed to serve as a read-out for an immune reaction into antigen-free mice and then fed mice a test protein they had never encountered (the lab stand-by, ovalbumin). Those mice mounted a massive immune reaction--what Surh calls the default response-- to ovalbumin relative to germ-free mice fed a normal diet.

This dramatically inappropriate reaction to a nutrient resembled the immunological storm aroused by harmful microbes. Surh's group concludes that it occurred because the antigen-free mice had not readied a population of immunosuppressive Tregs that would normally be primed to dampen an inflammatory response to food.

By extension, the new work could explain why children, who have more limited exposure to different types of novel nutritious macromolecules (that is, food) than adults, are more susceptible to food allergies. It also suggests what happens on a cellular basis as some outgrow it: namely, they may be expanding their repertoire of Tregs that recognize new foods as "safe."

Those issues continue to interest Surh, who in addition to his position at LJI is a director and professor in the Academy of Immunology and Microbiology (AIM) at the Institute for Basic Science (IBS) in Pohang, in Korea. "We are now examining the cellular and molecular details

of how the 'default' strong T cell response to food is regulated," he says. "In this context, we plan to pay particular attention to certain foods, such as peanut, egg and other foods that cause food allergy."

## A nutrition supplement is associated with lower death rate in patients, new study shows

Medical News Today 19 January 2016

**Research examined effects of a specialized oral nutrition supplement on hospital readmissions and mortality rates in malnourished adults aged 65 or older.**

Results from a new clinical trial show that a specialized oral nutrition supplement was associated with a 50 percent lower death rate in older malnourished patients with a heart or lung disease 90 days following hospitalization. The study, published online today in *Clinical Nutrition* and supported by Abbott, estimated that within this population one life could be saved for every 21 patients who received the specialized nutrition supplement, demonstrating it as a highly effective therapy.

The Nourish (Nutrition effect On Unplanned Re-admissions and Survival in Hospitalized patients) study - one of the largest nutrition clinical studies of its kind - was a prospective, randomized, double-blind, placebo-controlled trial. The study was designed to build upon the body of evidence demonstrating that oral nutrition supplements may reduce complications, mortality and hospital re-admissions in malnourished patients.

Participants in the NOURISH study included 652 malnourished adults, aged 65 or older, who were admitted to the hospital and suffered from heart or lung disease. Researchers compared the effects of a specialized nutrition supplement with high protein (20 grams), HMB\* (a muscle-preserving ingredient) and Vitamin D to a placebo supplement on rates of re-admissions or death 90-days after leaving the hospital.

Results showed no significant differences between the two groups for the primary composite (i.e. combined) endpoint of hospital re-admissions or death. However, the study individual components and additional analyses showed:

✓ A significantly lower (50 percent) death rate for those patients who received the specialized nutrition supplement. This lower incidence of death began at 30 days and continued for 90 days after participants left the hospital.

✓ Similar rates of hospital re-admissions between the two groups.

✓ Improvements in other health outcomes including body weight, nutritional status and Vitamin D levels at 30 and 60 days after leaving the hospital, and continued body weight and nutritional status improvements at 90 days for the group taking the specialized nutrition supplement.

"The NOURISH study clearly reinforces the power of nutrition in impacting health outcomes. For the people in this study who were ill and malnourished, nutrition was critical to survival because it helps keep your body, especially your muscles, functioning properly," said Nicolaas E. Deutz, MD, PhD, Center for Translational Research in Aging & Longevity, Department of Health and Kinesiology, Texas A&M University, and lead study author. "This is more proof that we need to change the standard and

include nutrition as an integral part of care, much like flu shots or aspirin, to help older adults who already have or are at risk for malnutrition and chronic illness."

#### Malnutrition: A common condition in older adults

Up to 1 in 2 older adults are malnourished when they are admitted to the hospital. Many adults may not even realize they are malnourished - they can be of normal weight, or overweight, but have low levels of muscle or lean body mass. The loss of muscle, strength and energy can intensify in malnourished patients and those with a health issue like a heart attack or pneumonia. Other studies have shown that malnutrition can worsen their health outcomes including higher chances of complications, re-admissions and even death.

"Surprisingly, malnutrition in older adults is very common - and it's a condition that is having a rippling effect on our health and health system," said Alfonso Cruz-Jentoft, MD, PhD, head of the Geriatrics Department, Hospital Ramón y Cajal, Spain, and past president of the European Union Geriatric Medicine Society. He was not involved in the study. "People underestimate how critical strength and muscle health are to recovery from hospitalization and illness. Proper nourishment is a key component and cannot be left out of the conversation."

The NOURISH study builds upon existing research that shows the role nutrition plays in a patient's health, ranging from rebuilding muscle mass to helping with recovery from disease and time in the hospital. The nutrients in the specialized nutrition supplement used in the study - protein, HMB and Vitamin D - are all important components in repairing and rebuilding muscle while recovering from hospitalization and illness.

"As medicine has advanced, so has the science of nutrition. We know proper nutrition is foundational for good health, but the medical community and patients don't always turn to it when recovering from a health issue like pneumonia," said Refaat Hegazi, MD, PhD, Abbott medical director and study author. "While the prevalence of malnutrition is high, research shows that less than two percent of malnourished patients in the hospital receive an oral nutrition supplement. Nutrition must be one of our critical tools to help adults live longer, better lives."

The commercially available versions of the specialized nutrition supplement evaluated in the study are Ensure® Plus Advance in Europe, and it will be available this year as Ensure® Enlive® in the United States. The specialized nutrition supplement is also expected to be available in other countries around the world in the next couple of years.

## Omega 3 levels affect whether B vitamins can slow brain's decline

Medical News Today 20 January 2016

### B vitamins more effective in preventing cognitive decline in people with higher omega 3 levels.

While research has already established that B vitamin supplements can help slow mental decline in older people with

memory problems, an international team have now found that having higher levels of Omega-3 fatty acids in your body could



boost the B vitamins' effect.

The team, from the Universities of Cape Town, Oslo, Oxford and the UAE, studied more than 250 people with mild cognitive impairment (MCI) in Oxford. MCI is when brain function is below what is normally expected for a person's age but is not significant enough to interfere with daily life. While it is not as serious as dementia, if untreated it often progresses to become dementia.

Dr Celeste de Jager said: 'We previously found that B vitamins are able to slow or prevent the atrophy of the brain and memory decline in people with MCI. This was most effective in those who had above average blood levels of homocysteine, a factor related to B vitamin status that may be toxic to the brain. Scientists in our team initially found that there was a link between Omega-3 levels, homocysteine, and brain atrophy rates. We wanted to find out whether Omega-3 and B vitamins might interact to prevent cognitive decline.'

At the start of the study, each person was given a set of tests to measure their cognition, and had a blood test to determine the levels of two Omega-3 fatty acids commonly found in oily fish: docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA).

The participants were split into two randomly-selected groups, who received either a B-vitamin supplement or a placebo pill over two years. Their cognitive performance was also measured and the results compared with the baseline results from the start of the study.

Dr Abderrahim Oulhaj said: 'We found that for people with low levels of Omega-3, the vitamin supplements had little to no effect. But for those with high baseline Omega-3 levels, the B vitamins were very effective in preventing cognitive decline compared to the

placebo. This result complements our previous finding that B vitamins slow the rate of brain atrophy in MCI only in those with a good Omega-3 level to start with.'

The team also found that levels of DHA might be more important than levels of EPA, although they caution that more research must be done to establish whether this is true.

Professor David Smith said: 'The next stage will be to see whether providing a combination of B vitamins and Omega-3 supplements can slow the conversion from MCI to Alzheimer's disease. This would be an important step in the prevention of Alzheimer's disease. We have high hopes that this trial would work but funding is not easy to obtain for such studies.'

Dr Doug Brown, Director of Research and Development at Alzheimer's Society said: 'These results help us to tease apart who could benefit from taking B vitamins, suggesting that they might only improve cognition in people who have high levels of Omega-3 oils in their blood. Encouragingly, these findings suggest that for some older people a combination of fish oil supplements and B vitamins may help to improve thinking and memory.'

'As this study shows, the relationship between nutrition and brain health is complex and we need to see increased research efforts to help us understand the role that diet and nutrition can play in reducing a person's risk of dementia.'

The paper, Omega-3 fatty acid status enhances the prevention of cognitive decline by B vitamins in Mild Cognitive Impairment, is published in the Journal of

Alzheimer's Disease.

## Study shows zinc supplement boosted serum zinc levels and immunity in older adults

Medical News Today 28 January 2016

**The immune system weakens as the body ages, making older adults more susceptible to infections. Low levels of zinc impair immunity, particularly in older adults.**

A research team set out to determine if it was feasible to increase serum zinc concentrations in older adults in nursing homes who were zinc-deficient. Their work appears in the American Journal of Clinical Nutrition.

"Our previous work showed that 30 percent of nursing home residents have low serum zinc levels and those with low serum zinc levels had a significantly higher incidence of pneumonia and morbidity from it. Our new finding that serum zinc levels can be improved in older adults with zinc supplementation and that this is associated with enhancement of T-cell numbers and function strongly suggests that ensuring adequate zinc consumption by older adults could have a significant impact on reducing the incidence of and morbidity from infection, which is a major public health problem in older adults," said the study's lead author, Simin Nikbin Meydani,



Image © iStock.com/Ljupcco

D.V.M., Ph.D., the director of the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts University in Boston, and senior scientist and director of its Nutritional Immunology Laboratory.

The small double-blind, placebo-controlled trial involved adults age 65 or older from three Boston-area nursing homes. The study participants had baseline serum levels of zinc that ranged from moderately to very zinc-deficient. Participants were given zinc supplements or a placebo for three months. A total of 25 people completed the study, with 13 receiving the placebo (a daily multi-vitamin with only 5 mg of zinc), and 12 receiving a daily multi-vitamin with 30 mg of zinc. A serum-level of 70 micrograms per deciliter was used as the cut-off standard for adequate serum zinc level and measuring improvement from supplementation. The function of the immune response was assessed by determining the immune cell profile and function.

In addition to serum zinc concentrations, the researchers found that zinc supplementation improved the function of T-cells as determined by their ability to proliferate in response to stimuli that mimicked infection. Furthermore, they saw a positive correlation between serum zinc levels and the number and function of T-cells. This effect of zinc was attributed to increasing the number of T-cells rather than enhancing the function of each T-cell. At the end of three months, researchers found that:

- ✓ Zinc supplementation increased serum zinc concentrations in nursing home residents with low zinc levels.
- ✓ Zinc supplementation increased both the number and effectiveness of T-cells in the treatment group at a much higher rate than the control

group

- ✓ The increase of serum zinc rose higher in the treatment group, at a rate of 16 percent, compared to those in the control group, which rose at a rate of 0.7 percent.
- ✓ For those in the treatment group who were moderately zinc-sufficient at baseline, their serum zinc levels exceeded the cut-off standard.
- ✓ Participants in the treatment group whose serum levels were measured as substantially zinc-deficient at baseline did not experience an increase to normal levels during the trial.

"Having a positive response to zinc supplementation may take some time in people who have been highly zinc deficient. We need to better understand how much supplementation is needed for certain people, and for how long a period, so that more refined recommendations can be made," added first author Junaidah B. Barnett, M.C.H. (N), Ph.D., scientist in the Nutritional Immunology Laboratory at the HNRCA. "It is worth noting that zinc deficiency is not just a problem in nursing home residents; it also exists in non-institutionalized older adults," Meydani continued. "On average, zinc supplementation measurably improved serum zinc levels in these older adults, with most participants achieving serum zinc levels considered to be adequate."

Zinc is found in a wide variety of foods, including oysters, pork, red meat, poultry, seafood, and fortified breakfast cereals. Zinc is also found in beans, nuts, whole grains, cucumber peel, and dairy products and is common in multi-vitamins. The Office of Dietary Supplements of the National Institutes of Health notes that zinc deficiency is rare in North America, but that some groups of people are more likely to have trouble getting enough zinc, including those with digestive disorders and vegetarians. Too

much zinc (the upper limit for adults is 40 mg/day) can be harmful. Some researchers suspect, however, the older adults do not absorb or use zinc as efficiently as others. In addition, while serum zinc levels are a commonly used measure to evaluate zinc deficiency, they might not accurately reflect cellular zinc status. Some cells might exhibit low zinc levels, which impacts their function, even when serum zinc levels are normal.

## Bone health benefits of botanical extracts linked to genetic pathways

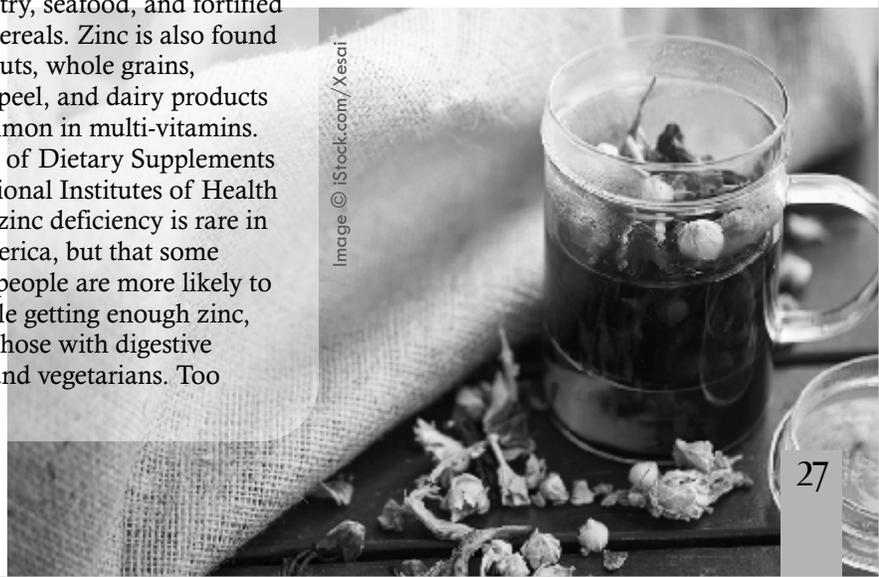
Nutra Ingredients USA 18Jan2016

**Extracts from pomegranate, grape seed, licorice, and quercetin may affect bone health by modulating gene expression relating to bone breakdown and formation.**

Results published in *Phytomedicine* indicate that extracts from pomegranate fruit (*Punica granatum L.*) and grape seed (*Vitis vinifera L.*) may work by affecting gene expression linked to reduced osteoclast activation (osteoclasts are cells which break down bone, leading to resorption and weakening).

On the other hand, quercetin (*Dimorphandra mollis Benth*) and licorice extracts (*Glycyrrhiza glabra L.*) may promote bone formation by modulating gene expression linked to increased osteoblast activation (osteoblasts are cells responsible for

Image © iStock.com/Xesai



bone formation). “These results demonstrate that the two botanical extract combinations developed through a targeted series of in vitro and in vivo assays caused changes in gene expression indicating that osteoclastic and osteogenic processes were modulated with both,” wrote researchers led by Kevin Gellenbeck from the Nutrilite Health Institute.

Working with scientists from Access Business Group (USA), The Himalaya Drug Company (India), and Yumei Consulting, Inc. (USA), the Nutrilite scientists assessed gene expression in an exvivo microarray analysis of mRNA obtained from blood samples of postmenopausal women following a 28day open label intervention study. Forty six women were randomly assigned to one of three groups: a combination of extracts from pomegranate fruit and grape seed a combination of quercetin and licorice extracts or a combination of all four plant extracts.

Results showed that the combination of pomegranate and grape seed extracts affected bone resorption gene expression, possibly by inhibiting a pathway called the RANKRANKL pathway. This pathway is already a recognized target for therapeutic agents in the treatment of osteoporosis, explained the researchers.

The quercetin and licorice extracts were found to affect genes expression linked to a reduction in osteoclast activity and to an increase in osteoblastic activity. This seemed to be partly linked to stimulation of the pathways linked to the formation of bone and collagen.

Interestingly, when all four extracts were combined, the changes to gene expression were different from when they were used in pairs. “The combination of all four plant extracts demonstrates that modulating both bone resorption

and bone formation simultaneously is difficult, possibly due to multiple feedback systems balancing the osteoblast and osteoclast activity,” they said.

“In summary, this exvivo microarray study indicates that the two botanical extract combinations modulate gene expression for both osteoclastic and osteogenic processes. Further work is warranted to confirm these results and to investigate the effect of the botanical extracts on the differentially expressed genes and their functional relationship to bone metabolism,” they concluded.

## Deficiency of vitamin B12 a concern among elderly

Nutra Ingredients 22 Jan 2016

**Lack of vitamin B12 among the elderly has been linked with serious health conditions, and researchers in Canada found that vitamin B12 deficiency is prevalent in long term care facilities.**

A study done in Canada found that 13.8% of seniors moving to an assisted-living facility are vitamin B12 deficient, with more developing deficiencies during their first year living there.

Multiple studies have connected B12 deficiency with several serious health conditions, including dementia, lethargy, osteoporosis, depression, and anaemia. The researchers, affiliated with the Schlegel University of Waterloo Research Institute for Aging , conducted their study in eight Ontario long term care homes managed by the same organization (Schlegel Villages ), which implements a policy that requires testing of vitamin B12 upon admission as well as annually. The study was published in the journal

Applied Physiology, Nutrition, and Metabolism.

How prevalent is it?

Included in the sample were the charts of 412 residents, 69% of which were female (286). The researchers found that, at admission, 13.8% of the residents experienced B12 deficiency, while 38.3% of residents had subclinical deficiency. The number of residents that were admitted with normal vitamin B12 levels made up 47.6%.

“This concept of at admission to [long term care] is particularly noteworthy in this population as persons receiving transitional care are generally more vulnerable because of the stress and anxiety of relocation,” the researchers wrote.



“The potential for breakdown in communication on medication and other treatments that are not incorporated into the resident’s care plan post-admission (Coleman 2003) and change in primary physician care for the resident.”

“Vitamin B12 (B12) is a nutrient of special concern in this population because of age-related decreased absorptive ability,” they added, citing several earlier studies.

An opportunity for supplements Heather Keller, a kinesiology professor at Waterloo who was part of the research team told The Waterloo Region Record about

prevalent deficiency at assisted living facilities: "It's not because [they] don't have enough in our diet. It's because [their] body is not absorbing it."

The effects of vitamin B12 deficiency are often mistaken for more serious conditions. "The person looks like they may have early dementia, when really it's a B12 deficiency," Keller told The Record. They recommend residents to consume supplements, or adding fortified foods to address the deficiency and reverse it.

## First time study tracks nutritional distribution of fat in human GI tract

NutraIngredients 22Jan2016

**An innovative analytical method has provided insights into the emptying, phase separation and distribution of fat in the human gastrointestinal (GI) system, which could pave the way for more effective functional foods that control energy intake and homeostasis.**

These functional foods often require a complex structure to ensure nutritional components are distributed and delivered in the correct order. The research, carried out by scientists from Zurich University and the University Hospital of Zurich, used the MRI method iterative decomposition with echo asymmetry and least squares estimation (IDEAL).

The technique detects and distinguishes between the signals water and fat send out allowing scientists to see the distribution of water and fat in the body. This was the first time the technique had been applied to the GI tract. The procedure allowed the researchers to identify features of phase separation and creaming within the gastrointestinal tract that were not visible in conventional MRI. They

believed this method had the potential to bridge the gap between current in vitro digestive models and in vivo behaviour.

"IDEAL would be best in handling homogenised (blended) meals," lead researcher, Andreas Steingoetter told us. "Predefined solid particles (like meat or vegetables) are possible, but additional MR sequencing would need to be carried out to avoid ambiguities. Similar concepts like IDEAL will eventually allow imaging of fatty acid composition and quantify the fractions of saturated and unsaturated fatty acids."

### Deeper fat layers

Current research to understand how food, particularly fat, is processed and digested within the GI tract have been accelerating of late, as the nutrition industry seeks to use these insights to improve products. The insights from this study could address the rise in nutrition related diseases such as obesity. Diets that are high in fat have often been cited as a leading cause for obesity. However, dietary fat remains an important source of essential fatty acids and plays a major role in the absorption of nutrients.

### Structure of the study

In the study, 12 healthy subjects were studied on two separate visits in a single blind, randomised, crossover study. IDEAL was used to create quantitative fat fraction maps of the GI tract after one of two fat emulsions was introduced: E1 (acid stable, droplet size 0.33 µm) and E4 (acid unstable, 0.38 µm).

The researchers were able to use fat fraction maps and GI emulsion profiles to identify the key steps of GI phase separation and creaming that were not visible in conventional MRI. Gastric fat emptying was faster for E4 compared with E1. Duodenal content volumes were also found to be larger for E1 than for E4.

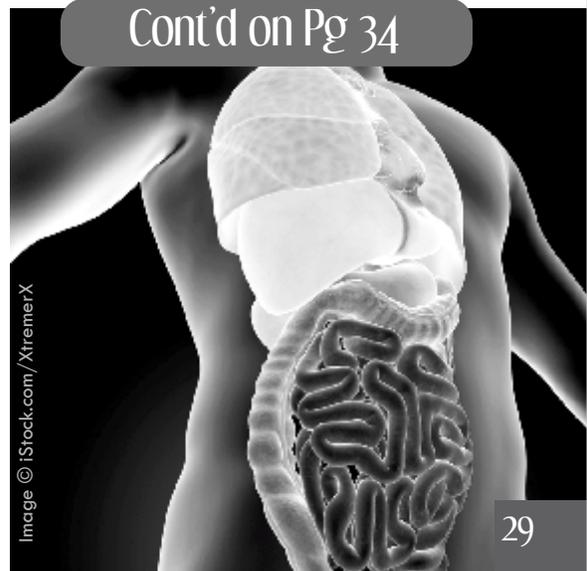
Findings of this study echoed recently published work on food products that modulate and control satiety and detect mechanisms that dictate disorders of human digestion and energy homeostasis.

The study used MR imaging, surface rheology and bioanalytics to investigate the effect of different lipid emulsions on gastrointestinal function and satiety/hunger. The team demonstrated that the stability of lipid emulsions in the stomach can alter the speed of fat emptying and processing. In addition, the release of plasma concentrations of gastrointestinal hormones was significant in the self reported feeling of fullness and hunger.

### Future research areas

Despite the success of this latest study, the researchers were quick to point out areas that required further investigation. "The feasibility of fat quantification in the lower GI tract still needs to be investigated because of two factors: first, lower fat contents due to continuous dilution by gastric and duodenal juice, causing the fat fractions to fall below the limit of detection or accuracy, and, second, the disintegration of fat due to digestive enzymes, causing the fat model to be no longer valid," they noted. "A spectroscopic approach could be potentially applied for analysing the fat model and its validation in the lower GI tract."

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# Regulatory & Safety News

## MSU helps fight food fraud

Ingredients Network.Com 31 Dec 2015

**Michigan State University (MSU) has not only defined the term “food fraud,” but the university says it is also helping the United States and other countries establish the strategies to fight it.**

In a recent issue of Food Chemistry Journal, the MSU research team introduces the topic of food fraud and provides a definition with translations in Russian, Korean and Chinese. The paper also tackles a system-wide focus that could lead to prevention.

“Our article is a translation by experts in their countries and includes an interpretation to address the emerging issue in their country,” Spink said. “The co-authors are champions for food fraud prevention around the world.”

Food fraud is defined as intentionally using deception for economic gain involving food. MSU has been helping governments, manufacturers and retailers that have been deceived. Recent examples include European stores unintentionally selling beef tainted with horsemeat, pet foods with melamine filler in lieu of whey protein – a substitution that proved deadly for many pets – and Chinese Wal-Marts mistakenly including fox meat in their offerings of donkey meat.

Donkey meat is standard fare in northern China. While this tainted-meat scandal may have happened in an isolated area, Wal-Mart felt the negative economic impact around the globe, said John Spink, director

of MSU’s Food Fraud Initiative, assistant professor in the College of Veterinary Medicine and co-author on the paper.

“It’s legal for Wal-Mart and other stores to sell donkey meat in rural northern China, which is sold by many stores there,” he said. “But when the news broke of this species swapping, the story went viral. Crises like these can have a catastrophic effect on companies, governments and consumer confidence.”

Spink and Doug Moyer, MSU program in public health professor and co-author, provide an academic definition – unbiased and peer-reviewed. The researchers’ goal is not simply to define and detect food fraud, but also to adjust entire food supply chains to focus on prevention, Spink said.

“For governments to begin addressing the issue, they needed a credible source they could reference – an academic source rather than a food association that could potentially have biased views,” he said. “Already, we’re collaborating with many other countries and serving as members on their food fraud teams. MSU is leading the world down the food fraud prevention path.”

Getting involved in the issue at the earliest stage has established MSU as one of the key sources for government agencies and company

leaders, Spink added. The next phase of this research will be to put these new laws and guidelines into practice.

Search “food fraud” on Google and MSU comes up as one of the top references. In the last month, representatives from Nigeria’s and Saudi Arabia’s departments of food and agriculture have met with Spink to establish guidelines to fight food fraud in those nations. Wal-Mart, looking to recover from its own scandal, helped sponsor a food fraud course, also led by MSU, translated into Mandarin, Spink said.

“We’ve built credibility, and government agencies and Fortune 500 companies are continuing to reach out to us for guidance,” he said. “Our research isn’t being shelved, either. It’s reaching people, and it’s already having a positive impact, one that we’ll certainly build on in the coming years.”

## EU approves digestive health claim for chicory root fiber

IFT Weekly January 13, 2016

**BENEO has announced that the European Union (EU) Commission has authorized a 13.5 health claim with proprietary use for its chicory root fiber inulin promoting digestive health.**

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Image © iStock.com/Diana Taliun

PFNDAI Mar 2016



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## Cont'd from Pg 30

**The official wording for the claim is “chicory inulin contributes to normal bowel function by increasing stool frequency.”**

In addition to the authorized 13.5 proprietary health claim, general health-related well-being claims under article 10.3 are also possible. Amongst others, these include “chicory inulin promotes digestive health” or “chicory root fiber supports a healthy and balanced digestive system.” Manufacturers that want to use the claim should consider that the beneficial effect is achieved with a daily intake of 12 g chicory inulin and the consumer should be informed accordingly.

While the recommended daily intake of dietary fiber is 25 g per day and actual intake is significantly lower, the authorization shows that adding inulin to a formulation helps to improve stool frequency and achieve the dietary goal of adequate fiber intake by the general population.

The authorization confirms that BENE0's prebiotic fiber inulin contributes to normal bowel function by increasing stool frequency without triggering diarrhea. This is possible because inulin resists digestion in the small intestine and is fully fermented in the large intestine.

“Improving regularity in a natural way is a growing health target of consumers,” said Anke Sentko, vice president of regulatory affairs and nutrition communication, BENE0. “With the recent proprietary health claim for BENE0's chicory inulin improving bowel function, our customers are well set to make the most of the ever-growing consumer trend of digestive health.”

Image © iStock.com/Diana Taliun



Image © iStock.com/XixinXing

researchers analyzed millions of food purchases in European supermarkets before and after the introduction of a front-of-pack nutrition label. The data covered two years and 61 products from a healthy (yogurt) and unhealthy (cookies) category.

“Smaller recommended serving sizes will let all nutrition values on the label appear smaller too, independent of the product's actual nutritional composition” says lead author Dr. Ossama Elshiewy from the University of Goettingen. Shoppers, who read nutrition labels, tend to ignore the smaller recommended serving size and think that these products are healthier than others. “The problem is that people are comparing calorie information that is not comparable,” Dr. Elshiewy adds.

Co-author Dr. Steffen Jahn, also from the University of Goettingen, suggests to always check the recommended serving size when reading nutrition labels. “This will prevent you from underestimating nutrition amounts and will make your choices healthier.”

**Consumers buy more when recommended serving sizes are smaller**  
Food Navigator, 21 Dec 2015

**Nutrition values seen on labels can differ substantially based on the recommended serving size, with consumers buying more of the same product among one of a**

## Seduced by the label: How nutrition information leads you to buy more

January 14, 2016 Science Daily

**Have you ever been to the supermarket and chosen foods based on nutrition labels? If so, be cautious, because the nutrition values you see on labels can substantially differ based on the recommended serving size, with undesired consequences for your purchase behaviour.**

According to a new research published in the Journal of the Association for Consumer Research, smaller recommended serving sizes on nutrition labels can unknowingly lead you to buy more than you need.

Consumer researchers from Germany, who conducted the research, found that shoppers bought more yogurt when the recommended serving size was smaller. In their study the

Image © iStock.com/JackF



### **number of undesirable consumer behaviours, researchers have found.**

The researchers found that shoppers bought more yoghurt when the recommended serving size was smaller. This may have few consequences as a relatively healthy food but may be cause for concern with snacks like chocolate bars.

Writing in the first edition of the Journal of the Association for Consumer Research, the researchers recorded millions of food purchases in European supermarkets before and after the introduction of a front-of-pack nutrition label.

The data collected was spread over two years and covered 61 products from the healthy (yoghurt) to the unhealthy (cookies) category. "When the serving becomes smaller this will decrease the nutritional values on the label," lead author Dr. Ossama Elshiewy from the University of Goettingen explained to us. "If you ignore this fact you might compare calorie information that is not comparable."

"People might infer that these products are healthier," co-author Dr Steffen Jahn, also from the University of Goettingen added. "So next time take care and check the recommended serving size on the label. This will prevent you from understanding nutrition content and make your purchases healthier."

Portion sizes of many foods have increased over the last 30 years with concern that this may be one factor that has contributed to obesity rates. Portion sizes are among a number of factors that influence the purchase of a food product, with packaging, labelling, advertising, and the unit size of equal importance.

While the blame has been firmly placed on the food industry's doorstep, consumers themselves

have resisted the introduction of smaller portion sizes, with value for money an important motivator.

In the U.S, the Food and Drug Administration (FDA) is keen to update the Nutrition Facts Panel (NFP) on packaged foods to improve understanding and recently took steps to recommend a uniform, front-of-package (FOP) labelling system that the food and beverage industries could take on.

In addition, as part of the 2010 Patient Protection and Affordable Care Act a menu labelling mandate was added that would require chain restaurants to provide calorie information on restaurant menus at the point of purchase.

### **Local authorities 'struggle' to fulfil food safety duties**

*Nutra Ingredients 21 Jan 2016*

#### **The Food Standards Agency (FSA) has voiced "growing concern" over the ability of cash-strapped local authorities to tackle food crimes and keep consumers safe.**

Many local authorities were struggling to provide adequate food safety enforcement services amid ongoing budget cuts, the FSA director in Wales Nina Purcell warned.

"The overall position is one of growing concern," Purcell said in a board paper published this week.

"At a local level there are a good number of authorities which are struggling to undertake interventions of food businesses at the required frequencies.

'Sampling levels fall'  
"More generally, the number of food businesses and customer complaints continue to rise, while local authority staff resources, intervention and sampling levels continue to fall."

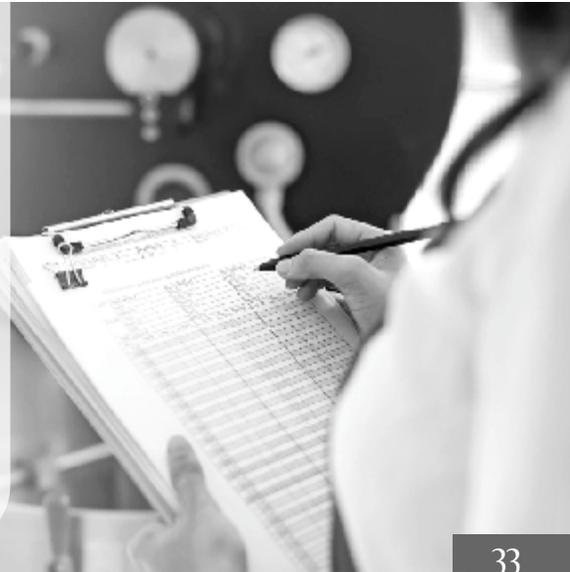
Monitoring of local authorities revealed that many of them were not able to deliver the food safety service required under the Food Law Code of Practice, the paper added.

"We are also acutely aware that local authority resources, particularly in England, will face further significant reductions over the next few years," it said.

The FSA's paper on local authority enforcement activity will come before the FSA board during a meeting in London on Thursday January 28.

Interventions have fallen  
Food hygiene interventions have fallen by 6.8% and food standards interventions have fallen by 6% over the past five years, the paper said. "Although possibly due in part to more targeted sampling, the number of UK official samples has followed a steep downward trend," it said. The FSA said the number of food law enforcement staff was down 17%, adding: "The decline has been most significant with regard to food standards where there has been a reduction of 38.6%."

But during the same period complaints about the safety and quality of food and the hygiene standards of food establishments rose by 9.3%.



## Cont'd from Pg 29

## A fat lot of good: Vegetables deep-fried in olive oil are healthier than boiled or raw

Nutra Ingredients, 22Jan2016

**Vegetables that are deep-fried in extra virgin olive oil contain more healthy phenols and antioxidants than raw or boiled vegetables important properties that reduce the risk of cancer and type 2 diabetes, Spanish researchers have found.**

This is because the phenols present in extra virgin olive oil are transferred from the oil, boosting the vegetables with healthy compounds exclusive to olive oil that are not naturally present in the vegetables themselves. "We can confirm that frying is the method that produces the greatest associated increases in the phenolic fraction, which means an improvement in the cooking process although it increases the energy density by means of the absorbed oil," said lead researcher Samaniego.

Olive oil: A fat lot of good  
Both olive oil and vegetables are important dietary sources of phenols that make up a staple of the Mediterranean diet, which has been associated with numerous health benefits such as reducing the risk of cancer and type two diabetes. The researchers from the University of Granada set out to determine how the phenolic content and antioxidant capacity of the vegetables changed during four common domestic cooking methods, and which method would retain – or even boost – the healthy properties of the cooked vegetables.

They determined the fat, moisture, total phenols and phenolic compounds as well as the

antioxidant capacity of the vegetables before and after cooking. The five most abundant phenols in the raw vegetables and those cooked without extra virgin olive oil were ovanillin, hydroxyphenylacetic, chlorogenic and vanillic acids, and rutin, in tomatoes. But after being cooked in olive oil, the vegetables also contained oleuropein, hydroxytyrosol, tyrosol, pinoreosin, and pcoumaric and hydroxybenzoic acids.

"Deep frying and sautéing led to increased fat contents and total phenolic content, whereas both types of boiling reduced the same. The presence of extra virgin olive oil in cooking increased the phenolics identified in the raw foods as oleuropein, pinoreosin, hydroxytyrosol and tyrosol, and the contents of vegetable phenolics such as chlorogenic acid and rutin," write the authors.

Samaniego et al. selected 120 g of four vegetables – potato, tomato, aubergine and pumpkin – which were either deepfried sautéed boiled in water or boiled in a mixture of water and olive oil. For cooking, the proportion of vegetable to either water or oil was defined according to traditional recipes in order to represent common domestic cooking methods a 5:1 proportion at 180 °C for deep frying, a 0.5:1 proportion at 80–100 °C for sautéing and a 5:1 proportion at 100°C for both types of boiling. In each instance, the vegetables were cooked for ten minutes, drained for five minutes and then immediately refrigerated for homogenisation.

Total phenolic content was determined using the Folin–Ciocalteu colorimetric method individual phenol content by liquid chromatography (HPLC) while antioxidant capacity was measured using DPPH, FRAP and ABTS methods.

Deep frying resulted in the highest loss of moisture and highest fat gain while sautéing maintained similar moisture levels to the raw samples. Boiling tended to increase or not significantly change the moisture content and fat content increased only the oil in water mixture. Total phenolic content increased for all four vegetables when deepfried, for the pumpkin when sautéed and for the eggplant when boiled by both methods. There was a nonsignificant increase for the sautéed aubergine and tomato whereas phenolic content fell for the potato and pumpkin boiled by both methods.

But the researchers also noted a decrease in total phenolic content for the sautéed aubergine, especially of chlorogenic acid, which they say may be due to oxidation caused by exposure to air since the food is not completely submerged in oil. All the cooking techniques increased the antioxidant capacity of the four vegetables, but deep frying was the most effective followed by sautéing and then boiling. "Hydrothermal cooking methods can be recommended when the foodstuff is consumed together with the cooking water," they wrote.

## Cont'd on Pg 38

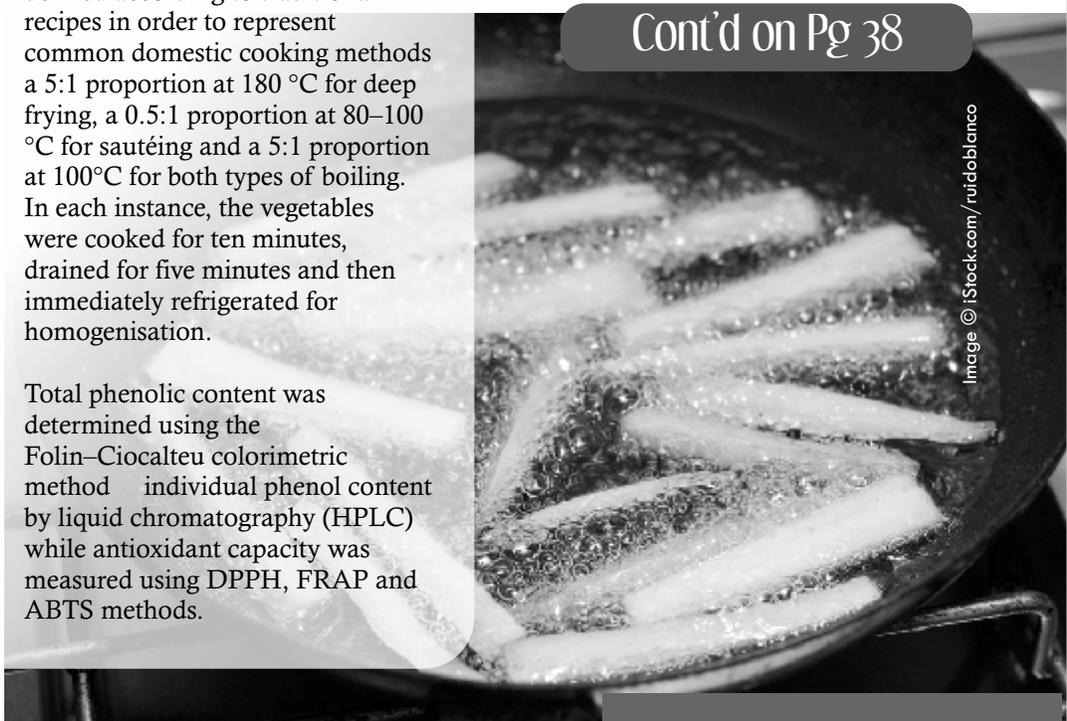


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### Oil Extraction

aids in the extraction of vegetable oils in aqueous process

## Cont'd from Pg 9

**18. Food Safety Plans for villages and towns**

Unless the plans made centrally are implemented at the town and village level, the benefits of food safety will not be available to the common man and woman. FSSAI needs to draw up model plans for a typical village and town, to be implemented by the local bodies, village community and the citizen. Such plans will identify the actions which are within the purview of the village/town and those which have to be attended to various govt departments. The only can they be budgeted for, and sufficient capability developed at the village and town level for taking the essential steps required for food safety.

**DELIVERABLES**

a. FSSAI will draw up model food safety plans for a typical village and town and disseminate them through

local bodies, NGOs, media and community organizations.

b. Training modules will be developed and agencies identified for providing them through a system of certification.

c. Food safety needs to be incorporated as an important item in school curriculum and local budgets.

**19. Building in house capabilities**

It is necessary to build FSSAI's capacity to implement the provisions of the Act and access skills whenever required. The technology levels in industry are far above the current skills within FSSAI and need to be brought at par. Otherwise, effective and responsible regulation will not be possible.

**DELIVERABLES**

a. FSSAI will undertake a quick review of its skill requirements and

staff and take steps to source themes early as possible. Such staff may be from the private or public sector with the required skills.

It needs to be emphasized that all these tasks cannot be performed by FSSAI single handed. FSSAI should acquire the capability to work with a multitude of other organizations which have the expertise and capability in various fields. That is where the mark of an effective regulator lies.

These tasks need to be drilled down to specify the number of months /years within which and the phases in which each task will be achieved. Only then can we hope to achieve the levels of food safety intended by Parliament and ensure safe food to the people.

**(Author was the first Chairperson of the Food Safety and Standards Authority of India.)**

Image © iStock.com/Mikko Lemola

## Shelf Life Study - Understanding the Basics

## Cont'd from Pg 6

Shelf life of a potato wafer cannot be determined without testing its peroxide value which is an indication of its rancidity and off flavour. So if peroxide value is not a part of shelf life study, the evaluation may lead to erroneous results.

Some products have label claims for vitamins, micronutrients etc. These are known to decrease during storage and in such cases, their content needs to be checked during the study.

Apart from chemical and microbiological parameters, organoleptic properties or sensory evaluations of food are also used to study the shelf life of a product, since a layman approves the product based primarily on its appearance!

Customer acceptance is largely dependent on flavour, colour and texture of a product. For example, products like ice creams when not frozen properly, their texture is affected and they are no more acceptable to the customer.

Therefore a study of these parameters also plays an important

role in assessing the quality of food product.

**When to end the shelf life study of a product?**

All foods spoil with time, but there is a considerable variation in spoilage rates. Shelf life studies are unique and vary from product to product. When the quality of a product starts deteriorating it is reflected in its microbial, sensory, chemical and physical evaluations and it is on these evaluations that one has to determine the end of shelf life study.

Image © iStock.com/jarabee123

## Cont'd from Pg 18

## What is flavonoid cocoa and what is its use?

Food News Latam January 11, 2016

**It is normal for cognitive function to deteriorate slightly with age, memory begins to deteriorate, along with processing speed and the ability to form long-term memories.**

Finding a way to delay the onset of these issues becomes increasingly important as life expectancy lengthens life expectancy. The Italian University of L'Aquila and Mars, Incorporated, reinforces the results of several studies that cast the role of diet in maintaining cognitive health.

The research was conducted in two stages, and Dr. Giovambattista Desideri (author) said that a diet rich in cocoa flavonoids may play an important role in maintaining cognitive health as we age. The results obtained in this study could provide some information on a possible mechanism of action for cognitive improvements observed.

The study, published in the journal Hypertension, found cacao cognitive and cardio-metabolic benefits of regular consumption of cocoa flavanols in older adults who had been diagnosed with mild cognitive impairment (MCI). The second study was published in the American Journal of Clinical Nutrition. Participants in this controlled study (men and women 61 to 85 years without evidence of cognitive dysfunction) were assigned to one of three groups of flavanols: consuming a drink containing 993 mg (high), 520 mg (intermediate) or 48 mg (low) amounts of cocoa flavonoids every day for eight weeks. The drinks were specially prepared.

Cocoa drinks and intermediate high

flavanol were produced using process patented by Mars. Cocoa powder while low flavanol drink was made with a powder alkalized cocoa and highly processed. They also had to keep the lifestyle and normal diets throughout the study.

At baseline and after eight weeks, cognitive function was assessed by examining memory, and memory retention. Among those individuals who regularly consumed drinks with high or intermediate flavanols, there were significant improvements in overall cognitive function. This study shows that even cognitively healthy individuals can benefit quickly after the regular inclusion of cocoa flavonoids in your diet.

In addition researchers monitored insulin resistance, blood pressure and other metabolic markers, which had cardio-metabolic improvements in results. In groups of high and medium flavanols, systolic and diastolic blood pressure they were reduced and insulin resistance improved significantly. Only a modest improvement in diastolic blood pressure was observed in the low flavanol group, no significant improvements in blood pressure.

What is not yet known is how they work and how long its effects, but if you can say that this discovery may affect the daily lives of people.

## Types of sugar substitutes and artificial sweeteners used in confectionery

FOOD NEWS LATAM JANUARY 5, 2016

**A variety of simple and complex sugars give sweet flavour preparations.**

Among the different types of sugar on the market and used in



Image © iStock.com/philipimage

beverages, confectionery and others cite the best known today: white sugar, this type of sugar is the most widely used in everyday life as we find it on the table, in shops and confectioneries. The pearl decoration or sugar is a large grain sugar that is usually used to decorate baked goods, biscuits, cakes, pastries, etc., as their final appearance can see crystals over the final product.

**Sugar or superfine sugar fine grain:** It is white powdered sugar that dissolves more easily. It is used in most recipes like sweet cakes, biscuits, meringues, mousses and creams.

**Icing sugar:** is powdered sugar to which was added cornstarch to prevent clumping. It is generally used when decorating to give a "snowy" finish various sweets. It also serves to prepare meringues, marzipan, gum paste, fondant and.

**Brown sugar:** Like white sugar is extracted from sugar cane grown in tropical countries, but the main difference with it is the process that is given because it is not as refined as white sugar. It also has a taste and aroma of vanilla, nuts, licorice.

**Liquid sugars** are obtained by dissolving white sugar in demineralised water, filtered and

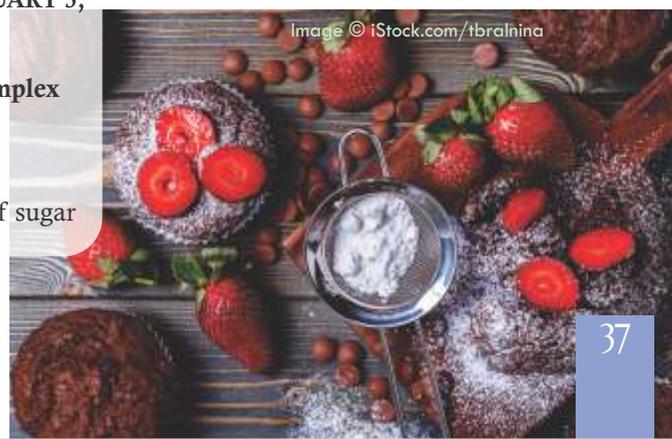


Image © iStock.com/tbralnina

purified later.

**Special Sugars:** Organic Sugar cane integral, brown sugar candy, sugar bolada or pearled, sugar lumps. Muscovado brown sugar, brown sugar superfine, brown Demerara sugar, brown sugar light and dark.

**Types of substitutes** are substitutes for sugar, glycerol, glucose or dextrose, polydextrose, polyols, isomalt Maltitol, Sorbitol, Stevia or Stevia.

**Artificial Sweeteners:** Aspartame, cyclamate, Saccharin, Sucralose.

Sugar can be used in different ways in baking, from giving sweetness to a preparation to be responsible for its texture. The cold sugar sweetness gives the point of baking ingredients and warm, like syrup or jelly, contributes to the texture. By heating the sugar at different temperatures, achieve points with can be worked various desserts and decorations and to achieve structures with caramel cast stretch blow. Almudena Villegas Becerril in his book "Basic elaborations of pastries and basic desserts": Proposes preparation simple recipes and it refers to the use of these

products in the field of baking. Thanks to the group of natural and artificial sweeteners, the taste that characterizes the pastry is achieved sweet. But it is important to select the type of sweetener, because each has different qualities and preparation therefore requires different sweeteners.

Sugar substitutes are used in confectionery products as a sweetener, as a stabilizer and for decoration, with no need to add many calories to the final result as when common table sugar is used. Some of the substitutes cause discomfort and should take into account the recommendations regarding the maximum daily dosage to prevent side effects.

Artificial sweeteners are used in baking as sugar substitutes for people suffering from diseases such as diabetes and to add sweetness products. However, you should take precautions because many can be toxic. They are also not very popular in baking. Applying artificial sweeteners and sugar substitutes in baking is beneficial because they do not change the organoleptic characteristics but rather improving them depending

on their application as an example by applying sucralose in developing sponge cake results in more fluffiness that when realizing ordinary sugar, in the case of the liquid working is easier to integrate the sweetener to the mixture since being liquid mixed without problem, in the dark working or those that will be needed a degree of caramelisation and use stevia brown sugar which does not help in relation to colour and caramel flavour that could not be obtained using only a product ersatz as stevia, dextrose or sucralose.

It should be noted the application in pastry as these can give an extreme sweetness to the product which would be harmful and review the product purchased before applying because in the market by marketing the name of a component is placed but by analyzing the content has more than one can give us a different desired result. Besides that should not abuse these substitutes or artificial sweeteners because it can affect the health not because alternative products to use sugar we consume without moderation as it is the belief of consumers in general.

## Research in Health & Nutrition

Cont'd from Pg 34

### Researchers in India use curcumin to create 'functional ice cream'

Nutra Ingredients USA, 26 Jan 2016

**Researchers from the National Dairy Research Institute in India sought to bring the health benefits of turmeric's main metabolite—curcumin—into one of the world's most popular treat: ice cream.**

Powdered turmeric, a key ingredient in making curry, can be found in spice cabinets across South Asia.

Researchers at India's National Dairy Research pointed that, as people are looking for naturally occurring bioactive components in plants, the bioactives of turmeric is a valuable source of nutrients for functional foods. "It has been used as a remedy since ancient times because of several pharmacological properties," they wrote. These properties, among other things, include antioxidative, antiinflammatory, and antiparasitic activities.

Despite soaring sales of curcumin supplements, curcumin's application as a functional food ingredient hasn't been widespread—the researchers

attribute this to "poor water solubility, extremely low absorption and bioavailability, and rapid degradation under neutral and alkaline pH conditions." Published in the latest edition of Food & Function, their study found that the hydrophobic curcumin can actually be dissolved to add nutrition to functional foods when it has been nanoencapsulated using sodium caseinate. The best part, to the joy of children and adults alike: ice cream was a successful host of the functional ingredient.

**Tiny droplets encapsulated by casein**

To make the curcumin bioactives dissolve, the researchers turned

them into nanoemulsions, which are “transparent heterogeneous mixtures of oil in water and are stabilized by emulsifiers,” they wrote. Imagine nanosized droplets of orbs encapsulated by a membrane. For this study, the researchers used casein to emulsify and encapsulate the curcumin, this is because, compared to whey protein, casein can form a thicker interfacial layer around the lipid droplets, and because it is easily degraded by the enzymes of a stomach.

Another advantage is that the food industry already widely uses sodium caseinate (NaCas), so the study could simulate a feasible functional food design. But then there’s the question of shelflife and stability. “The pharmaceutical and food sectors are focusing great attention on developing suitable delivery systems for the incorporation of curcumin oil in water emulsions and these need to be stable in food product,” the researchers wrote.

#### Blends well with ice cream

After various tests using different oils to dissolve the curcumin—butter, palm, olive, MCT60, and sunflower oil—maximum solubility was found in MCT60, a medium chain triglycerides60 procured from Kamani Oil Industries in Mumbai, India. The curcumin itself was obtained from Plant Lipids, based in Kerala, India, whereas the Sodium caseinate came from Thomas Baker Chemicals in Mumbai, India. The team made their ice cream from scratch. Dry ingredients (skim milk powder, stabilizer, emulsifier, and sugar) were mixed with the liquid ingredients (milk and cream) at 70 to 72°C. Afterwards is the homogenization process around 65°C, when the curcumin nanoemulsion is added. The mixture is then pasteurized at around 85°C, and cooled between 0 to 4°C. After 24 hours of ageing in

freezing temperature, flavour (mango) and color was added, before freezing and packaging it at below freezing temperatures (around 18°C).

#### Was it good ice cream?

“For the stability, we observed no phase separation after centrifugation,” the researchers wrote. “At physiological pH (7.2 to 7.4) curcumin was unstable and degraded immediately. To challenge the use of a curcumin nanoemulsion in drug delivery in pharmacological therapy, we solubilized curcumin alone or the nanoemulsion (1 mg mL<sup>-1</sup>) in PBS (pH 7.4) and observed the complete solubilization of the freeze dried curcumin nanoemulsion compared to native curcumin which is less soluble with undissolved flakes”

In other words, the nanoencapsulation of lipophilic curcumin by using the sodium caseinate as an emulsifier was found stable under various processing conditions: Heat, pH, and ionic strength. “The release kinetics data also suggest that our formulation was stable in simulated gastrointestinal conditions,” the researchers wrote. “Further, ice cream was selected as an ideal food system for the delivery of curcumin nanoemulsion.” Though further studies are needed in the field to study the functional attributes and use for therapeutic purposes, it’s safe to say curcumin can start becoming a more widespread ingredient for functional foods in the near future.

## Algae will be nutritional star of the century, sports nutrition formulator asserts

Nutra Ingredients USA, 12 Jan 2016

**Catharine Arnston, founder of the brand Energybits, said she believes her company is the only sports nutrition formulator based solely**

**on whole algae products. Energybits are small tablets pressed from whole spirulina algae.**

The company also markets a recovery product based on chlorella, and features a 50/50 ‘vitality’ offering as well, all of which are now sold as food products, not supplements. The products are marketed as an on-the-go energy source for competitive athletes and health conscious consumers.

#### Helping a relative

Like so many entrepreneurs in the sports nutrition and wider dietary supplement arenas, Arnston has a personal story. While helping a relative deal with the damaging effects of chemotherapy and hearing the advice the oncologist gave on nutrition, she decided to go back to school at the Institute of Integrative Nutrition to study the subject.

“I started the whole journey about seven years ago when her oncologist was telling her she needed to improve her diet. I went on to read about the power of green nutrition,” Arnston told NutraIngredients USA.

Armed with her dietitian degree, she set up a private practice counselling individual patients. Arnston, who also has an MBA, also set up a consulting business offering healthy nutrition advice to groups of employees at companies. But she was seeking a way to affect more consumers at a deeper level, and that desire and her research into the power of green foods led her to algae. “Algae is a nutritional superstar,” Arnston said. “My prediction is that algae is going to be one of the biggest industries of the 21st Century.”

**Athletes were early adopters** Arnston has been pursuing a bootstrap type of development for her company, which is based in Boston. As the products first came on the market, among the early

adopters were runners, who appreciated the energy boost they attributed to the tablets, and the no-fuss delivery that contrasts to the sticky mess associated with many sweetened energy products on the market. Energybits are formulated as tiny, 1 calorie tablets, with 30 to a serving, which can be a bit of a hurdle, Arnston admitted. But she believes swigging a handful of small pills down with a swallow of water beats trying to choke down goo at mile 20 of a marathon, and the reports she got from the field showed no stomach upset associated with the products, as opposed to the significant amount of GI distress associated with existing energy products loaded with carbs and caffeine.

#### Energy boost attributed to nutritional profile

Arnston said she attributes the reports she receives from athletes of an energy boost to the algae's unique nutritional profile. The products feature about 4.8 grams of protein per serving (which is 60% or more of the total weight) and a full suite of B vitamins and minerals. And the minerals are naturally chelated, that is, bound to the amino acids, and so are more fully absorbed, she said. Algae are rich in chelated iron in particular, and not having enough iron in the blood restricts its ability to carry oxygen, Arnston said, leading to fatigue during endurance exercise.

Arnston said she believes that kludgy marketing has held back the adoption of algae products in the US market, something that she aims to change. "Algae have been sold in America for 50 years and virtually nobody knows about it yet," Arnston said. One of the things that could boost uptake of the product in the sports field is a drug-free certification, and obtaining one is one of her near-term goals, Arnston said. While the products have one or at most two ingredients, athletes still need assurance that there is nothing else in there. But certifications cost money, so she is

in the process of raising capital with that in mind. The funding picture got a boost recently when Arnston won a \$15,000 prize as first runner up in Entrepreneur magazine's annual Entrepreneur of the Year competition.

### Fibres: The unsung hero in food marketing

FOOD NEWS LATAM JANUARY 15, 2016

**Thirteen slices of bread, 10 cups of broccoli or 6 medium apples. This is what a consumer would need to achieve the suggested daily intake of 25 grams fibre, says the World Health Organization.**

Although many consumers are currently not close to these suggestions, they are trying. In fact, 56% of consumers worldwide think you want more fibre in your diet. Decades of research have shown that diets high in fibre are associated with a lower risk of coronary heart disease and diabetes and promote intestinal health and healthy digestion. Instead of consumers will only come to wholemeal bread, apples or broccoli, producers have the opportunity to help consumers achieve these nutritional benefits fibre-fortified foods and beverages.

In addition to the health benefits inherent fibres provide the functionality to help meet demand for many other health and wellness statements, which are trend. For example, some fibres can help balance the volume and mouthfeel in products with reduced sugar content again. This unique blend of inherent benefits and functionality makes the fibres to market key players "better for you" products.

**Reducing sugar and calories**  
According to a study by IFIC (International Food Information Council) conducted in 2015, 55% of consumers looking to reduce consumption sugar<sup>3</sup>. This trend makes many producers seeking high

intensity sweeteners. By replacing sugar with sweeteners high density fibre can help keep the sensory experience of a standard product with sugar. Fibre, including soluble corn fibre and polydextrose, help rebalance the volume and mouthfeel in these formulations. Polydextrose is especially ideal for low-calorie formulations without sugar because it only provides 1 kcal /g.

#### Fat reduction

As products with reduced sugar content, soluble corn fibre and can also help reduce fat, to rebalance the volume and mouthfeel. The beta-glucan oat fibre is another option that helps achieve a product with reduced fat content is satisfactory. Its major hygroscopic and emulsifying properties thicken and stabilize emulsions, creating the sensation in the mouth and creamy texture homogeneous product related standard fat content.

#### Maintaining a level of healthy blood cholesterol

Several clinical studies have shown that increasing intake of soluble fibres viscous as beta-glucan can also help reduce low-density lipoprotein (LDL) and total cholesterol when consumed as part of a heart-healthy diet. Overall, the data suggest that 3 g / day of beta-glucan collaborate to lower LDL cholesterol by up to 3-5% and total cholesterol by up to 2-4%. Various countries allow statements on the health benefit or statements that relational functional beta-glucans and lowering cholesterol.

Certain fibres allow the inclusion of claims as "excellent source of fibre," "less sugar", "low fat" and "helps maintain a healthy cholesterol level", giving marketers the opportunity to add an extra attraction to their packaging labels. Along with a provider that has a complete portfolio of fibre ingredients, food producers and drinks can determine the option that will get the statements that best fit your target audience.

Micronutrients and  
Macronutrients are crucial for a child's  
**brain development, immune health**  
and **physical growth**



Enfagrow A+ energy contribution from Carbohydrates, Fats and Proteins are in line with expert recommendations

Energy Source	% of Energy Contribution	
	WHO/FAO <sup>1,2</sup>	Enfagrow A+
Carbohydrates	55%-75%	56%-57%
Fats	25%-35%	29%-30%
Protein	10%-15%	13%-14%



+ = 2 serves of

**Enfagrow A+ daily will help meet RDA for important nutrients.**

**Enfagrow A+ with DHA PLUS is a high quality nutritional milk powder that supports cognition, immunity and physical growth.**

**Specially designed for regular use in children 2 years and above**

\*Mead Johnson & Company claim based in part on data reported by Nielsen for the Children's Nutrition Milk Formula category across measured off-premise retail channels in 28 countries for the 12 months ending June 2015. This product is not an infant milk substitute or infant food for less than 2 years old.

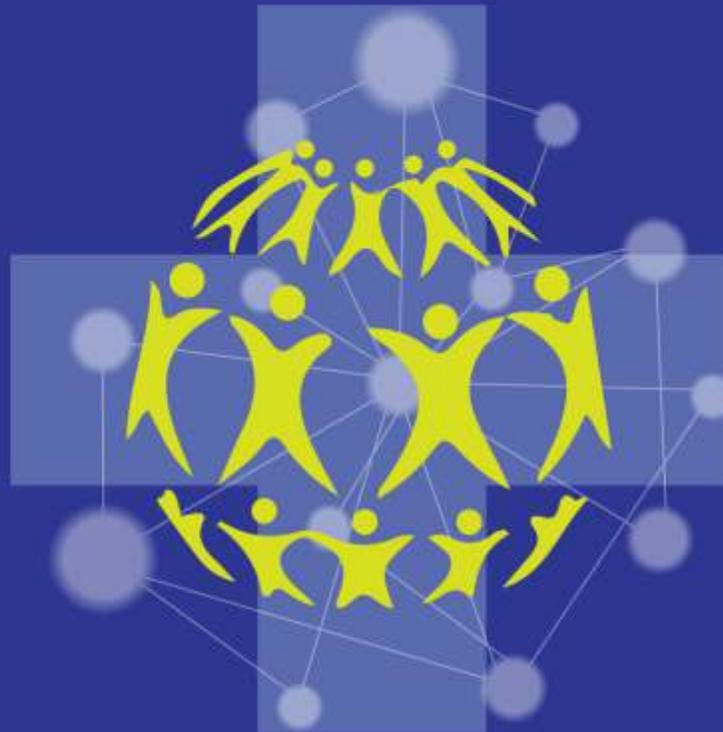
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**British Biologicals**  
The Protein People  
A Global Nutraceutical Company

# Transforming Science Into Nutritional Solutions For The Better Health Of Mankind



**WE** touch the lives of millions of people for their wellbeing and achieve this through partnerships with the medical community. Our philosophy embraces better life for the people and also extends to the wellbeing of the community where we operate.

The patient is at the centre of our universe, in which we discover, develop and deliver innovative nutritional products that prevent serious ailments and diseases. As a result, today we are leaders and the No.1 medical nutrition company in India that is Dynamic, Diversified and Developing.