



SciTech in Brief

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Scientists are explorers.
Philosophers are tourists.

Richard Feynman

May 11, 1918 – February 15, 1988) was an American physicist



Ref:

www.lhup.edu , Wikipedia

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New Barrier Packaging Solution

A European-based manufacturer of food packages, has launched a new barrier packaging solution, which is made up of multi-layer structures. Designed to block humidity and oxygen, this solution helps to extend the preservation of products by up to 24 months, while food products packaged in this way retain the highest level of quality.

The manufacturers have developed a multi-layer plastic-barrier sheet intended to package food products that do not require cool storage for preservation. The shelf life of products packaged with this coextruded sheet can be extended by as much as two years.

They offer four basic reel structures, which are intended for FFS (Form/Fill/Seal) machines. The PS/Ethylene vinyl alcohol copolymer (Evoh)/PE structure is intended for the packaging of stewed fruit, fresh fruit, cold cuts

and desserts, while the PP/Evoh/PP structure, which is microwavable and sterilizable, is designed for the packaging of baby food, pre-prepared food and pet food. The PS/PE structure is suitable for cheese, fish and for industrial applications and the PS/Evoh/PS form is designed for the packing of fresh products.



New Packaging material for food

As each food company has its own specific requirements, they also manufacture made-to-measure sheets in accordance with its customers' specific requirements and in order to achieve a perfect match with their packaging machines.

The sheet made up of 9 layer designed by this manufacturer has an increased barrier

properties and the sheet has an added barrier to protect the packaged product from light. The thickness of each layer and its formulation can be adapted upon request. Sheets can also be produced in a two-colour version, with white on the inside and a colour on the outside: this is designed to meet the growing demand from companies to make packaging relevant from a marketing standpoint.

In terms of equipment, the company has a fleet of high-quality modern machines, which are fitted with the latest technology, such as autoflex, and an online thickness-measurement tool. Thanks to its machines, PACCOR can provide a constant and accurate spread of the master layers (EVOH, PE and bonding agents).

Ref: *DirectU2: the world of packaging and labelling; November 1, 2011 - Volume 7 Issue 14*

Add Protein Power with Peanut Flour

At present consumers are increasingly considerate about health and nutrition. As a result manufacturers are looking for methods to boost the nutritional portfolio of food and beverages. Not only the health brands, many everyday products are now claim to have 'low calorie, vitamin enriched or minus claims such as low fat, free from trans fatty acids. Weight management has also become a key issue in health. It has been realized that cutting food out is an unsustainable method and the type of food we eat that impact weight loss significantly. Thus products linked with satiety are now booming.



Several different options exist with satiety group such as low GI, high protein and high fibre. High protein diets are significantly attracting interest as a weight management aid. It has been predicted that market for high quality protein will be worth €1.71bn by 2020.

Amino Acid Content

	28% fat		12% fat	
	g/100g flour	g/100g protein	g/100g flour	g/100g protein
Taurine	0.01	0.02	0.02	0.04
Hydroxyproline	0.23	0.53	0.26	0.49
Aspartic Acid	5.26	12.02	6.43	12.00
Threonine	1.21	2.77	1.45	2.71
Serine	2.03	4.64	2.35	4.39
Glutamic Acid	8.64	19.75	10.66	19.89
Proline	1.99	4.55	2.48	4.63
Lanthionine	0.00	0.00	0.00	0.00
Glycine	2.76	6.31	3.34	6.23
Alanine	1.83	4.18	2.24	4.18
Cysteine	0.53	1.21	0.62	1.16
Valine	1.91	4.37	2.41	4.50
Methionine	0.49	1.12	0.58	1.08
Isoleucine	1.48	3.38	1.91	3.56
Leucine	3.08	7.04	3.79	7.07
Tyrosine	1.85	4.23	2.23	4.16
Phenylalanine	2.46	5.62	3.02	5.64
Hydroxylysine	0.05	0.11	0.05	0.09
Ornithine	0.03	0.07	0.04	0.07
Lysine	1.11	2.54	1.35	2.52
Histidine	1.07	2.45	1.32	2.46
Arginine	5.24	11.98	6.38	11.91
Tryptophan	0.49	1.12	0.66	1.23

Peanut flour is an ideal solution for formulating products with high levels of quality plant proteins.

Not only is it carefully roasted to create a delicious taste and tempting aroma, it is packed full of nutrients and dietary fibres. More over it is gluten free. Peanut flour is naturally free from trans fats and cholesterol. Overall fat content in peanuts is relatively low and predominantly unsaturated. Since peanuts are partially defatted during processing to enable it to be milled to flour. Peanut flour contains between 40 – 50 % protein making it a heavy weight option for increasing protein content.

Peanut flour can be used to add nutritional and functional value in confectionary, nutrition bars, slimming products, seasoning blends and sauces. In soy protein-based beverages, where off notes caused by the bean can limit product success at market, whereas peanut flour enhances the taste.

A study at the University of Georgia successfully copied commercially available meal replacement shakes and protein shake mixes using milled peanut flour.

Amino acid content of 12 and 28 % fat containing peanut flour is given.

Ref. American Peanut Council, Trade Information Paper No. 2

Standards on Greenhouse Gases

Greenhouse gases (GHG) reduction and removal is an increasingly important issue in today's world. The American National Standards Institute (ANSI) accredits GHG Validation/Verification Bodies (V/VB) that, in turn, provide validation/verification of assertions made by those involved in GHG reduction.

Greenhouse gases are a group of gases so named for their role in the greenhouse effect, the process through which those gases reflect light back toward the Earth's surface, effectively heating it up. Chief among them are water vapor, CO₂, CH₄, NO_x, and O₃, each contributing in different ways.

In response to concerns raised over the magnitude of the human contribution to the amount of GHG in the atmosphere and their effects, reduction efforts have been undertaken at every level of organization, from local projects to regional and multinational agreements to those stretching over a global scale. Subsequently, assertions put forth by those involved in GHG reduction, as well as proper enforcement of

adherence to legal and contractual obligations together create a need for a system of validation and verification by impartial third parties of GHG assertions.

ANSI provides accreditation for GHG V/VBs through the "ANSI Accreditation Program for Greenhouse Gas Validation/Verification Bodies". In order to earn ANSI accreditation, a V/VB must be operating in accordance to the requirements defined in the international standard ISO 14065:2007, including qualities such as consistency and impartiality. From there, ANSI-accredited entities validate/verify GHG assertions put forth by those involved in GHG reduction.

Lastly, investors, the general public, and regulators can then act accordingly and with confidence in the validity of the GHG emissions and reductions data provided to them.

In addition to offering standards guiding the validation/verification of GHG assertions, ANSI also offers standards aimed at guiding the quantification, monitoring, and reporting of GHG emissions, reductions, and removals.

ISO standards on green GHGs,

ISO 14064-1:2006 - Greenhouse gases -Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals

ISO 14064-2:2006 - Greenhouse gases -Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements

ISO 14064-3:2006 - Greenhouse gases -Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions bacteriophage

ISO 14065:2007 - Greenhouse gases - Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition

ISO 14066:2011 - Greenhouse gases - Competence requirements for greenhouse gas validation teams and verification teams

Ref: <http://webstore.ansi.org/>

[greenhouse-gas/](http://webstore.ansi.org/greenhouse-gas/)

[source=globalspec_1211](http://webstore.ansi.org/source=globalspec_1211); *Global Specs: The world of environmental technology, December 12, 2011 - Volume 6 Issue 14*

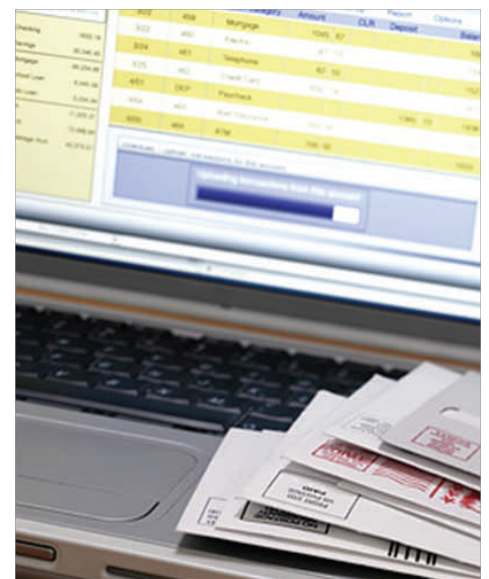
Make a difference

Time April 9th, 2007; image blog.timesunion.com

Eliminating your paper trail by banking and paying bills online does more than save trees. It also helps reduce fuel consumption by the trucks and planes that transport paper checks. If every U.S. home viewed and paid its bills online, the switch would cut solid waste by 1.6 billion tons a year and curb greenhouse-gas emissions by 2.1 million tons a year, according to Javelin Strategy & Research. To avoid unnecessary carbon dioxide-emitting car trips to the bank on payday, ask your employer to directly deposit your paycheck. You'll get your money faster

Pay Your Bills Online

Time April 9th, 2007; <http://www.time.com>



GM Mosquitoes Show Fever Promise

Genetically modified mosquitoes could prove effective in tackling dengue fever and other insect-borne diseases; a UK-based scientific team has shown. The male mosquitoes are modified so their offspring die before reproducing. Researchers found that the GM males mated successfully with wild females. Such mating has not before been proven in the wild, and could cut the number of disease-carrying mosquitoes.



Dengue is caused by a virus transmitted by the *Aedes aegypti* mosquito. There is no vaccine as yet. As far back as the 1940s, it was realised that releasing sterile males into the wild could control insects that carried disease or were agricultural pests. When females breed with the sterile males rather than wild fertile ones, there will be no viable offspring, meaning there are fewer mosquitoes

around to transmit the disease.

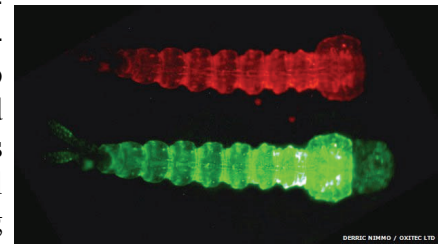
In the 1950s, the screw-worm fly was eradicated from the Caribbean island of Curacao using males sterilised by radiation. But this has not been successful with disease-carrying insects. Generally, the sterilising process weakens the males so much that they struggle to mate while the wild males dominate.

Oxitec, a company spun off from Oxford University, uses a genetic engineering approach. Offspring of their GM males live through the larval stage but die as pupae, before reaching adulthood.

In the latest study, the research group - which includes scientists from Imperial College London and the Liverpool School of Tropical Medicine - released batches of GM mosquitoes in 2009 in an area of the Cayman Islands where *Aedes aegypti* are common, and dengue sometimes present.

A proportion of the eggs collected from the study area in subsequent weeks carried the introduced

gene, meaning the biotech mosquitoes had mated successfully. The GM males made up 16% of males in



The GM larvae also carry a fluorescent gene that distinguishes them from wild relatives

the study area, and 10% of the larvae were not quite as successful as the wild males, but not significantly worse. The GM larvae also carry a fluorescent gene that distinguishes them from wild relatives

In principle, a process that allows larvae to hatch and stay alive for many days should be more advantageous than the traditional approach of producing infertile eggs, as the larvae will consume food that could otherwise be used by viable larvae from the union of wild males and females.

Ref. www.bbc.co.uk/news/science-environment-

Self-Composting Bag

The newest kitchen waste bag from BASF is the Ecovio® FS, which will break down in an industrial composting facility within four weeks. The bags are a solution to either disposing of organic compostable materials in a plastic bag, which does not degrade and must be removed from the compost, or in a paper bag, which doesn't hygienically contain the waste.



An average kitchen generates lots of organic waste which can be turned into nutrient-rich compost in an industrial composting plant, but only if it is collected separately in advance. However, collecting leftovers in a bin or lining the bin with paper bags are not the solutions to the problem of collecting the organic waste in plastic bags and treating biodegradable waste as non-biodegradable.

A multinational company has come up with a solution to this problem: the compostable plastic Ecovio® FS. In an industrial composting plant, this innovative material biodegrades within four weeks. Bin liners made from Ecovio FS are strong and tear-resistant, even if the waste inside is wet. Once full, the bag can simply be put out for collection with its contents.

The plastic's properties first underwent extensive investigation in pilot projects at composting plants

in Germany, Canada and Australia. But would the new compost bags pass the test when used on a large scale? To find out, BASF and its project partners examined the bags under real-world conditions. The study took place in the German state of Rhineland-Palatinate, from April to June 2011. Around 65,000 households each received ten Ecovio FS bio-waste bags free of charge, and could buy more if needed. Consultancy IBK-Solutions GmbH was responsible for analyzing the compost.

The key to Ecovio FS's outstanding compostability lies in its composition. The material comprises a partly petroleum-based, compostable plastic called Ecoflex® FS, and polylactic acid made from corn starch. Polylactic acid, which is derived solely from renewable raw materials, tends to be brittle in its pure state. But when combined with Ecoflex, a flexible plastic is created that can be used to manufacture a variety of products, including bin liners. In the controlled conditions of an industrial composting plant – high temperature and humidity, defined oxygen levels – microorganisms such as fungi and bacteria break the plastic down into water, carbon dioxide and biomass. In other words, they transform the bag and the bio-waste into valuable compost.

Both components of Ecovio – Ecoflex and polylactic acid – are biodegradable as explained by the Head of Research for Biopolymers at BASF. Biodegradability of a material based on the structure of

the molecule and not on whether it is plant- or petroleum-based. Because this synthetic polymer has been engineered for outstanding biodegradability, microorganisms can easily digest it. Ecovio FS's superior biodegradable properties are recognized internationally, and it conforms to all relevant standards for compostable and biodegradable plastics in Europe, North America and Asia.



Bio-waste bin liners are by no means the only application. Paper cups can be covered with a thin layer of Ecovio FS, making them both waterproof and compostable. The same applies to shrink films for drink bottle packaging. And not only bin liners but also shopping bags can be manufactured from Ecovio. Agriculture, too, stands to benefit: by using biodegradable mulch films for their crops instead of conventional polyethylene film, farmers can simply plough it into the ground instead of painstakingly collecting it after the harvest. International demand for biodegradable plastics is on the rise, with experts estimating an annual market growth of around 20 % in the next few years.

Ref: Global Specs: The world of plastics and Resins, December 14, 2011 - Volume 7 Issue 12; <http://www.basf.com/group/pressrelease/P-11-494>. Images icis.com, asiapacific.basf.com

A super-hydrophobic spray-on coating set to launch next year could dramatically change our perception of the phrase "water resistant."

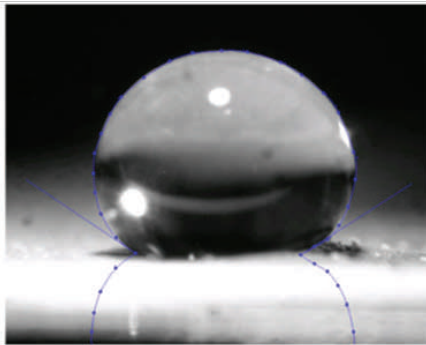
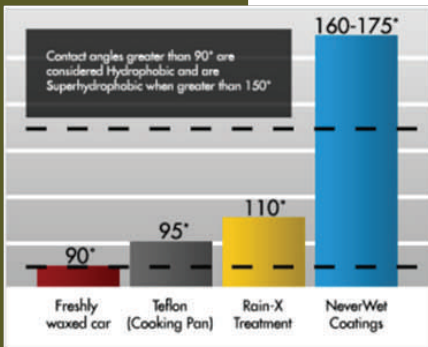
NeverWet is a patent-pending silicon-based covering that deflects nearly all liquids and heavy oils by creating a very high contact angle upon application. The angle is much higher than traditional substrates, such as car wax (90 degrees), Teflon (95 degrees), or Rain-X (110 degrees). Liquid literally glides off NeverWet's 160 to 175 degree angle in a way that almost seems like computer animation.

NeverWet offers many advantages than repelling liquids. Surfaces that are sprayed with NeverWet repel ice, corrosion, and even bacteria. The company behind the product says on its Web site that the material does not fade in strength from blasts of high pressure. In fact, it even states that NeverWet-infused materials "have remained under seawater for over a year and reemerged completely dry." Other potential applications include a variety of objects and places, such as shoes, electrical equipment, clothing, hospitals, bathroom products, and much more.

Ref: Global Spec: The world of coatings and surface engineering, December 9, 2011 - Volume 6 Issue 12;

<http://news.cnet.com/>

Left: Contact angles of various surfaces. Right: A droplet sitting on the super-hydrophobic surface of a lotus leaf, which is extremely difficult to get wet



Too Good Not to be Wood

It looks like wood, feels like wood and handles like wood, yet it contains absolutely no wood. This is a revolutionary eco-friendly decking material designed to protect rainforests by reducing the amount of wood needed for high quality furniture. It has all the characteristics of tropical hardwood but no wood at all- it is made from rice husk, salt, mineral oil and binding agent. It has none of the downsides of wood: it does not crack, splinter swell or rot and is not vulnerable to insect and the elements. And better still, it is recyclable and no trees are cut down to make it.

Ref. Our Planet – The magazine of UNEP, Dec. 2010; <http://www.resysta.com/>



EVENTS

Analytical Research Forum 2012

2 – 4 July 2012

Durham University, UK

Introduction - The annual Analytical Research Forum (ARF) is the premier Analytical Science meeting of the RSC. The meeting is primarily for early-stage analytical science researchers (industrial scientists, PhD students and postdoctoral fellows) to present their latest results in the context of the wider analytical science community.

The programme will feature both poster sessions and lectures, including oral presentations from students, medal winners and international leaders in the field.

Bursaries - Generously supported by the Analytical Chemistry Trust Fund (ACTF) of the Analytical Division, the forum is traditionally able to offer a number of discretionary travel bursaries to students.

Contact and Further Information

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Fax: +44 (0) 1223 423623

Ref: <http://www.rsc.org/ConferencesAndEvents/RSCConferences/ARF12/index.asp>

Enhancing Underwater Video

Marine videos and pictures are affected by problems of noise, blurring, colour constancy and reflection. Scientists in Universiti Sains Malaysia's School of Computer Science have developed a technology which combines colour correction techniques with video enhancement, noise removal and sharpening.

The tool automatically corrects marine videos and pictures that are affected by noise, blurring and colour constancy, producing higher visibility videos and pictures, which are a more true visual reproduction of subjects. The new technology will benefit marine biologists, fisheries departments, Navies, marine archeologists, ecologists, environmentalists, divers and aquaculture industries. Its use is not restricted to underwater photography; it may also be useful for general film.

Ref. *Asia Research News* 2010



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