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NEWS LETTER

OIL TECHNOLOGISTS' ASSOCIATION OF INDIA WESTERN ZONE

Safety and Security in any project plays a great role in financial and economic success. Adequate attention is to be paid to safeguard earnings and future. Here is the panorama.

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This news letter is for free circulation only to the members of OTAI-WZ

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OIL TECHNOLOGISTS' ASSOCIATION OF INDIA WESTERN ZONE

From the Editors's Desk

Think and Grow Rich

The media is screaming that India will have to import higher quantities of Edible Oil in the coming years. Failure of monsoon is not the only reason. Hopefully, we will have a good monsoon in 2010 but the ground situation for oil seed production does not augur well. Fortunately, other crops and sugarcane seem to have a cheerful note. For years, technology mission has been struggling with growth of oil seeds. Not just growth. A quantum jump is absolutely necessary. How are we going to break the jinx. By diversifying to more of personal care products? For economic growth? But, we are talking of human nutrition. How about that? are we missing the wood for the trees? We need to literally dig ourselves - literally - to sparkle on the vast growth of oilseed crops. How have other countries broken into the problem. To the extent that even Biofuels are produced leaving enough vegetable oil for feed purposes. Perhaps, we ought to ponder over this problem. As a brain storming exercise. Perhaps, we ahve enough sources and resources. We need to explore in depth calling all oil technologists to contribute their thoughts on the subject.

Trade & Commerce

Full steam ahead for Mumbai

*The sixth **Chemspec India** takes place in April.*

We take a brief look ahead

Launched in Hyderabad in 2005, ***Chemspec india*** returns to the NSE Goregaon Exhibition centre in Mumbai on 15-16 April this year. This is still the only dedicated event for the fine and speciality chemicals community in India.

As ever, many of the world's largest suppliers of fine and speciality chemicals and associated products and services will be located here in one spot. The show also features a range of new features this year.

For full details, including an exhibitor list and advance registration for visitors (anyone who has been before will know that this is a seriously good idea; the queues to register on-site can be mind boggling), please go to the website ***www.chemspecindia.com***. This also contains useful information about visas, accommodation and how to get around Mumbai, a chaotic but always fascinating megalopolis.

The week of Chemspec India begins with the ***11th Annual Business Outlook Conference***, held by Quartz Business Media's partner, ***Chemical Weekly***. This takes place on 13-14 April in the ITC Grand Maratha Sheraton Hotel in Mumbai and has as its theme *'The Indian Chemical Industry: Meeting the Challenges for the Decade'.*

The conference is a vital introduction to the Indian market, overviewing just about every area of the fine and speciality chemicals in one of the world's fastest growing producer and consumer regions. Attendance at both days cost Rs. 8,000, one day Rs 4,500. Full programme details and information on how to register can be found at www.chemicalweekly.com.

On Tuesday 13 April, Raj Nair of Avalon Consulting will look at macro-economic trends for the Indian chemicals industry, followed by Biswanath Bhattacharya of KPMG Advisory Services on 'Preparing for Growth & Improving Competitiveness' and R. Sankariah of Jubilant Organosys on strategies for taking Indian business to the world. The morning also features presentations on human resources from BASF and on sustainability from Dow Corning.

The day continues with further presentations on chlorine and bromine chemicals from Aditya Birla Group and Solaris Chemtech respectively. The later speakers focus more on the life sciences, with Rajesh Srivastava of Jubilant Organosys on CRAMS, Pramod Karlekar of Cheminova on agrochemicals and a final presentation on APIs.

On Day Two, Wednesday 14 April, Ravi Raghavan, editor of ***Chemical Weekly***, will give a performance review of the industry, followed by Partik Kadakia of Tata Strategic Management Group on competing in speciality chemicals and Dr. M.G. Palekar taking a similar look at fine chemicals.

K.R. Sekhar of Bayer CropScience will look at sustainability in the supply chain, and the day continues with market-specific papers on personal care, food ingredients, dyes and textile chemicals, pigments and construction, among others.

Chemspec India 2010 is open from 09.30 to 18.30 on Thursday 15 April and from 09.30 to 17.00 on Friday 16 April. The international contingent on the exhibition floor begins with Dow Chemical International at Stand C4, representing the Indian arm of one of the world's largest chemicals companies.

Other Western fine and speciality chemicals companies, CROs and distributors that re present in their own right or via their Indian subsidiaries include Huntsman International (R3-4) FMC

Lithium (E7), Brenntag (C7), Croda Chemicals (D24), Johnson Matthey Chemicals (B2), Notox (D18), Intertek (R8), Vertellus Pharma (B8), Thermo Fisher Scientific (D8), Connect Chemicals (D19), the Muller Group (D3) and Manchester Organics (D23), plus nine others at a collective Chemical Industries Association (CIA) stand (D22).

There is also a strong East Asian presence, most obviously through the Chinese pavilions organised by the CCPIT Sub-Council of Chemical Industry and the China National Chemical Information Centre. However, some major Chinese players have large stands of their own, such as Sinochem Jiangsu (D1) and Sinochem Shanghai (ED. Also present are the Taiwan External Trade Development Council (B13-18), hosting various Taiwanese firms, and Japan's TCI Chemicals at G14.

Most of the companies present at Chemspec India, of course, are Indian and the show has always pulled in a large contingent of leading players from the domestic industry. Among those present this year are Atul (G7), Balaji Amines (C6), Corey Organics (C17), Gujarat Alkalies & Chemicals (E3), Kutch Chemical Industries (G3), Laxmi Organics (E9), Nerwreka Green Synth (E13), Punjab Chemical & Crop Protection (D6), S. Amit (D5) and Solaris Chemtech (B1), to name just a few.

Perhaps the most important new addition to Chemspec India, this year is ***ChemProTech India***, a new exhibition organised jointly by Chemical Weekly, Kolnmesse, YA.

Tradefair and Chemspec India Expo that runs alongside the show in separate halls on the same days. It is intended to be a complimentary event and will give attendees the chance to connect and network with some of the major players in an important sister industry.

ChemProTech India will focus on chemical plant equipment, process instrumentation, process control and automation engineering, project management and construction services, process licensing, environmental technology and products, consulting services, packaging equipment and quality and safety management. For full information, please visit ***www.chemprotechindia.com***.

Also new this year is the ***Agrochemical Zone***, which targets suppliers to the crop protection industry in one of the world's largest agrarian producers. This debuts alongside REACH Corner, which returns after a successful debut at Chemspec India 2009.

Organised by the REACHReady, the UK Chemical Industries Association's REACH compliance body, REACH Corner will unite suppliers of REACH compliance services in a single area. It also features a free-to-attend seminar programme in a purpose-built lecture theatre running for the duration of the event. For a full programme, please consult the main website.

In addition, John Knight and Will Watson from Scientific Update, the recognised leaders in training and conferences for the fine chemicals sectors, will give three brief presentations and invite discussion from the audience on the showfloor. The subjects for discussion are:

• Scale-up - What Goes Wrong?, looking at the typical failings processes go through as they are scaled up, types of failure modes and safety issues and what makes a good process.

• Green Chemistry, discussing the technology and tools available to facilitate the achievement of environmental and sustainability goals, with an emphasis on measurement and metncs, green chemistry concepts and principles

• Outsourcing - What Goes Wrong?, focusing on where projects have gone wrong, strategies to guard against the recurrence of problems and how to manage client expectations.

(Courtesy : Speciality Magazine, March 2010).

THE COMPERE

Oilseed market report

According to USDA's September *World Agricultural Supply and Demand Estimates* report. US oilseed ending stocks for 2009-2010 are projected at 7.3 million metric tons (MMT), up 0.4 MMT from August mostly due to increased soybean stocks.

Soybean production is forecast at 3.25 billion bushels, up 46 MMT based on higher yields. Other oilseeds are up due to higher peanut and cottonseed production. Soybean crush is raised 20 million bushels due to higher projected soybean meal exports. Higher exports from the United States partly offset a sharp decline in projected soybean meal exports for India as a reduced soybean crop limits exportable supplies.

Soybean exports arc increased 15 million bushels to 1.28 billion reflecting increased supplies and lower projected prices. Soybean ending stocks are projected at 220 million bushels, up 10 million from last month.

Soybean exports for 2008-2009 are projected at a record 1.28 billion bushels, up 15 million from last month reflecting exceptionally strong shipments in the final weeks of the marketing year. The increase is offset with lower residual, leaving ending stocks unchanged at I 10 million bushels. Other changes for 2008-2009 include increased use of soybean oil for biodiesel and reduced soybean meal exports. Season-ending soybean oil stocks are projected at a record high of 3.1 billion pounds.

The US season-average soybean price range for 2009-2010 is projected at $8.10 to $ 10.10 per bushel, down 30 cents on both ends of the range. The soybean meal price is projected at $250 to S3 10 per short ton, down $10 on both ends. The soybean oil price range is unchanged at 32 to 36 cents per pound.

Global oilseed production for 2009-2010 is projected at 422.8 MMT, up 0.2 MMT from last month. Foreign production is down 1.2 MMT to 326.9 MMT. Global soybean production is projected at a record 243.9 MMT. up 1.9 MMT as increased production forecasts for the United States and Brazil are partly offset by reductions for China, India, and Canada. Brazil soybean production is projected at 62 MMT, up 2 MMT from last month due to an increased area projection reflecting favorable soybean prices relative to corn. China soybean production is reduced 0.4 MMT to 15 MMT based on lower yields resulting from untimely dry conditions in northeastern growing areas. India soybean production is reduced 1 MMT to 9 MMT due to reduced harvested area and lower yields. A late start to planting resulted in lower-than-expected area sown. Lower yields are projected due to a period of dryness in late July and early August. Global rapeseed production is almost unchanged as lower production for Canada is offset by higher production for EU-27. The EU-27 crop benefited from record yields in France. Other changes include reduced peanut and cottonseed production for India and increased sunflowerseed production for Kazakhstan.

Global oilseed trade for 2009-2010 is raised 0.7 MMT to 91.8 MMT. Increased soybean imports for China account for most of the change. Global oilseed stocks are projected higher mainly due to higher soybean stocks in China and the United States, which are only partly offset by lower stocks in Argentina and India. China soybean imports for 2008-2009 are raised to a record 39.8 MMT.

(Source : Inform November, 2010, vol. 20 (11), Pg 690).

LOOKOUT !

Personal care markets in India and China

The Indian market for personal care products is estimated at $4 billion, according to an article in the India Business Insight Database (IBID: www.ibid.informindia.co.in/). Personal hygiene products in India are dominated by bar soaps; bath and shower products (including bar soaps) account for 46% of the total Indian personal care market, IBID says. The segment grew by 5% per year between 2004 and 2008.

Likewise, the domestic hair care market, which accounts for 31% of the Indian personal care market, exhibited growth of 9-10% per year during the same period. By comparison, the skin care segment contributes only 16% to the Indian personal care market.

IBID notes that China's per capita spending on skin care products is 10 times more than India's. Similarly, on a per capita basis, China spends six times as much on cosmetics, two times more on hair care products, and more than two times as much on oral hygiene products. "However, with a GDP

growth of 8-9% per year, the Indian personal care market is estimated to reach $8 billion, with a growth rate of 15-16% by 2012-2013," IBID noted.

(Source : Inform february 2010, vol. 21 (2), Pg 92.)

WATCH OUT !

Do not ignore peak oil peril

At the recent International Petroleum Week series of conferences held in London, UK, in February, there was a growing murmur about a future where renewables such as sugar cane and algae eat up increasing amounts of fossil fuel market share.

This is nothing new. As industry stalwarts will tell you, whenever there is a crisis and oil becomes too expensive, renewable solutions are dug out and dusted down by research and development departments across the world, only to be dropped again when prices fall.

However, there was an added edge to the discussions taking place at this and other recent conferences. The question of peak oil was becoming a pervading influence.

The debate about when global oil production would peak and then decline has been around since US geophysicist M. King Hubbert formed his "peak" theory in 1956. Now, though, the fact that oil will one day run out has become the elephant that has outgrown the room.

Last year, the France-based International Energy Agency (IEA) warned that current levels of investment in oil production would need to substantially increase to avoid a peak oil scenario - whereby demand is in excess of supply - by 2020. However, this seems to ignore the fact that companies are having to poke increasingly into the world's nooks and crannies to unearth new fields.

Brazil's well-publicized massive offshore oil discovery at the Tupi field in 2007 is some 4.48 miles (7.21km) below the surface of the Atlantic ocean. Offshore drilling only exceeded 1,000ft (305m) in 1979. With drills having to extend ever deeper, no longer is the question of "when" the key debate. Now people are seriously asking "what next?"

At present, naphtha is the chief petrochemical feedstock, derived from oil. From it come olefins and aromatics, the two main branches of the petrochemical industry. This leaves the petrochemical sector with something of a predicament.

Chris Martensen, fellow with US think tank the Post Carbon Institute, says: "Recently, we do not have a major find at 1,000-2,000 ft. The deep oil finds are not at the same quality [as before]."

Martenson believes that the cost of retrieving oil from these new, unconventional sources will soon outweigh its relative value, and that all of the focus should now be solely on the matter of what next.

"All the data available to me suggests that the next 20 years are going to be completely unlike the last 20 years. It's completely unprecedented. It's going to take a lot of people's best efforts," he says.

"The worst thing is if the economy goes flying off again and people say: 'See? Everything is fine'. Potentially, the world could run into a supply shock in 2012."

In the "everything is fine" corner is Myron Ebell, director for energy and global warming policy at US free market think tank the Competitive Enterprise Institute. He believes that reserves are in no danger of running out for many years. Rushing into change in the current climate would be economically unsustainable and risks damaging the fragile global economic recovery. "If we had used the same technology to drill for oil in 1980, we would have already reached peak oil. But we are reaching oil more cheaply at 20,000ft than at 10,000ft in 1980. If you look at the technology that oil companies use, it's the most advanced in the world. So it's hard to tell how much further they can go. The problems are political, not geological.

From a US perspective, Ebell argues that this means getting stuck into areas protected by environmental restrictions.

So where exactly does this leave the oil industry, and the petrochemical sector in particular? Do they keep their heads down and charge on as

before, hoping that free market economics will present an organic solution? Or do they address the issue right now, accepting the short-term pain of transition, as opposed to gambling on an unprecedented crisis in the future?

A spokesman at German chemical group BASF said: "Although oil is a finite resource, there are sufficient reserves. The static reserve life developed positively in the last few decades. In the 1980s, this key indicator was at 30 years. Thanks to technological progress, it is now over 40 years."

However, the prospect of raw material change makes up one of five growth clusters in BASF's research group. "We are looking at the entire range of options for supplementing crude oil with other raw materials for our value-adding chains," said Friedrich Seitz, head of BASF's Competence Centre, Chemicals Research and Engineering.

The positives, which Martenson is quick to point out, are that the technologies for the future are already with us. For petrochemicals, this includes nascent processes such as converting methane into benzene at high temperatures using catalysts. The development of catalytic technology has also meant there have been huge strides in adapting the Fischer-Tropsch synthesis of carbon monoxide and hydrogen gas into olefins. BASF states that the ensuing process technology development is scheduled for completion by the middle of the next decade.

No timetable is offered on the commercial viability of these burgeoning methods. We can only hope that they will be comfortably up and running by the time even the earth's nooks and crannies have run dry of oil.

(Source : ICIS Chemical Busness, March 22-28,2010, Pg. 13).

GOOD VIBES FOR INDIA

Vegetable oil imports to rise

How happy will 2010 prove to be for those in the vegetable oils trade in India? An analysis of what transpired last year is necessary to see the way forward.

The oil year 2008-09 witnessed an exceptional jump in imports of all vegetable oils, a phenomenon not seen since the market was opened to imports in 1994.

Imports have been gradually increasing since 2005-06, peaking in 2008-09 at 8.66 million tonnes (Table I).There was a jump of 2.35 million tonnes (a whopping 37%) over the previous year The trade has tried to account for this but has not been able to pin down a single credible explanation.

Varied reasons cited include:

* Increase in consumption resulting from rise in incomes

* High degree of price elasticity: lower average prices, especially for imported, palm oil, boosted consumption

* Government schemes: mid-day meals, subsidised oil through PDS and various unemployment schemes have enhanced demand.

* Depreciation of the dollar vs the rupee by about 5%: leading to affordability.

Of course, the increase in imports has led to the usual hue and cry about the negative impact on domestic production. This resulted in calls for measures to curb imports through a review of the tariff regime. In light of rising inflation rates, this has not found favour with the policy makers.

In 2008-09, there was a shift in the ratio of refined oils imports vis-a-vis crude vegetable oils. Intake of refined oil, principally RBD palm olein, rose sharply from 126,000 tonnes in 2006-07 to 1.24 million tonnes in 2008-09. Refined oil imports made up 15% of the total volume (Table 2).

This was attributed directly to lower international prices coupled with lower import duties. Another factor was the inability of the domestic processing industry to absorb the entire production of stearin from the fractionation of CPO, or high refining costs. In fact, some segments canvassed for abolition of duties on refined oils but, again, this has not found favour with the policy makers.

Table 1: Vegetable Oil Imports, 2004-05 to 2008-09 ('000 tonnes)

	2008-09	2007-08	2006-07	2005-06	2004-05
Edible oils	8.18	5.61	4.71	4.30	5.04
Vanaspati (est)	0.02	0.05	0.25	0.30	0.20
Non-edible oils (CPS, PFAD, CPKO & others)	0.46	0.65	0.63	0.68	0.41
Total	**8.66**	**6.31**	**5.59**	**5.28**	**5.65**

Source: SEA of India

Table 2: Import of Refined and Crude Edible Oils ('000 tonnes)

Year (Nov-Oct)	Refined Oils	%	Crude Oils	%	Total
2008-09	1,240	15	6,943	85	8,183
2007-08	731	13	4,877	87	5,608
2006-07	126	3	4,589	97	4,715
2005-06	135	3	4,282	97	4,417
2004-05	448	9	4,594	91	5,042

Source: SEA of India

Table 3: Import of Palm Oil and Soft Oils ('000 tonnes)

Year	Palm Oil		Soft Oil		Total
	RED olein + CPO + Crude olein + CPKO		SBO + SFO & others		
2008-09	6,535	80%	1,648	20%	8,183
2007-08	4,809	86%	799	14%	5,608
2006-07	3,172	67%	1,543	33%	4,715
2005-06	2,569	58%	1,848	42%	4,417
2004-05	3,003	60%	2,039	40%	5,042

Source: SEA of India

Lower import duties seem to have worked in favour of palm oil and its derivatives. In percentage terms, these imports fell from 86% in 2007-08 to 80% a year later In terms of absolute quantity, however palm-based imports went up by 1.7 million tonnes compared to an increase of 0.8 million tonnes for soft oils (Table 3).

Indian budget 2010-11

On the back of the record imports of 8.66 million tonnes in the oil year 2008-09, at an estimated outlay of 27,000 crore rupees (about US$5.4 billion), there were calls for the adoption of both fiscal and non-fiscal measures, including the reimposition of higher levels of import duties, to provide protection to farmers. These recommendations were aimed at increasing productivity and production of oilseeds.

The Budget has, by and large, left vegetable oil duties untouched. A marginal increase from 8% to 10% has been announced in the excise duty applicable to acid oils and other by-products produced locally from oil refining.This will result in a corresponding increase in

counterveiling duty on similar imports, specially on crude palm stearin and PFAD.

Several measures to enhance agricultural productivity and infrastructure have been introduced and these will have far-reaching implications but in the longer term.

Current prospects

Although it is difficult to imagine a repeat performance of a 37% growth in imports, it is a foregone conclusion that - barring intervention - imports in 2009-10 should see an increase in volume.

Stability in international prices, combined with lower forecast prospects for the upcoming Kharif crop, lends credence to this. A 7% fall is expected in domestic oil production, from 5.4 million tonnes to 5 million tonnes. This does not bode well for supply throughout 2009-10, and India's heavy reliance on imports is set to continue.

This signals a happy year for international trade in vegetable oils. Indian industry and consumers should benefit from the availability of imported oils at international prices. If global prices rise, it will also signal a happy year for Indian farmers in terms of better returns from their crops.

As such, it seems like a good year for all, except probably for policy makers who will have the thankless task of balancing the interests of consumers with those of farmers.

Bhavna Shah
MPOC India

Source : Global Oils & Fats Business Magazine, Vol. 7 Issue I, 2010.

EUROPEAN UNION

EuroBioRef project to build biorefinery of the future

Some of Europe's leading fine and speciality chemicals companies, including Arkema, Umicore, Merck KGaA and Novozymes, are among the 28 partners taking part in the European Multilevel Integrated Biorefinery Design for Sustainable Biomass Processing, or EuroBioRef, project. This was formally launched on 1 March.

Co-ordinated by Professor Franck Dumeignil of the Centre Nationale de la Recherche Scientifique (CNRS) in France, the project has been granted ("23 million in funding from the EU's 7th Framework Programme. EuroBioRef, CNRS said "will deal with the entire process of transformation of biomass, from fields to final commercial products."

EuroBioRef aims to develop a highly integrated and diversified biorefinery concept, including multiple non-edible feedstocks and multiple processes - chemical, biochemical and thermochemical alike - to produce both chemicals and aviation fuels. It will also seek to facilitate better co-operation among actors to improve the efficiency of the process and overcome the fragmentation of the biomass industry.

"This programme is an excellent opportunity to fill the gap between agriculture and the chemicals industry," said Dumeignil. "It integrates the whole biomass chain into a commercial, viable and adaptable approach, allowing a sustainable bioeconomy in Europe."

Specific targets include improving cost-efficiency by 30% by means of better reaction and separation effectiveness, reduced capital investments, improved plant and feedstock flexibility, plus shorter production time and logistics. Energy use should also be cut by 30% and feedstock consumption by 10%, while zero waste should be generated.

Only Umicore has publicly commented on its role, which will be to develop and make new ruthenium based catalysts for the chemical transformation of feedstocks. The company's Precious Metals Chemistry business unit has access to metathesis technology and other areas of catalysis, based on its back-integration into primary metals.

Also taking part are various technology-based companies, universities and research institutes in France, Germany, Belgium, Norway, Denmark, Greece, Switzerland, Portugal, Italy, Poland, Sweden, the UK and Bulgaria, plus Societe Agricole de Befandriana-Sud & Partners in Madagascar.

In related news, BASF has just broken ground for a new plant at Guaratingueta in Brazil. This will have 60,000 tonnes year capacity and will supply sodium methylate in tandem with the main Ludwigshafen facility for use as a catalyst in the production of biodiesel. The firm described sodium methylate as "an efficient and reliable catalyst" in this application.

Meanwhile, however, US-based ion exchange firm Purolite and Israeli biocatalysis specialist TransBiodiesel will work on enzyme-loaded ion exchange resins to replace traditional transesterification processes based on a new, patent-pending process. The companies claim that their enzyme-loaded ion exchange resin replaces sodium methylate and can simultaneously esterify free fatty acid and trans-esterify fats and oils, eliminating some of the downstream issues biodiesel producers typically face.

Another firm active in the field with a new announcement is Rockwood subsidiary Sachtleben. It has developed catalytically active particles using a fluid bed system that is about to be introduced at commercial scale at the facility of its biodiesel-producing partner, Ever Cat Fuels, in Minnesota. This process, the two claim, could "revolutionise the production of biofuels using sustainable and environmentally friendly means".

(Source : Speciality Chemicals Magazine, March 2010, Pg 8.)

Chemically enhanced oil recovery stages a comeback

Catherine Watkins

Nobody knows how much petroleum is left in the ground; estimates range from one trillion to four trillion barrels. Current global production of petroleum is about 85 million barrels/day (bbl/d), or more than 30 billion bbl/year. OPEC (the Organization of the Petroleum Exporting Countries) expects demand by developing countries to increase global production to 107 million bbl/d by 2030.

Here is one more statistic that signals unparalleled opportunity for surfactants researchers and manufacturers: Only about 30% of available oil and gas has been extracted from most existing wells. That leaves chemically enhanced oil recovery (CEOR) on the short list of methods available to boost oil production in the secondary and tertiary phases of oil recovery.

Some industry observers are leery of such talk. They remember the research boom in the 1970s and 1980s when the oil crisis pushed up the price of oil and research flourished. They also remember the bust that occurred once oil prices fell. CEOR in the 21st century, however, is significantly different: Custom-made surfactants used at much lower concentrations in tandem with new technology have dramatically changed the outlook.

"Shell is quite bullish on surfactant-based CEOR." Kirk Raney, a senior staff research engineer at Shell International Exploration and Production Inc. in Houston, Texas. USA. explained. "We feel CEOR is a large price that will maximize our existing resources and will be an important component of meeting the world's energy challenge."

Shell is not alone in that belief. Celanese. Rhodia, Tiorco (Stepan's joint venture with Nalco). Sasol, Oil Chem Technologies, and Surtek are just a few of the participants in the CEOR market anticipating future growth. All of them are bullish about CEOR and happy to explain why.

ECONOMICS

The development that most affects the economics of CEOR in the 21st century is the change in the concentration of surfactants used in reservoir flooding. CEOR in the 1970s and 1980s focused on "micellar" flooding with 2-12% surfactant. Now. the surfactant concentrations "are in the range of only 0.1-0.5%." said Ron Wyatt. vice president of engineering at Surtek Inc. in Golden. Colorado. USA. As a full-service firm, Surtek has provided engineering, laboratory, and operational expertise since 1978 to oil companies seeking to improve oil recovery.

"The bottom line is that the new surfactant formulations cost in the range of $0.90-$2.75/bbl injected, where a micellar formulation would cost $20-$75/bbl injected at today's chemical costs," Wyatt noted in a recent article in The American Oil & Gas Reporter (52:102-105. 2009). "Establishing a successful CEOR operation is a long-term commitment, but the rewards can be substantial and long-lived, even at oil prices as low as $20-5257 bbl."

FIRST WAVE OF RESEARCH

One longtime CEOR researcher who was involved in the first wave of CEOR research is Gary Pope, a professor in the Department of Petroleum and Geosystems Engineering and director of the Center for Petroleum and Geosystems Engineering at The University of Texas at Austin (UT: USA). Pope, who once worked at Shell, counts among his staff AOCS member and Samuel Rosen Memorial Award-winner Upali Weerasooriya. who is director of surfactant development for the center.

Pope points first to the surfactants used in the 1970s, when petroleum sulfonates were the surfactants of choice. "Now we know what the molecular structures are and how to vary them," he

said. "Those structures can be made at about the same cost. or even less, than before, mostly at under $2/pound," he added.

Then there are the differences in the scope and speed of research. In the old days of CEOR, petroleum companies would put 20 staff members on a pilot study for two years. "At today's cost that would be about $20 million in labor alone at $500,0007 person/year," Pope noted. Now. with high-throughput methods and a willing graduate student, the same project can be completed in about three months, he said.

The UT Center currently has separate funding for 16 projects, including surfactant selection for CEOR at Cairn India's large oilfield in Rajasthan. In addition, the group has worked with many companies all over the world. Interest in collaborating with the Center has accelerated in the last six months. Pope reported. "Once the price of oil hit $50 again [after a low of around $35 in March 2009], interest just exploded." he said.

Further changes differentiating CEOR efforts in the 1970s and 1980s from the present, according to Pope and Weerasooriya. include advances in polymer science as well as in oil drilling technology, with horizontal well drilling, advanced reservoir characterization, and 3D seismic exploration now available in the oil recovery toolkit.

Pope and Weerasooriya also point to breakthroughs in the UT laboratory within the past year. "We now have an alkaline that will work in hard brine," they said, "allowing us to conduct alkaline-surfactant-polymer flooding without softening the water.

We also have large branched surfactants available at relatively low cost. In addition, we have developed a process to use sulfates. as opposed to sulfonates. that can be employed at high temperatures."

The UT scientists are working with Shell. BASF. Harcros Chemicals, Huntsman. Stepan, and others to commercialize the many products developed in their laboratory - which points to another difference between the CEOR boom of the 20th century and the current boom: "During the first boom." Pope said, "there was a complete disconnect between oil companies and chemical companies, even when it was the same company."

OTHER NEW WORK

Another prominent CEOR researcher is AOCS member and Samuel Rosen Memorial Award-winner Paul Bergen who is vice president and technical director of Oil Chem Technologies. Inc.. in Sugar Land, Texas, USA. The company recently was listed as No. 2 on *Inc.* magazine's 2009 list of fastest-growing companies in the energy sector, up from No. 6 the previous year.

Oil Chem has been working since 1995 on CEOR and currently has 20 active projects with an annual recovery of up to one million barrels of oil. To date, the company has successfully injected more than 50 million pounds of surfactants at oilfield projects all over the world. In a recently completed Canadian CEOR project, the oilfield went from producing 300 bbl/d to producing over 2.000 bbl/d an increase of more than 600%.

"We are starting to look at very high-molecular-weight glycerides (C_{18}-C_{24}) from vegetable oils such as rapeseed. sunflower, safflower, meadowfoam, jatropha. and another I can't talk about just yet," said Berger. "They can be used to make viscoelastic surfactants that can give you viscosity in reservoirs with high salinity and temperatures where polymers won't work," he added. "Viscoelastic surfactants actually seek out the oil rather than staying in solution in the water - we call them 'smart surfactants.'" They are also used to make novel anionic ether sulfonates that are resistant to high salinities and temperatures.

Oil Chem's viscoelastic surfactants (VS) form viscoelastic solutions in injection fluids at 0.1-1.0 wt%, reducing interfacial tension to below 0.01 millinewtons/meter. They divert injection fluids to oil-bearing sites by reducing viscosities as they contact oil, allowing injection fluids to flow into oil-bearing portions of the reservoir, Berger said. They also exhibit high thermal stability, he noted. They are particularly useful when used alone in tight formations with high temperatures and salinities. Used with polymers. VS can provide some residual viscosity when contacting oil to help the oil sweep out of microscopic pores in the reservoir

while maintaining high viscosity in the water /ones. Unlike polymers, VS are not permanently degraded by high shear. Berger noted. "Although shear converts their worm-like micelles to a spherical shape, this process is reversible. They become less viscous under shear but their viscosity returns when the shear is removed."

Oil Chem Technologies is developing five major lines of VS for use depending on the type of oil, pH, water hardness, and temperature in the reservoir system. Berger estimates that the company's present line of surfactants is used in roughly 80% of current CEOR projects worldwide. The company has also developed surfactants for recovering oil from tar sands, heavy oil deposits, shale, and for reservoirs having high concentrations of total dissolved solids and high temperatures.

In other work, Sasol North America Inc. is investigating microemulsions that can be applied to CEOR. Research led by AOCS member Charles Hammond. a research associate based in Westlake, Louisiana, USA. involves adjusting the optimum salinity of anionic microemulsions with alcohol ethoxylates. His presentation at the 2009 AOCS Annual Meeting & Expo illustrated that the optimum salinity of alcohol propoxylate sulfates can be shifted by the addition of alcohol ethoxylates and influenced by the degree of alcohol ethoxylation, the concentration of alcohol ethoxylate, and the structure of the alkyl group.

"With the ever-growing need for energy, and the high volume of hard-to-obtain oil underground, CEOR is inevitable." Hammond said. "Although there are several tertiary methods available to pursue oil recovery, we believe that there is great potential for surfactants. In fact, Sasol Olefins & Surfactants is working on generating fundamental surfactant structure-property knowledge that will be needed by both surfactant manufacturers and formulators for CEOR as this market continues to grow."

MARKET POTENTIAL

The market potential for surfactant use in CEOR is substantial. One analysis by Shell's Kirk Raney suggests that annual demand for surfactants for CEOR (C_{14}-C_{28}) could eventually be as high as 12.5 million metric tons (MMT)/year. That figure is roughly double the existing total surfactant market demand of around 6 MMT/year (predominantly C_{10}-C_{16}). [See Fig. 1 for a production route flowchart.]

"Assuming oil prices stay at least at current levels, several large surfactant floods are scheduled by the oil industry to occur in the 2015-2020 time frame." Raney said. "Each could consume on the order of 25,000-50,000 metric tons of surfactant per year at full implementation. This projected level of demand would make a significant impact on the synthetic surfactant market. However, it is important to note that the surfactant hydrophobes than of most interest to CEOR researchers to-

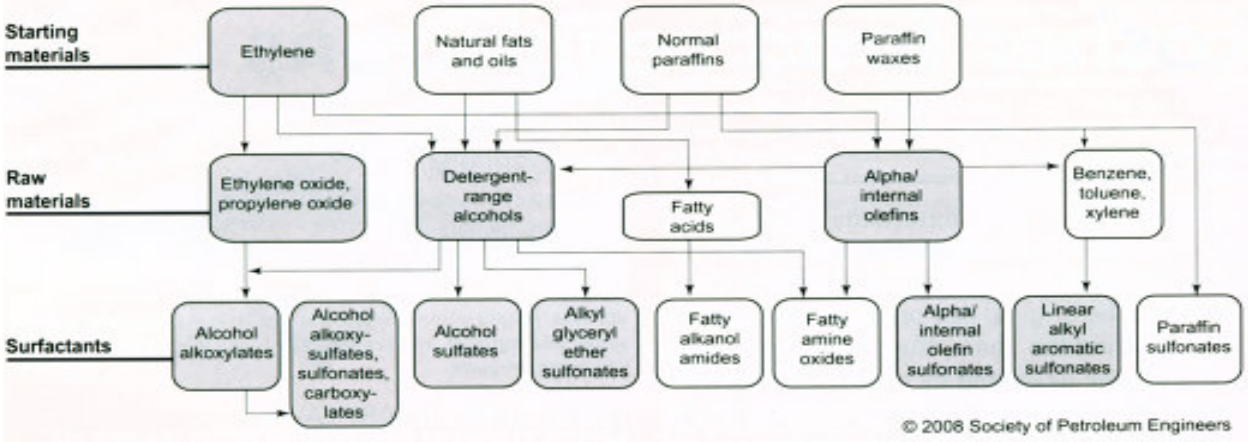

FIG. 1. *Different routes to surfactants. Source: Barnes, J.R., J.P. Smit, J.R. Smit, P.G. Shpakoff, K.H. Raney, and M.C. Puerto, Development of Surfactants for Chemical Flooding at Difficult Reservoir Conditions, Paper SPE-113313-MS, presented at the Society of Petroleum Engineers/Department of Energy Improved Oil Recovery Symposium, Tulsa, Oklahoma, USA, April 19–23, 2008. Shaded boxes: Shell Chemical commercial routes and surfactants*

day are different those currently produced at large scale in the detergent industry." he added. "Therefore, if current capacity is used to manufacture surfactants for CEOR, changes to the process will be needed."

But are the major petroleum companies ready to gamble again on CEOR?

"There is a tremendous amount of interest by oil companies in doing the groundwork for CEOR so that when the price of oil increases, they are ready," said Tom Waldman. director of sales and marketing for Tiorco of Denver, Colorado. USA. which provides custom-engineered chemical solutions for EOR. Tiorco is a joint venture formed in September 2008 by Stepan Co., a surfactant manufacturer located in Northfield. Illinois, USA, and Nalco, a water treatment company based in Naperville. Illinois.

There is good reason for oil companies to be cautious about CEOR. "The return on investment is slow and it is a huge financial risk," noted Bob Krucger, global business director, oilfield, for Stepan. "A company can spend $50 million on flood-pumping equipment and chemicals and not see the first return on investment for 24 months. By comparison, it takes about five days to drill 10,000 feet." he added.

Nonetheless, with new. more efficient molecules that make more economic sense than before, CEOR clearly will - slowly but surely - alter the surfactants industry.

"Although it has taken years, we have sold the oil companies on the idea that using chemical energy in place of some mechanical energy can have a net-net positive effect," Krueger concluded.

Catherine Watkins is associate editor of inform and can be reached at cwatkins@aocs.org.

(Source : Inform, November 2009, Pg. 682-685.)

FIND OUT

Bio-diesel and engine improvements

First generation bio-diesel is made from vegetable oils as methyl or ethyl esters while the second generation are hydrocarbons from hydrogenation and decarboxylation of the oils. As oil palm is the world's highest oil-yielding crop per unit area with the promise of still higher oil yields from crop improvements, considerable interest for bio-diesel production has been inevitable. Palm oil remains the cheapest feedstock, and among others, the Finnish manufacturer Neste Oil has set up plants in Southeast Asia and Europe that use palm oil as a bio-diesel feedstock. With petroleum prices in the new range of US$70-80 per-barrel, bio-diesels can be profitable with or without subsidy or tax incentives but dependent on the prices of co-products and by-products. Petroleum diesel provides a net energy loss of 19.5% from energy inputs needed for drilling, transport and refining. In comparison using life cycle analysis and depending on the crop yield and required agricultural inputs for the site, a net energy gain of up to 220% for palm oil may be realised. Generally vegetable oil from a high yielding tree crop can provide up to 73% reduction of life cycle CO_2 emissions compared to petroleum diesel.

New processes whereby multiple feedstocks can be processed together with refined palm oil to improve the Cold Flow Pour Point, and the promotion of bio-diesel use, affordability, sustainability and pump availability have to be assured. Provision of mandatory incentives (subsidies) as practised in some developed countries has been successful. As vegetable oil prices have not fallen as much as petroleum prices, direct costing for profitability of bio-diesel production is dependent on the ability to add value from co-and by-products ranging from glycerol (or derivatives) and oleochemicals to phytonutrients. Even then intangible cost benefits are normally neglected such as: reduction of GHG (zero-carbon dioxide emission), lower polluting exhaust gases, zero-sulphur emission, lower toxicity (carbon monoxide), and less of aromatic carcinogens and particulates. Countries with strict emission standards can benefit from bio-diesel blends while bio-diesel also provides better lubricity to the engine.

The diesel engine is 50% more efficient than the petrol engine and the diesel engines of today use atomised fuel-spray injection resulting in no exhaust particulate fumes, which meet strict EU emission standards.The electric engine is more remarkable in efficiency (9596) and electric-diesel hybrid vehicles can benefit from energy stor-

age from braking and downhill runs. Green electricity has been an option for use of biomass, e.g. empty fruit bunches or palm oil mill effluent-biogas, but this will have to compete with other commercial uses (particle board, etc). Conceptually green electricity supplied to the grid will be able to power hybrid-diesel cars in a new era where the lithium battery may just be the limiting cost factor.

As with palm oil, bio-diesel also faces protectionism and dubious environmental challenges in many EU countries but acceptance in the future will be inevitable as new economic scenarios arise or a better image of producing countries emerges. Good business leadership and sensible governments will provide the necessary changes for putting priority on the future of the planet and welfare of future generations.

MR Chandran, Platinum Energy

(Courtesy : Global Oils & Fats Business Magazine, Vol.7, Issue 1 (Jan-Mar), 2010).

MORE EARNINGS

Biodiesel enhances US farm income

The United Soybean Board (USB) announced from its St. Louis, Missouri (USA) office that a recently completed study showed US soybean farmers received an additional $2.5 billion in net returns in the past four years as a consequence of demand for biodiesel made from soybean oil. Viewed another way, this added $0.25 in support per bushel ($9.20 per metric ton) to the price of soybeans.

The study was undertaken to quantify how much soybean farmers benefit from the checkoff they pay to the USB for promoting the soybean production industry. According to a statement released by the USB on September 9. the study asserts that "the biodiesel industry has essentially created a new floor for soybean oil prices" because the price of petroleum diesel "has such a large influence on the price of biodiesel and soybean oil."

The study also found that the increased demand for soybean oil resulted in an increased supply of soybean meal and a consequent drop of $19 per ton ($21/metric ton [MT]) in meal prices, to $45/ ton ($50/ MT). This decrease benefits the animal agriculture industry.

(Source : inform November 2009, Vol.20 (11))

REALLY ?

Flaxseed and cholesterol

may help lower cholesterol levels, according to a study led by Xu Lin of the Chinese Academy of Sciences in Shanghai and published in the American Journal of Clinical Nutrition (90:288-297. 2009).

Lin and colleagues examined results from 28 studies involving more than 1 ,500 men and women to try to clarify the impact whole flaxseed and its derivatives have on cholesterol levels. Average whole flaxseed or flaxseed oil intake was about one tablespoon (1 5 mL) daily. The findings link whole flaxseed with reductions in total cholesterol and LDL (low-density lipoprotein)-cholesterol. Total and LDL-cholesterol reductions with whole flaxseed intake were stronger in women, particularly postmenopausal women, than men, and in people with higher cholesterol concentrations at the outset. Whole flaxseed, however, did not appear to alter levels of triglycer-ides or HDL (high-density lipoprotein)-cholesterol significantly.

The researchers also saw declines in total and LDL-cholesterol, but not HDL-cholesterol or triglycerides, associated with taking supplements of flaxseed lignans (about 430 mg on average). but no reductions associated with flaxseed oil supplements. The investigators suggest, based on their findings, that eating whole flaxseed may be a "worthwhile dietary approach" for preventing high cholesterol. They call for further large-scale investigations to assess the impact that flaxseed and flaxseed compounds have among men and women at risk for heart disease.

(Source : inform November 2009, Vol.20 (11))

SHORTCUT TO HEALTH

Eat soy: live long, and prosper

A new study links daidzein, one of the primary isoflavones found in soy, and longevity.

Led by Laura Ions, researchers at Newcastle University (Newcastle upon Tyne, England) suggest that the long lives experienced by inhabitants ol Okinawa Island in Japan may be due as much

to their consumption of soy foods as to their low-energy diet. (Caloric restriction has been found to extend lifespan in a number of species.)

The scientists point out the structural similarity of resveratrol (the bioactive polyphenol found in red grapes and wine) and isoflavones. suggesting that both may activate a protein called sirtuinl (Sirtl) that has previously been linked to the regulation of aging and longevity.

"The concentration of daidzein that elicited [the Sirtl] response (100 millimolar) exceeds achievable plasma concentrations but is not unrealistic with respect to local intestinal concentrations following consumption of isoflavone-rich foods or isoflavone supplements," the researchers write.

The study appeared in Nutrition Bulletin (34:303-308, 2009).

(Source : inform November 2009, Vol.20 (11))

NEW LOOK

Production ofbiodiesel using expanded gas solvents

Ginosar. D., et al.. Battelle Energy Alliance LLC. April 7. 2009. US7514575B2

A method of producing an alkyl ester. The method comprises providing an alcohol and a triglyceride or fatty acid. An expanding gas is dissolved into the alcohol to form a gas-expanded solvent. The alcohol is reacted with the triglyceride or fatty acid in a single phase to produce the alkyl ester. The expanding gas may be a non-polar expanding gas, such as carbon dioxide, methane, ethane, propane, butane, pentane, ethylene. propylene. butylene. pentene, isomers thereof, and mixtures thereof, which is dissolved into the alcohol. The gas-expanded solvent may be maintained at a temperature below, at, or above a critical temperature of the expanding gas and at a pressure below, at. or above a critical pressure of the expanding gas.

(Source : inform November 2009, Vol.20 (11))

INTERESTING ?

"Process for the production of biodiesel in continuous mode without catalysts

Dall'agnol. A., el al.. Intecnial S/A. April 28. 2009. US7524982B2

A continuous, noncatalytic process for producing biodiesel from vegetable oils and ethanol or methanol includes pumping a mixture of vegetable alcohol through a pump toward a tube-shaped reactor, wherein the mixture is submitted to high pressure and temperature, where the resulting product is nonreacted alcohol, glycerin, and a mixture of esters (biodiesel). which is directed to the reservoir at the reactor outlet where an upper phase of alcohol is redirected through an alcohol return pipe to the pump inlet, and the intermediate phase, biodiesel, and the lower phase (mostly glycerin) are led to the separation reservoir or decantation tank, where the alcohol is removed through the alcohol return pipe, being biodiesel and glycerin the final products, which are then collected for the end to which they were aimed.

(Source : inform November 2009, Vol.20 (11))

NEW WAYS

Fluidized bed desolventizer for gentle rapeseed meal processing

Editor's note: This article is based on a presentation given Wednesday, May 6, in the Processing Exhibitor Session at the 100th AOCS Annual Meeting & Expo, held in Orlando, Florida, USA.

Karl-Heinz Leidt, Lothar Morl, Frank Pudel, Klaus Weigel, and Reinhard Zettl

In a conventional desolventizer/toasterthe meal is treated under conditions that lead to the denaturation of the contained proteins. Such proteins have lost their techno-functional potential and are not suited for applications other than animal feeding. A more gentle meal processing is possible by using fluidized bed technology. This article describes a pilot-scale fluidized bed desolventizer and gives results from test trials with rape-seed meal.

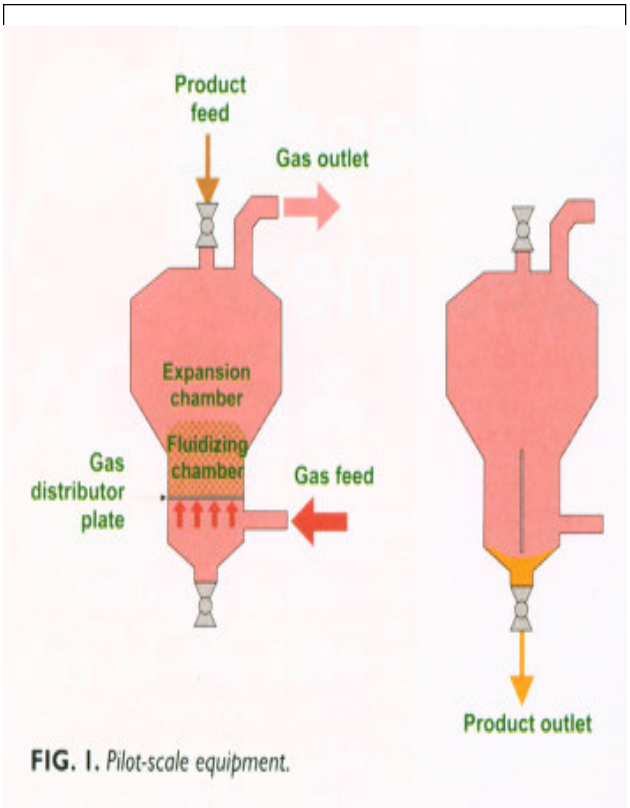

FIG. 1. *Pilot-scale equipment.*

FIG. 2. *Photograph of fluidized bed unit.*

Rapeseed processing in Germany was doubled from 2003 to 2008. driven by biodiesel production. The doubling of rapeseed processing led also to the doubling of the rapeseed meal amount. Most of the available meal is used for animal feeding, but about I million metric tons is exported. Like other oilseeds, rapeseed contains not only oil but also considerable amounts of proteins, which are enriched in the meal during processing. Rapeseed proteins have, up until now. not been produced and utili/ed on an industrial scale, except in feeding the meal. Rapeseed contains different proteins: the storage proteins cruciferin and nupin and the (very difficult to recover) membrane protein oleosin. The nutritional potential of rapeseed proteins is very high, holding a strong potential to fulfill the United Nation's Food and Agriculture Organization (FAO) requirements, among others.

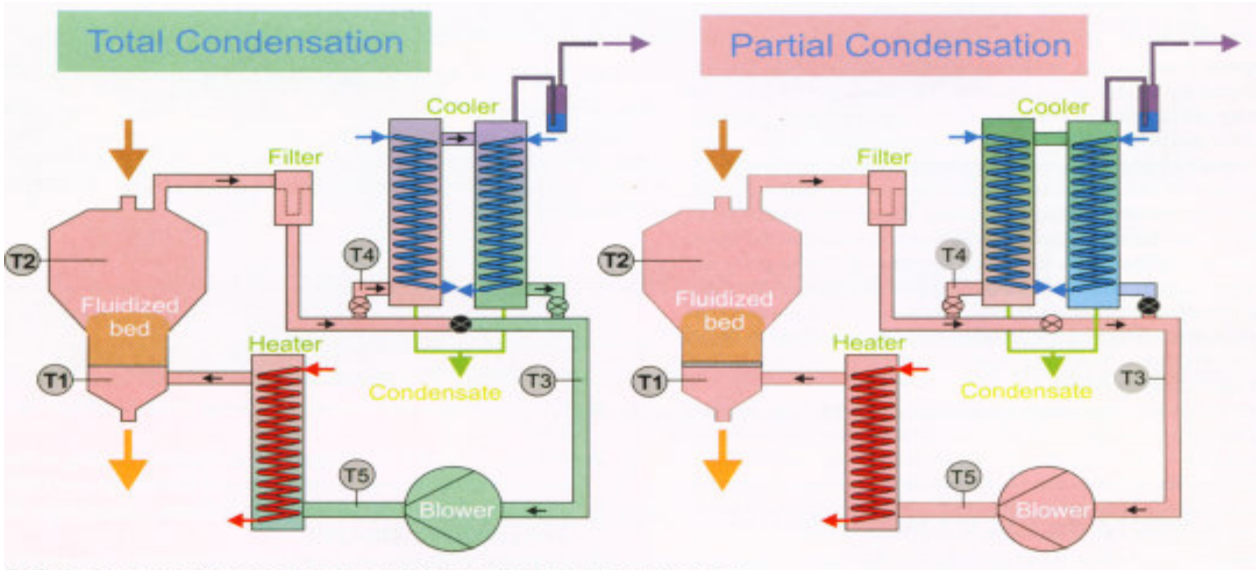

FIG. 3. *Schemes of the operating regimes for total and partial condensation.*

Proteins possess very interesting functional properties. Having both hydrophilic and hydrophobic properties, they can stabilize interfaces and form films. By physical, enzymatic, or chemical modification, the subunits can be dissociated and the polypeptide chains can be unfolded, which improves the interface-stabilising properties. And they can form networks to build bioplastics. These functional properties depend on the original protein structures, as well as their changes during processing steps. Because of these functional properties, proteins can be used in various technical and nutritional applications. The functional properties depend not only on the original protein structure, but also on the conditions of processing steps, which may change this structure (Rapsproteine in der Humanernahrung, 2007).

Therefore, there are some requirements for the meal from which proteins should be extracted.

These are:
- low oil content (< 1 %);
- particle size < 160 um;
- low hexane content (<300 ppm):
- low contents of undesired components (glucosinolates. phytic acid, phenolics);
- high PDI (protein dispersibility index); protein denaturation; minimal thermal damage.

DESOLVEMTIZING OF SOLVENT-EXTRACTED RAPESEED

The problem is that these requirements cannot be totally fulfilled in conventional oilseed processing. By crushing and extracting rapeseed with solvent, the oil content in the meal is decreased to about 1%. The hexane content of the meal is then reduced by the desolventi/ing step of the conventional desolventizer equipment (DTDC: Desolventi/ing-Toasting-Drying-Cooling) to 300 ppm. But by the same process the PDI is also drastically reduced.

CONVENTIONAL DESOLVENTIZER

In a conventional desolventiser. especially during the first desolventizing and toasting/stripping steps, temperatures of more than 100°C exist. The treatment takes between 1 and 2 hours. Under these conditions the proteins are damaged and the PDI is reduced.

In the case of soybean processing, gentle meal desolventizing can be accomplished with so-called flash desolventizers; the product is white flakes. The flaked meal is discharged into a pipe, in which superheated hexane at about 85°C is circulating at a high velocity. The circulating superheated hexane drives out the hexane from the meal. The treatment is finished after some seconds. This is possible owing to the very high heat and mass transfer surface of the flakes. In the case described by Vavlitis and Milligan, there is an active surface in the tube of about 6.700 m2 when the flakes are 0.009 inches (0.229 mm) thick. But. if the flakes are only a little bit thicker, this active surface will be drastically lower. Finally, spherical particles lead to a very low active surface. Hexane-wetted rapeseed meal particles have a more nearly spherical shape than that of flat blanks. Therefore a flash desol-venti/er system does not seem to be suitable for gentle desolventizing of rapeseed meal.

FLUIDIZED BED DESOLVENTIZING

A fluidized bed is a quantity of solid particles that are contained in a fluid under such conditions that the solid/fluid mixture behaves like a fluid. In our case, the fluid is fed up from the bottom and distributed by a perforated plate. It leaves the separation chamber at the top. The meal is fed in from the top and fluidi/.ed by the fluid. After treatment the distributor plate is turned and the desolventi/.ed meal can be removed from the equipment (Fig. 1).

The velocity of the fluid must be higher than the minimum fluidized bed velocity; below that, a fixed bed occurs. At the upper end. the velocity has to be lower than the fluctuation velocity; above that, pneumatic transport begins. Minimum fluidi/ed bed velocity and fluctuation velocity depend on particle size. Therefore, the operating range of a stable fluidized bed is defined by the minimum fluidized velocity of the largest particles and the fluctuation velocity of the smallest particles. In our case particles with a size less than 0.4 mm would begin to leave the apparatus if the fluid velocity is just high enough that particles of about 5 mm can be fluidized.

In the pilot-scale equipment in the PPM (Pilot Pflanzenoltechnologie Magdeburg) lab (Fig. 2) we investigated two different operating regimes (Fig. 3). The first one. called total condensation, uses nitrogen as fluid. The nitrogen is heated and fed by a blower into the fluidized bed chamber. It removes hexane and water from the meal and then leaves the apparatus. After filtration the fluid is totally condensed. Hexane and water are separated and the nitrogen is discharged.

The second one, called partial condensation, uses superheated hexane. The batch operation begins with nitrogen as fluid in the same way as previously described. But after leaving the filter the fluid is only partially condensed. In this way the circulating fluid contains more and more hexane.

The TABLE I - Energy requirement

	Total condensation (kWh/kg)	Partial condensation (kWh/kg)
Specific heat power	0.57	0.20
Specific cooling power	0.54	0.10
Specific electric power	0.03	0.028

RESULTS AND DISCUSSION

The results of desolventi/ing by total condensation mode show that, to reach the target hexane value of 300 ppm. a treatment time of about 45 min is needed. Then the water content in the meal is about 2%. In the case of partial condensation trials, the target hexane value can be reached after about 20 min. Partial condensation leads to lower energy requirements, as is shown in Table 1.

The important parameter of meal quality is the PDI. It can be shown that the PDI after fluidi/ed bed desolventi/ing is in the same (high) range as that achieved by drying by ambient temperature.

PPM offers a small-scale batch fluidized bed desolventizing plant. The diameter of the fluidized bed chamber is 1 or 2 m. The 1 -m diameter plant has a capacity of 1,200 metric tons (MT) per year, if it is operated in three shifts. The 2-m plant has a maximum capacity of 6.000 MT per year. The next development is a continuous plant. It will consist of three parts: a predesolventizing step followed by the desolventizing step, realized as a fluidization channel, and a gas exchange step.

(Source : inform November 2009, Vol.20 (11))

REVOLUTION ?

Nanoparticles catalyze biodiesel production

Currently, the most widely used processes for making biodiesel involve mixing a hydro-phobic liquid, such as palm or soybean oil, with a hydrophilic alcohol, such as methanol, in the presence of a catalyst such as lye. The reaction produces biodiesel (fatty acid methyl esters), glycerine, perhaps a bit of soap, water, and residual alcohol. This mixture, when allowed to stand, will separate into layers. Glycerine can be drained off the bottom, but most of the impurities will concentrate in the region between the glycerine and the biodiesel. The steps needed to purify the biodiesel can be tedious, and of course add to the cost.

Researchers in the School of Chemical, Biological, and Materials Engineering at the University of Oklahoma (Norman, USA) have developed new solid catalysts that can stabilize water-oil emulsions and catalyze reactions at the liquid/liquid interface (Crossley, S., el al.. Science: doi:10.1126/ science. 1180769).

The catalysts consist of palladium deposited onto carbon nanotube-inorganic oxide hybrid particles. The oxides are hydrophilic, and the nanotubes are hydrophobic. In an accompanying perspective piece in Science (doi: 10.1 126/science. 1184556) David Cole-Hamilton of the University of St. Andrews, Scotland, described these as "Janus catalysts," which sit at the surface like a large surfactant molecule. However, the nanoparticles are solids, unlike a surfactant, and can be easily separated/recovered.

The Oklahoma researchers studied two preparations with nanotubes of different types. The solid nanotubes localized at the interface between homogeneous liquid phases (e.g., hydrophobic soybean oil or palm oil, and an alcohol such as methanol) and formed an emulsion in a layered configuration: oil/emulsion/water. By removing oil-soluble products from the top layer and water-soluble products from the bottom layer, the reaction could continue in the emulsion without experiencing inhibition by-product formation.

Formation of the emulsion maximized the extent of the interface at which the reaction occurred.

Hydrogenation was the dominant reaction at ~100°C, hydrogenolysis at 200°C, and decarbonylation at 250°C.

Potential advantages of these Janus catalysts include the greater amount of precision and control that would be available to fuel makers, and speedier reaction times. Ars Technica (http:// arstechnica.com/science/ news/201 % 1 / nanoparticles-make-biofuel-production-more-efficient.ars) pointed out that filtration methods and reusability of the catalyst particles were not addressed in the research report.

(Source : inform February 2010, Vol.21 (2))

PURSUIT

Jatropha and karanjia for biofuel

The Indian Oil Corporation (IOC) plans to acquire 50,000 hectares of wasteland in Uttar Pradesh for the purpose of growing Jatropha *(Jatropha curcas)* and karanjia *(Pongamia)*. IOC also intends to acquire wasteland in the Lalitpur area near Jhansi and plant Jatropha. Seeds will be harvested and the oil from them used for biodiesel production. B.M. Bansal, director of business development at IOC, told the Business Standard on January 5, "Plantation . . . will be done partly by IOC and partly through contract farming."

The company already has 30,000 hectares in Chhattisgarh and 2,000 hectares in Madhya Pradesh. Bansal said 1,000 hectares had already been planted, and 10,000 hectares will be planted in 2010. Harvest is anticipated to commence in three or four years.

IOC has also set up a Memorandum of Understanding with Indian Railways to plant Jatropha on railway land.

Biodiesel produced by the IOC has met international standards. Indian Railways and Haryana Roadways, in cooperation with the IOC, have used biodiesel in 5% and 10% blends with petrodiesel and recorded a 10-15% reduction in density of smoke emitted by the locomotives with the blended product.

(Source : inform February 2010, Vol.21 (2))

AMAZING !

Soy and breast cancer

A step in answering the question "Is soy food consumption safe for women with breast cancer?" has been taken by a study published in the Journal of the American Medical Association (302:2437-2443. 2009).

Research led by Xiao Ou Shu of the Vanderbilt University Medical Center in Nashville, Tennessee, USA. finds that "among women with breast cancer, soy food consumption was significantly associated with decreased risk of death and recurrence." As an accompanying editorial (JAMA 302:2483-2484, 2009) notes, the observational study of a cohort of 5,042 breast cancer patients in Shanghai was "well-designed" and shows the way toward studies in larger cohorts with longer follow-up periods. (The follow-up period in the Shu study was four years.)

"This new research from Shanghai is consistent with the clinical evidence showing that soy foods are safe for women with breast cancer," commented Mark Messina, an adjunct associate professor at Loma Linda University in California, USA,and president of the Nutrition Matters, Inc. consultancy in Port Townsend, Washington. USA. "And with the additional findings that soy consumption may actually improve prognosis, this study should help put women's minds at ease about consuming these foods during and after treatment for breast cancer."

The researchers analyzed data from the Shanghai Breast Cancer Survival Study, a large, population-based study of 5,042 female breast cancer survivors in China. Women aged 20 to 75 years with diagnoses of breast cancer between March 2002 and April 2006 were recruited and followed through June 2009. Information on cancer diagnosis and treatment, life style factors after cancer diagnosis, and disease progression was collected at approximately six months after cancer diagnosis and was reassessed at three follow-up interviews conducted at 18. 36, and 60 months after diagnosis. A Shanghai Vital Statistics Registry database was used to obtain survival information for participants who were lost to follow-up.

After a median follow-up of 3.9 years, 444 total deaths and 534 recurrences or breast cancer-related deaths were documented among the group of 5,033 surgically-treated breast cancer patients. Soy food intake, as measured by either soy protein or soy isoflavone intake, was inversely associated with mortality and recurrence. Patients in the group with the highest intake of soy protein had a 29% lower risk of death during the study period, and a 32% lower risk of breast cancer recurrence compared to patients with the lowest intake of soy protein. The adjusted four-year mortality rates were 10.3% and 7.47r, and the four-year recurrence rates were 11.2% and 8.0%, respectively, for women with the lowest and highest groups of soy protein intake.

"The inverse association was evident among women with either estrogen receptor-positive or -negative breast cancer and was present in both users and nonusers of tamoxifen." the researchers write.

The drug tamoxifen is prescribed to reduce the recurrence of breast cancer in patients with estrogen receptor-positive breast cancer. It works by blocking the estrogen receptors and preventing estrogen from attaching to them. Soy contains phytoestrogens such as the isoflavone genistein, which can act as an estrogen in the body. The concern has been that soy foods may interfere with tamoxifen by binding to estrogen receptors in the body.

"In summary, in this population-based prospective study, we found that soy food intake is safe and was associated with lower mortality and recurrence among breast cancer patients. The association of soy food intake with mortality and recurrence appears to follow a linear dose-response pattern until soy food intake reached 1 1 grams/ day of soy protein; no additional benefits on mortality and recurrence were observed with higher intakes of soy food. This study suggests that moderate soy food intake is safe and potentially beneficial for women with breast cancer."

(Source : inform February 2010, Vol.21 (2))

YOU BE THE JUDGE.

Biofuel from GE tobacco leaves?

Will tobacco be the next source of biodiesel?

A number of news sources picked up a story about research out of the Biotechnology Foundation Laboratories of Thomas Jefferson University (Philadelphia, Pennsylvania, USA), suggesting that bioengineered tobacco can be used as a source of biofuels.

Vyacheslav Andrianov and colleagues point out that tobacco seeds contain about 40% (dry weight) oil. On the other hand, tobacco plants yield only about 600 kg of seed per acre. (For comparison, in the central United States, a typical yield of soybeans might be 44 bushels, or 1200 kg, per acre.)

Andrianov and his coworkers have genetically engineered (GE) tobacco, a nonfood crop, so that its leaves synthesize oil. Typical un-engineered tobacco plant leaves contain 1.7 - 4% oil (dry weight). The GE plants were made to overexpress one of two genes: the diacyglycerol acytransferase (DGAT) gene or the LEAFY COTYLEDON 2 (LEC2) gene. The DGAT gene modification led to about 5.8% oil (dry weight) in the leaves, or about twofold the amount of oil produced normally. The LEC2 gene modification led to 6.8% oil (dry weight). For comparison, soybeans can easily contain more than 20% oil on a dry weight basis.

The research was published online (DOI: 10.1111/J.1467-7652.2009.00458.X), ahead of publication in *Plant Biotechnology Journal.*

(Source : inform February 2010, Vol.21 (2))

New soybean line resists key nematode

ALFRED FLORES

A new soybean line developed by US Department of Agriculture Agricultural Research Service (USDA ARS) scientists is good news for growers. The line, JTN-5109, is effective against the most virulent soybean cyst nematode, called LY1.

The soybean cyst nematode is a pervasive soybean pest worldwide. In the United States, the nematode is the most damaging soybean pest: it caused an estimated yield loss of nearly 94 million bushels in 2007. Genetic resistance has been the most effective means of controlling the pest.

Nearly all nematode-resistant soybean varieties currently available contain resistance genes from one of two sources—soybean lines "Peking" or Plant Introduction (PI) 88788. JTN-5109. however, has combined nematode resistance from three sources—-'Peking," PI 437654. and PI 567516C.

JTN-5109 is the latest soybean line developed by geneticist Prakash Arelli and his team at the ARS Crop Genetics Research Unit's satellite laboratory in Jackson, Tennessee, USA. The soybean was developed using a combination of traditional plant breeding and genetic marker-assisted selection.

JTN-5109 provided yields of 26 bushels per acre in field studies conducted in 2008 at Jackson, and Ames Plantation near Grand Junction. Tennessee. That yield is not far below the 29 bushels per acre produced by 560IT. which is a commonly used cultivar. but one susceptible to LYI. The JTN-5109 line will be an excellent source material for breeding high-yielding soybeans with resistance to nematodes, especially for the LYI nematode population.

Arelli collaborated on the project with scientists at the University of Tennessee (Knoxville). Michigan State University (East Lapsing), Iowa State University (Ames), and the University of Missouri (Columbia), as well as the ARS Com and Soybean Research Unit at Wooster. Ohio.

Alfredo Flores is USDA ARS public affairs specialist; he can be reached at Alfredo. Flores@ars.usda.gov.

(Source : inform February 2010, Vol.21 (2))

Chain reaction

ANDY BRICE / LONDON

IT TAKES a matter of seconds to sully the reputation of the chemical sector. Despite producers boasting an enviable safety record compared with most other major industries, a solitary accident can send shockwaves around the globe and have major repercussions that linger for years to come.

The very nature of the chemicals handled or produced at these sites means that every incident can be potentially fatal. As a result, rules and regulations regarding their handling and storage are constantly reviewed.

A quick search on our sister service, 1CIS news, throws up dozens of deaths and injuries following explosions at chemical facilities since the start of the year. Numerous incidents have been reported in India, China, Malaysia, Slovakia, Japan and the US to name but a few. Their legacy, like those before them, is that lessons will be learned, and new processes and procedures put into place to hopefully prevent a recurrence.

Michalis Christou heads the Major Accident Hazards Bureau (MAHB) at the European Commission and says that 10 accidents in particular have shaped the chemical industry and legislation over the past few decades.

'Ihe 1966 Feyzin explosion in France, Flixborough in the UK in 1974, and the Seveso incident in Italy two years later (see timeline below) were all landmark accidents that led to the introduction of some of the chemical sectors most stringent safety legislation, says Christou. The Seveso Directive -so-called because of the 1976 disaster - came into force in 1982 as a yardstick to prevent similar accidents.

The regulations were amended several times in the years after the San Juanico LPG disaster in Mexico City and the gas leak in Bhopal, India - in

November and December, 1984, respectively. Bhopal is widely regarded as the most devastating chemical disaster of all time and to this day, thousands of residents are still suffering from ill health as a result.

"Bhopal was by far the worst accident if you consider its severity and the impact it had on the chemical industry. Just look at the number of victims - the death toll and the huge number of injuries - as well as awareness to the public," he says.

The pollution of the Rhine following the Schweisehalle, Switzerland, incident in 1986 emphasised the need to tighten the existing legislation further, adds Christou.

"After these accidents, there was an important impact on the legislation and safety initiatives in the industry," he says. "Taking these events into consideration, the environmental consequences of accidents were included in the directive (or the first time."

"It was after Bhopal that the industry established the Responsible Care program, and the authorities developed the Risk Management Program rule in the US and the Seveso 11 directive in Europe [in 1996]. It was the initial reason tor including land-use planning requirements, which is now an important obligation of the Directive.

REPUTATION DAMAGE

"It was also perhaps the most damaging accident to the image of the chemical industry. Usually people are worried about pollution and the long-term effects of the industry, not the threat to life."

The legislation was again amended in 2003, to take three more accidents into consideration, he says.

The Baia Mare cyanide spill on January 30,2000 in Romania, resulted in the river Danube becoming polluted. Waste from gold mining ran into the river all the way to the Black Sea and affected drinking water.

At the time, the Enschede fireworks disaster, in the Netherlands in May 2000 was the biggest accident seen in Europe in decades. The fireworks factory was based in the middle of the town. It killed more than 20 and injured over 300 people. Worst of all, however, in terms of fatalities and damage was the Grande Paroisse fertilizer plant explosion in Toulouse, France, in September 2001.

These events resulted in the introduction of far stricter rules on storage and handling, and revisiting the guidelines for land-use planning. "After Bhopal it became clear that there was a very high risk when residential areas are located close to chemical facilities. Article 12 of the Scvcso Directive now concentrates on land use planning," he says. "The problem with accidents like Toulouse was that when the plant was built in the 1920s it was in the open fields far away from the city. By 2001 when the accident happened, it was surrounded by houses as the city had expanded so much," says Christou.

Finally, the 2005 disaster at the Texas City refinery in Texas, US - considered the nations worst industrial disaster in 15 years - emphasized the need to enforce safety culture in the industry, and increase risk management and the use of performance indicators.

Almost 15 years since it was first introduced, Seveso 11 is now being reviewed, says Christou. "Many things have been learned in that time," he says. "The intention is to achieve a high level of protection, but at the same time not to impose additional burden to the industry. We hope that the proposal will be ready by the end of the year or early 2011."

An online database is already being used by both the EU and Organization for Economic Co-operation and Development (OECD) member countries to report industrial accidents and exchange information on lessons learned from the accidents, to avoid recurrence in the future.

A new system is also being developed by the MAHB, which will be used to collate accident scenarios and risk assessment data to support land use planning decisions. The first version of the system is expected to be completed later this year.

(Source : ICIS Chemical Business, March 29-April 4, 2010, Pg 24 -25).

Protecting the bottom line

Proper security measures pay for themselves

David Mccann -
WIVENHOE MANAGEMENT GROUP

MANY CHEMICAL executives regard security as a necessary evil, but when they view it in the budget, they see an unnecessary cost item that does not produce revenues or add to a company's profitability. They are simply wrong. Security systems and measures, when applied correctly to meet design criteria in compliance with the accepted standards and practices of the security industry, can greatly enhance the bottom line, particularly in today's uncertain economic climate.

PREVENTING INCIDENTS

Obviously, a primary goal ot any security department and the systems and measures adopted is to prevent incidents, particularly those that might affect employees, company operations, infrastructure, or inventories. A stoppage in operations or provision of services is measurable in many different ways, and security measures preventing such stoppages provide a valuable addition to the bottom line, as does the prevention of damage to infrastructure and other situations.

What would be the cost to the company if a primary manufacturing area was damaged, or a warehouse destroyed with its inventory, or if there was critical damage to a series of loading docks that disrupted supplies?

It should also be remembered that while chemical facilities have always been concerned about safety and the prevention of accidents at a plant, they now have to he very concerned about deliberate acts ot sabotage. Such acts may be terrorist-related or the vengeful act of a disgruntled employee. In cither case, a successful event could be financially crippling to the company.

PREVENTION OF NEGLIGENT LIABILITY

It is unfortunate that many executives believe negligence is something measured "after the fact," for the issue should actually be considered in anticipation of any incident that could lead to allegations of negligence or gross negligence.

In the US especially, the occurrence of a security event, such as an assault in the workplace or the theft of private data, will almost certainly trigger a legal action of some sort. It is unlikely that an organization would be able to completely avoid a lawsuit as such, but it is vital that the company be in a position to defend itself against any alleged negligence.

Companies and organizations that take sound and effective security measures and utilize adequate security design criteria to develop their security measures will be in a much better position to rebut charges of negligence than those that have not pursued such measures. Punitive damages, if proven in court, could mean very significant penalties in the hundreds of thousands - and possibly millions - of dollars that will go straight to the bottom line, even with the best insurance coverage.

LOSS OF PUBLIC CONFIDENCE

In the event that a serious incident takes place, particularly for chemical companies, there is a secondary cost additional to any legal and health consequences: the loss of public confidence. Almost immediately, the company will also lose its customers' confidence. Kveryonc remembers the 1982 7)4vio(incident in the US and the 1984 Bhopal tragedy in India. Imagine the effect that a deliberate incident with similar consequences would have upon your own company.

The cost of good security needs to be looked at in comparison to the cost of such consequences, though not necessarily on the scale ot the two events referred to above.

STAFF MORALE

A multitude of sources detail the effects of low staff morale on productivity, whether the cause is the Monday morning blues, personal issues or

fears concerning personal safety or the damage or theft of property. Good security will generally give an employee a feeling of being in a safe environment, which is normally a morale booster. If a person is concerned that they may be accosted or assaulted at any moment, or harassed in a myriad ot ways, their productivity will not be high.

For example, when closed-circuit television surveillance systems are employed, areas such as the cafeteria, meeting rooms and supervisor offices can be fitted with inexpensive video monitors where employees can see that areas such as facility parking lots are being monitored. Ihe increase in morale and, by extension, productivity is considerable. Ihe additional eyes also effectively boost security manpower, as those same employees checking up on their vehicles would almost certainly report suspicious activity.

It is unfortunate that many executives believe negligence is something measured "after the fact". Security professionals often refer to the "10/80/10 rule," which states that 10% of the population are honest all of the time, 10% are dishonest all of the time, and the remaining 80% are prone to dishonesty if there is opportunity. Sound security measures are a deterrent not only to criminal acts from the outside, but also to "insider" crime, which may range from petty theft and pilferage to fatal assault.

Unfortunately, pilferage takes on an entirely new meaning at chemical facilities where certain types of chemicals can be used to build Improvised Explosive Devices (IKI)s). Terrorists are willing to pay well for small amounts of such chemicals.

SALES ADVANTAGE

It may at first sound a little incredible to suggest that good security can assist and actually increase sales, but the point is perfectly valid. Particularly in industries such as chemicals, where companies supply raw materials or key ingredients to their customers, continuity of supply can often be as important as price and other factors, and in many cases, being able to rely upon a vendor for continuous deliveries at all times, particularly in a crisis, is paramount.

Indicating to a customer that you have carried out a qualified Security Vulnerability Assessment (SVA), devised appropriate security design criteria, and implemented sound security measures will greatly aid in the customer's sense of your company and its ability to provide products or services without interruption. In addition to reinforcing long-term customer relationships, such perceptions will often lead to increased sales, as well as referrals from that customer to other potential customers.

SECURITY LEGISLATION

In 2006, the US released its initial version of new security legislation, the Chemical Facility Anti-Terrorism Standards (CFATS), 6CFR Part 27. The final Chemicals of Interest (COI) list was approved in late 2007.

These regulations are substantially different from prior regulations on security, such as the 2003-2004 Public Health Security and Bioterrorism Preparedness and Response Act (RPRA), and involve not only the completion of a Security Vulnerability Assessment of a facility, but where applicable, the submission of a Site Security Plan (SSP), followed by a timetable of implementation.

At last count, the Department of Homeland Security (I)HS) had trained some 250 inspectors to monitor and enforce the security regulations. Failure to meet the regulations in a timely manner can result in severe fines ot up to $25,000 (C 18,720) per day of violation, and in certain circumstances, the DHS has the power to shut down a facility altogether.

As can be seen, the cost of inadequate security may well outweigh whatever budget costs apply to actual security measures and systems at a facility.

There are other ways good security can add to the bottom line, as well. These are some ot the major ones and well worth noting.

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(Source : ICIS Chemical Business, March 29-April 4, 2010, Pg 24 -25).

WHITENING: A BOTANICAL ROUTE TO EFFICACY

PAULA LENNON PH.D,
LAURENT SCHUBNEL

During the last few years, many active ingredients have been developed to help us restore a healthy glow to our skin. For many years, skin lightening ingredients have been formulated with hydroquinone and kojic acid which, despite their undeniable efficacy, have been shown to present a certain cytotoxicity. These ingredients are now both either banned or are in the process of being limited in Europe and in many Asian countries.

There are alternative offers available, including botanical extracts such as Mulberry or Lemon Peel, containing tyrosi-nase-inhibiting flavonoids. However, these products are more or less stable in the raw material and the cosmetic formulations, bringing about an inactivation of the efficacy.

Today, new botanicals have been screened for anti-tyrosi-nase activity and a synergy has been discovered between Sophora f lavescens root and kiwi (Actinidia chinensis). A strong tyrosinase inhibiting action has been demonstrated before and after in vitro transepidermal diffusion.

At the same time, discovery of the anti-hyaluronidase properties of this composition has allowed us to target pigmentation problems linked with scaring of acne-prone skin or, on the contrary, that of aging skin showing signs of dryness due to the destruction of hyaluronic acid.

To safely, and in an original manner, get rid of hyperpigmentation problems while protecting the Hyaluronic acid pool in the skin, a high performance, original composition is available from Gattefosse- LIBiol.

Plant Extracts and Synergy

After a preliminary screening, two extracts have been identified for their efficacy as anti-tyrosinase and anti-hyaluronidase agents.

Sophora flavescens, a 2 meter-high tree growing in most of China, is composed of leaves and yellow flowers. It is the root of this tree, which is indeed used in Chinese pharmacopoeia, which is collected during the spring and fall season and dried.

Used as a herbal drink, Sophora is traditionally used to treat dermal lesions & eczema and is known to possess anti-elastase and anti-hyaluronidase properties.

The main constituents of this extract include Matrine and oxymatrine, with anti-inflammatory and anti-tumor properties. It is to be noted that Matrine has a positive calming effect in cases of stress-induced ulcers. The extract is also particularly rich in Flavonoids, which are responsible for the anti-tyrosinase activity.

Similar properties have also been identified in Actinidia chinensis. This kiwi extract showed a significant action against tyrosinase and hyaluronidase enzymes.

The combination of these two ingredients, commercialized in a product named Synerlight, leads to a synergistic activity which can be used to fight age spots as well as hyperpigmentation, and helps wound healing by protecting the hyaluronic acid in the tissue (hyaluronic acid is the main target of enzymes active during scarring).

Substantiation

In order to measure the inhibiting potential of Synerlight upon melanin synthesis, the product was tested in vitro at several concentrations. In parallel, the ability of the compounds to remain active after transepidermal diffusion was assessed.

A study measuring the anti-hyaluronidase activity of Synerlight was conducted and, finally, the cytotoxicity was evaluated in order to assess the safety of Synerlight compared to Kojic acid.

1 - Tyrosinase Inhibiting Action

The principle of this study is based on the DOPA/DOPAchrome transformation pathway and how tyrosinase allows this transformation to take place.

The tyrosinase activity, linked to the variation in

concentration of DOPAchrome as a function of time is determined indirectly in presence and absence of Synerlight.

The results, presented in table 1, reveal the high efficacy of Synerlight in inhibiting melanin production by inhibiting the tyrosinase enzyme.

The inhibiting action of Synerlight is far stronger than that of the Mulberry extract with an efficacy that is more than 10 times more important. An efficacy similar to that of kojic acid can be obtained at a relatively low amount of Synerlight, at only 6% of the active.

The inhibiting effect is clearly a linear function of the concentration of Synerlight up to 6%, when the relation dose/ effect starts to flatten (similar efficacy at 12% active).

2 - In vitro assay for transepidermal diffusion

The transepidermal diffusion of this compound in a human, cornified, reconstituted epidermis was studied. The amount of compound recovered in tissue culture media was evaluated and the tyrosinase inhibition measured in the same way as described earlier.

The results show that the inhibitory activity of pure Synerlight after a complete diffusion through the epidermis is maintained at the very high level of 79%.

In conclusion, the skin enzymes and other molecules, which may come to inactivate such ingredients during their travel through the epidermal layers, do not affect the efficacy of Synerlight.

With the two studies above, not only is the capacity of Synerlight to target the melanocytes in the deeper layers of the skin demonstrated, but also its potency.

3 - Anti-hyaluronidase assays

During the healing process, or even regular skin metabolism, hyaluronic acid production and preservation is at the center of a healthy, supple and functional skin. It is therefore important to prevent the breakdown of this product in the skin by an enzyme called Hyaluronidase.

In this study, the capacity of Synerlight to inhibit hyalu-ronidase activity was evaluated according to a standard assay (spectrophotometric measurements).

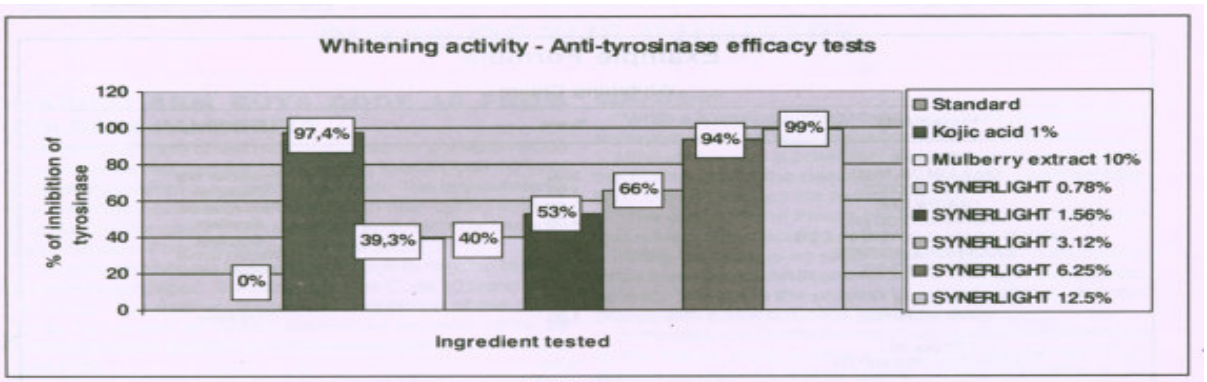

Table 1

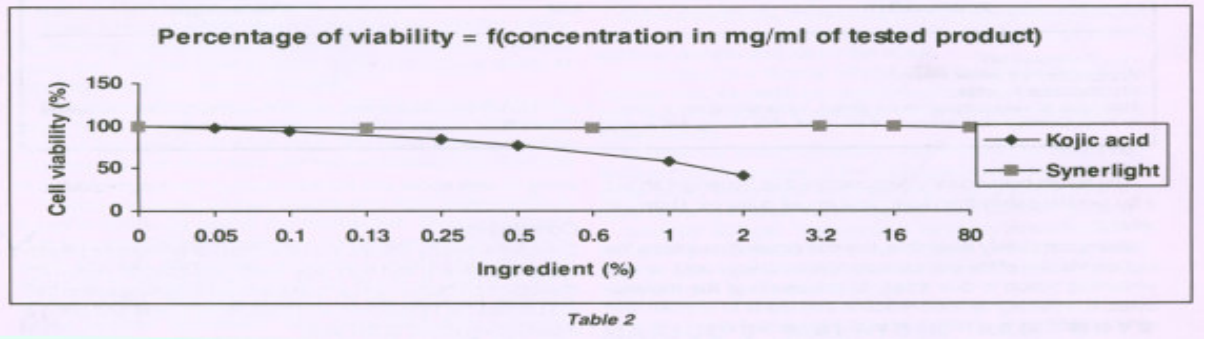

Table 2

Example Formula
Whitening Cream

Ingredients	% w/w	Function
Phase I		
EMULIUMDELTA(I)	5.00	Emulsifier o/w
CETYLALCOHOL	1.00	Thickener
DIMETHICONE	3.00	Feeling agent
LABRAFACOCC(I)	4.00	Emollient
ISOSTEARATEISOSTEARYLE (1)	3.00	Emollient
TOCOPH EROLACETATE	1.00	Vitamin active
PRESERVATIVES	0.50	Preservative
Phase II		
TITANIUM DIOXIDE	1.00	UV Filter
Phase III		
DEMINERALIZED WATER	76.10	
Phase IV		
PERFUME	0.40	Perfume
SYNERLIGHT(I)	5.00	Whitening agent

(1) - Gattefosse sas

Appearance Pale yellow cream

Manufacturing Process

Heat I until all waxy compounds are melted. While stirring add II. Heat I + II and III up to 75°C. While mixing, pour III heated to 75°C into I + II heated to 75°C. Continue rapid mixing for 5 mn. Cool while stirring and at about 30°C add IV.

The results, shown below, demonstrate a significant protecting action of Synerlight upon hyaluronic acid. This means that the composition contributes as a moisturizing ingredient preventing the degradation of water-retaining molecules in the skin.

Inhibition of Hyaluronidase activity by Synerlight

Synerlight (%)	Inhibition (%)
5	4.5
10	14

Synerlight, by its protective action upon hyaluronic acid will help the skin heal and repair itself while preserving its moisture content.

4 - Cytotoxicity assessment (MTT method)

Solutions of Synerlight were tested on the cornified surface of an epidermis then the viability of the epidermis was evaluated using a standard MTT reduction assay. The cytotoxic activity was compared to that of Kojic acid.

The results below clearly demonstrate that Synerlight shows a far greater safety than kojic acid in cell cultures, shown in Table 2.

Being completely reversible, this composition maintains the highest viability of the skin cells compared to kojic acid, whose whitening action is due solely to the death of the melano-cytes. It is this highly toxic reaction that leads to uneven skin tone or patches and blotches of depigmented skin.

Synerlight allows us to obtain an even and reversible whitening of dark spots and freckles without harming the cells.

Conclusion

Synerlight clearly shows a dual action - a tyrosinase inhibiting action, which can fight age spots and specific hyperpigmentation problems, and a hyaluronidase inhibiting action that will protect the hyaluronic acid pool in the tissue and bring a moisturizing effect to the skin.

The safety of this active is excellent, showing no cell cyto-toxicity even at high use levels.

(Source : Soaps, Detergents & Toiletries Review, January 2010)

Monsanto begins work on Bollgard III

Even as reports of Bt cotton 1 developing resistance to pink bollworm create concern in the farming community, Monsanto has begun work on two new technologies Bollgard III, the third generation Bt cotton technology, and Roundup Ready Flex (RRF), a technology that gives herbicide tolerance to the plant.

Confirming the newer biotechnology research, a senior Monsanto executive said the company had just started the Trait Introgression (TI) process in the green house in India.

"This process would take 24 months. This, then, would be followed by five-six years of regulatory trials," the executive told Business Line, responding to a query on Bt iii research.

"Insect resistant Bollgard III is a three-gene Bt cotton technology which will provide the cotton crop added protection from a broad spectrum of bollworms and spodoptera," the executive said.

The company launched the first-generation single-protein (or Bt 1) cotton technology in India in 20O2. A few seasons later, it replaced the native cotton varieties in the country almost completely. In 2006, it introduced Bt 2 that could tackle Helicoverpa armigera (cotton bollworm) and Pectinophora gossypiella (pink bollworm).

Pink bollworm resistance

Soon, both the technologies spread very fast, virtually eliminating the non-Bt cotton seeds from the country. But last week, the company came out with a startling submission that Bt 1 had developed resistance to pink bollworm in parts of Gujarat.

While some view this as a ploy of the company to push the costlier Bt 2 further, environmentalists have reminded that they have always been warning about the possible resistance.

Even as the statement on resistance triggered a fresh debate in the country, the company has begun work on the newer versions of Bt technology.

"Currently, Monsanto is working on future Bt cotton technologies such as Roundup Ready Flex (RRF), and Bollgard III to help farmers get more productivity from the same acreage, get savings on pesticides sprays, use resources efficiently and thus, earn higher income," the executive said.

"Weeds or unwanted plants have an adverse effect on plants, as they rob the soil of essential nutrients and water. They also harbour pests and insects, causing a reduction in yields and productivity. Biotech-enhanced insect resistant and herbicide tolerant Roundup Ready Flex (RRF) trait in cotton hybrids is being developed in India," the official said.

RRF, which can be applied at any time from seedling emergence to seven days prior to harvest, is currently in the early stages of regulatory trials.

While the herbicide the farmers spray would kill the weeds, the built-in RRF would protect the plant from falling prey to the herbicide. The premise is that only the unwanted plants are killed.

Both biotech-enhanced insect resistant Bollgard III, and herbicide tolerant RRF technologies will be introduced only in an open market policy that encourages investment and innovation, an efficient regulatory process and implementation of IPR, the executive said. (Hindu Business Line, 10th March, 2010).

Source : AICOSCA Newsletter, March, 2010.

Top cotton scientist junks Bt firm's bollworm alarm

A Top cotton scientist has dismissed a declaration that the pink bollworn has shown resistance to Bt cotton, saying the finding is based on wrong data.

The finding came, surprisingly, from Bt technology giant Monsanto, which issued a press note about the pink bollworm developing resistance to Cry 1 Ac, the Bt protein in Bollgard cotton, in four districts of Gujarat - Amreli, Bhavnagar, Junagarh and Rajkot.

The larvae were found resistant to first-generation, single-protein Bollgard cotton, the company

said, adding no such resistance was seen with Bollgard II, the second generation technology.

The director of the Central Institute of Cotton Research (CICR), however, says the study was conducted on a handful of surviving larvae and that does not mean resistance is across the board.

"They have collected the surviving larvae (there would always be ten resistant bollworm larvae out of every 10000) and have conducted tests on them. Such tests will always show resistance. It doesn't mean there is across-the- board resistance to Cryi Ac," CICR director Keshav Kranthi told The Indian Express.

Kranthi is credited with a model that shown how resistance to Bt protein will slowly grow with the surviving larvae inter-mating and growing in numbers. "That study is for American bollworm, not pink bollworm where their larvae would generally become weak due to the effort (in developing resistance) and will not survive, Nowhere in the world is pink bollworm known to have survived after developing resistance to Cryi Ac," he said.

The company said Monsanto and Mahyco scientists had detected the resistance during field • monitoring of the 2009 cotton crop in Gujarat, that no such resistance has been confirmed outside the four districts, that they have reported the findings to the Genetic Engineering Approval Committee (GEAC), and that Mahyco-Monsanto Biotech (MMB) has been conducting field monitoring research across India since 2003 in collaboration with the CICR and other agricultural research organizations. Kranthi, however, says the CICR wasn't part of any such tests. "I have already written about it to GEAC," he said.

When The Indian Express asked the company for the reason behind the declaration, it replied, "In keeping with Monsanto's commitment to transparency and product stewardship, it has reported this information immediately upon obtaining compelling evidence from laboratory and field evaluations," it said.

The company sought to explain the resistance: "Among the factors that may have contributed to pink bollworm resistance to the Cryi Ac protein in Gujarat are limited refuge planting and early use of unapproved Bt cotton seed, planted prior to GEAC approval of Cryi Ac cotton, which may have had lower protein expression levels."

Pitching for Bollgard II, Monsanto says, "No instance of insect resistance in any of India's cotton growing states, including the four districts in Gujarat, has been observed with Bollgard II, the second-generation Bt. Cotton technology. Bollgard II, introduced in 2006 contains two proteins, Cryi Ac and Cry2 Ab. While single protein CryiAc cotton products continue to deliver value to Indian farmers, increasingly Indian farmers, are planting two protein Bollgard II cotton because it reduces the need for insecticide sprays compared to CrylAc products and increases yield."

In the US, Monsanto has developed what is known as Roundup Redifiex, a herbicide-proof Bt cotton brand that kills all weeds. But like Bollgard II, it also needs only non-Bt cotton as refuge crop around Bt. The GEAC has approved us of pigeon pie as refuge crop since it not only offers a good feed for the American bollworm larvae but also leads to less crop destruction (about 5 to 10 percent).

"More importantly, the larvae on pigeon pie then mates with the resistant larvae from Bt cotton crop and dilutes the resistance. Thus, the growth of resistance also gets arrested," Kranthi says. (The Indian Express 8th March, 2010)

Source : AICOSCA Newsletter, March, 2010.

US rules for bio-diesel from soybean

On Feb 3, the EPA ruled that bio-diesel made from soybean oil, waste oils, and algae must satisfy the government's renewable fuels standard. It further ruled that US petroleum marketers must blend a total of 1.15 billion gallons of bio-diesel in 2009 and 2010 combined. Only about 400 million gallons were blended in 2009.

It will take about 2.55 million tonnes of fats and oils to make the balance of 750 million gallons of bio-diesel, assuming 7.5 pounds per gallon. If soybean oil is used to make half of that volume, then its usage would total 1.28 million tonnes for bio-diesel.That would rise to 1.53 million tonnes if soy-

bean oil is required to make 60% of the bio-diesel. That is far higher than USDA's forecast that about 0.99 million tonnes of soybean would be used to make bio-diesel in the 2009/10 marketing year.

It is not clear how much of the mandated blending will be done with domestically produced bio-diesel. It may well result in a substantial increase in soybean-based bio-diesel imports from Argentina and Brazil, as well as large amounts of duty-free palm oil by bio-diesel makers located along the coast.

USDA is currently forecasting soybean oil ending stocks at the end of the 2009/10 marketing year to stand at 976,140 tonnes. Thus, the new EPA mandate apparently will result in a sharp drawdown in ending stocks of soybean oil. That assumes a lot of the mandated volume will not be supplied by imports or by bio-diesel made from imported soybean oil.

There also is the issue of the expired $1 gallon bio-diesel tax credit. Most bio-diesel plants are either sitting idle or operating far below capacity awaiting the tax credit to be reinstated.The longer it takes for that to happen, the harder it will be to meet the new 2009/10 bio-diesel blending mandate. Courtesy : Ag Perspective, 4 February, 2010.

(Source : Global Oil Fats Business Magazine, Vol. 7, Issue I, 2010).

Tips on producing good FFA palm oil

1

Reduce the number of steps involved from harvesting to sterilisation. Instead of applying 12 steps as tabulated in Box 1, quality conscious companies have managed the task with about

2

To achieve very good quality oil, load the fruits in the field directly into cages for sterilisation. If this can's be done, operate a containerised system for loading at strategic points

3

The fruits must be processed within 48 hours, the better. Reducing the time taken from harvesting to strelisation is of the essence in quality oil production. Sterilisation of the fruits stops FFA from increas-

4

Estate and mill must coordinate the timing on receipt of the fruits to prevent delays or a long queue

5

Avoid dumping fruits on the mill's concrete

6

Eliminate the use of front end loader to push the

7

Operate on first-in, first-out, basis to push the fruits

8

Keep moisture at storage at around 0.17% and impurities below 0.08% (the lower the