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News Letter

OIL TECHNOLOGISTS' ASSOCIATION OF INDIA
WESTERN ZONE

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The Goa Glamour

The RSDC Conference at Goa, in October 2008 is on full steam. Already in top-gear, the event will get into a glamourous track very soon. Start Packing your bags.

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

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OIL TECHNOLOSISTS' ASSOCIATION OF INDIA WESTERN ZONE

From the Editors's Desk

Hail the New Year!

From this issue onwards we are leaping into the Modern Age. Visit the web-site and read all info at your leisure. Do you like some write-up? Print it out for your further chewing.

But, first things first All members will kindly update their E-mail addresses for our records. No? You have no E-mail? No problem (as the Yankee's say) Ask for a hard copy. May be it costs you a little. We will gladly mail it to you.

But what is the valuable observation of all members? E-mail News Letter? Friendly hard copy? Never mind the extra cost? But the time and effort in sending hard copy could be eliminated by modern E-mail wonder. You be the judge.

Meanwhile You have the RSDC info already on the E-mail. Better be an early bird. The rush is already on. Don't miss the bus. Enrol as a delegate or participate in many other ways and get a free delegate entry.

Many possibilities. You will learn a lot from top-notch speakers. Read the programme more than once, to make up your mind. Or, shall we make up your mind for you?

But do start packing your bags, now. Now!



Trade & Commerce

THE WARNING

No Policy, No Feedstock

India's bio-diesel urgently needs solutions

The development of India's bio-diesel industry has been hampered by the absence of a feasible policy. Yet, there seems to be no urgency to formulate one or to ensure adequate supply of feedstock.

Demand for energy is growing by leaps and bounds, and India is now ranked sixth worldwide in terms of petroleum consumption. If this continues, about 94% of domestic needs would have to be met by imports by 2030.

Annual diesel demand is approximately 52 million tonnes. Even a 5 % blend of bio-diesel into petroleum diesel would generate a demand for 2.6 million tonnes of bio-diesel. Extending this to 10% blending, which is technically quite feasible, would move up the annual bio-diesel demand to 5.2 million tonnes.

The Bio-diesel Association of India has made several representations to the government to rationalise the import duty on feedstock, principally palm oil, but has yet to find success. The government regulates the price of bio-diesel, now at Rs. 26.50 per liter. If producers pay full import duty on palm oil, then bio-diesel cannot be sold at this level.

Four bio-diesel plants are in operation with an aggregate capacity of 250 tonnes per day. Another eight are planned with an aggregate capacity of 1,730 tonnes per day.

Unless duty rebates are made available on import feedstock, these plants are unlikely to produce enough for local usage. Some of them may enter into toll processing arrangements for exports in which case they could possibly import feedstock without paying duties.

Jatropha as feedstock

Requests have also been made for incentives to produce Jatropha seed by cultivating the vast wastelands. Of the 55 million ha of wasteland, 43 million ha would be suited for Jatropha cultivation. One hectare would produce 1.5-2 metric tonnes of Jatropha oil a year, This would also reduce the use of edible oils for bio-diesel manufacture.

Even if the idea of large-scale planting of Jatropha is taken up seriously, the gestation period for production will be five years. How big an area can be planted in a short period also remains to be seen. Until productivity of the seed is improved and best cultivation practices are established, bio-diesel will not be cost-competitive.

There is a need fo an incentive pricing policy for Jatropha seed. This would be possible if there were no taxation on bio-diesel, say for 10 years, since it is an agricultural product and only a 5-10% blend is recommended currently. India is already a significant net importer of vegetable oils for edible and non-edible uses, so there is no possibility of diverting locally produced oilseeds towards bio-diesel production.

Unless the government implement a policy that subsidises duties on imported feedstock, there does not seem to be likelihood of significant production of bio-diesel from vegetable oil feedstock, at least fro the next 6-7 years.

If petroleum prices rise again above the US$70/barrel, India may be forced to give concessionary import duties and other incentives to manufacture bio-diesel from palm oil.

In this scenario there is a distinct possibility of increased imports, specially RBD palm olein and RBD palm oil from Malaysia.

The order of the day is to find ways and means to increase the supply of feedstock material for bio-diesel manufacture. The short term needs can be met only by palm oil imports. The long-term needs may turn to Jatropha cultivation.

Bhavna Shah
MPOC Mumbai

[Source: Global Oils & Fats, Page 32 &33, Jan.2007]

NOTICE TO MBAS

Supply Chain Management in Developing Economies : Opportunities Threats & Ethics

By: Chetan L. Hamchate

Supply chain management has transformed the archaic process of inventory forecasts, manufacturing plans and shipping schedules into a nearly exact science with just-in-time delivery; precise inventory and distribution, tracking capabilities, which help companies, avoid over stocking and offer cost cutting benefits. This could be achieved as a result of reliable raw materials supplies through the production process. There has been a growing recognition that it is through logistics and supply chain management that the twin goals of cost reduction and service enhancement can be achieved. Better management of the pipeline mean that customers are served more effectively and the costs of providing that service are reduced.

Cost reduction and price decline

The supply chain supports the satisfaction of end-user requirements. Information and financial components are as important as physical flow in the supply chains.

The price becoming a major competitive advantage, manufactures now complete less on product and quality, which are often comparable and more on inventory turns and speed to market.

Market maturity combined with new sources of global competition has led to over-capacity in many industries with an inevitable pressure on price. Price has always been a critical competitive variable in many markets and the signs are that it will become even more of an issue as the commoditisation of markets continues, with a shift of market focus to rural areas from urban and semi urban.

Lower prices offered to consumers are leading to fierce confrontation between competing supply chains and pressure is applied on each member of the supply chain to reduce the price and improve the service or sales.

The prices are rapidly declining as the result of the emergence of large distributors with powerful means. In the Fortune 100 list, we find on the top of the list distributors enhancing their position every year while producers are lagging behind. We are witnessing a power shift from producers to distributors squeezing the profit margins and pushing every member to look for cheaper labor, alternative raw material and shorter cycles; under these circumstances the violation to ethics is spreading and dangerous consequences might occur.

Two examples could be mentioned in the food chain where safety and health hazards are sensitive issues.

The Bovine Spongiform Encephalopathy or Mad Cow Disease that appeared recently that was traced back to the pressure that food distributors were putting on meet producers which incited them to replace vegetal animal food by various animal remains, mainly meat and bone in cattle feed reducing the consumer's price however the consequences were disastrous with the spread of the disease among consumers the scare that followed and the slaughter of millions of animals in many countries that has to be achieved.

Mad cow disease was lately linked to a human brain-wasting disease variant of the Creutzfeldt- Jakob that has killed about 100 people in the United Kingdom alone; the disease is believed to spread through eating brain or nerve tissues from infected animals. Manufacturers of raw materials for animal feed are introducing fish feed meal since the ban in Europe on the use of cattle meat and bone feed meal.

Genetically modified organisms introduced in agriculture are another controversial issue; competitions between large companies and often between countries lead to a change in raw materials and production processes (the use of pesticides, insecticides, and fertilizers) with supply chains taking advantage of these changes.

The changes allowed costs reduction, better-lloking products, a longer shelf like and easier logistics in distribution; consumers first were happy to receive more attractive products at a lower price. Despite the strong presence of the genetically modified organisms in the food chains several scientists are warning from their potential risks for the environment (soil damage and groundwater depletion) and the health hazards pushing a large segment of consumers to switch to organic products naturally grown. The supply chain in the food industry is under greater scrutiny and accusing voices are becoming louder spreading doubts in the consumer mind.

These examples show the important of traceability in SCM to identify the problem and correct it promptly avoiding damages that might harm the brand, the consumers or the company's environment.

Such occurrences in developed countries where government regulations are loose and the enforcement of laws is random due to corruption and lack of transparency could create new problems and threats.

We must not forget that companies are under constant pressure from shareholders and financial intuitions for higher profits and better performance; other pressures are also applied from the community and the customers for social involvement. decision makers within the company are abiding by business ethics for personal beliefs, influence by peers and fear of repression.

Risk factors

In developed counties logistics tend to be unreliable due to an unpredictable environment and supply chain management has had to be adapted when one or several members are located in countries suffering from instability (Before the September 11 attacks, several African countries have also come under threat).

The company's culture, principles and code of conduct cannot be applied or fully imposed to external organizations and partners, members of the supply chain, who are contributing in the creation and the delivery they adopt a different company's culture with different management styles and they operate in other environments.

In applying the supply chain management, an organization is giving up the accumulated experience in production or delivery often item allowing other members of the chain to use the experience curve and to reduce their costs. The costs reduction obtained by one member in the chain are beneficial for al the members however a great risk of loss faces the chain if a member that has accumulated a large experience is attracted by a competitors chain.
The bullwhip effect, occurring when a gap between the forecasted and the effective results at one level creates a large gap at the end of the chain, might add another obstacle to the geographical expansion of supply chain. The distortion leads to excessive inventors throughout the system, poor product forecasts, insufficient or excessive capacities and higher costs. This effect becomes common when the chain contains members in developing countries.

A direct way to reduce costs is to move the production operations to countries offering cheap labour and loose legal constraints contributing to the creation of jobs in less developed countries but the temptation is high to cooperate with subcontractors joining the supply chain without interfering in their local practices which sometimes violate workers rights despite abiding by the local laws (child labor, discrimination against minorities, women's rights etc.)

Cultural impact on supply chain management

Cultural or religious diversity among the members of the chain could add other problems; for example a contradiction could occur regarding accidents or unpredictable events, some members will accept events with fatality and try to manage the consequences later without blaming humans for wrong forecasts or shortfalls because natural disasters are related to God's will while others will investigate the situation both scientifically and legally then try to hold personally responsible some operators. The discrimination against women in the workplace is very common; women are restricted to certain type of jobs and in limited activities.

On human rights and child labor issues, cultural differences offer different interpretations for the same concept according to the culture or the background in which a company operators.

For example women's rights and civil liberties are perceived differently and enforcement cannot be done using the same procedures.

In most oriental cultures the child is considered a gift of God given to the parents and they can dispose of the children according to their wishes. The tradition to their wishes. The tradition of solidarity among the family members tends to push parents to sacrifice their eldest child for the sake of the family welfare specially the girls. The child remains dependent of the family socially and financially until he or she creates his or her own family. The head of the family is the man and the head of the family makes the major decisions.

In such situation where alternative social assistance is not available, preventing children from working might push them toward dangerous practices (theft, prostitution etc)

Expatriate managers and immigrant workers face difficulties when it comes to understanding the differences and adapting to the local context.

The same difficulties are facing the supply chain operations when company members work in several countries with different cultures specially when the good produced are sold in developed countries.

Supply chain management in developing countries.

Supply chain membership in developing countries is restricted to local companies offering the cheapest prices and abiding by the quality standards set by the main company running the chain, usually a large producer or a distributor in a developed country.

Despite developing countries' needs for job creation and know-how transfer, their governments are worried about the protection of the environment that is threatened by polluting activities performed by large companies; this threat is increasing under the pressure of developed countries' governments and consumers lobbies wishing to move polluting activities to countries where regulations are loose.

The supply chain, if not monitored, could become a convenient tool to avoid restrictions imposed in certain countries but threatening the future welfare of entire generations in countries looking desperately for quick economical growth.

Conflicts between the company and its external suppliers in products or services and located in developing countries are settled in the court of these countries according to local legislation. The judicial system in these countries is, in most cases either slow or corrupt; even if an international legislation is applied for conflict settlement, the enforcement of the court ruling remains difficult in developing countries. This situation usually leads companies, wishing to deal with new partners in the supply chain, to ask fro collateral and guarantees until the contract is fulfilled; the guarantees are sometimes difficult to gather for local suppliers and sub-contractors.

English language and compatible information systems are required to achieve a good communication between the supply chain members and bride the gaps separating the members; training of human resources located in developing countries and involved in the supply chain operations will overcome the lack of skills and the language diversity. Difference in technological development among the countries in which companies are located and weak telecommunication infrastructure reduce the geographical expansion of a company thus dealying cooperation actions and partnerships. If the right economical and ethical condition actions and partnerships. If the right economical and ethical conditions are met, the major positive consequences of supply chain emergence are know-how transfer, job creation, improvement of working conditions and the reduction of digital division.

Education and communication with transparency in supply chain membership and working conditions should be accessible to external audit bodies delivering an ethical label for the company wishing to join international chains. This certification process might become a reference used by funds looking for ethical investments.

Adopting a code of conduct applied by one or several members of the chain is a contribution in the fight against any misconduct or ethical trespassing that might emerge in developing countries. Large corporations are bearing a great responsibility in controlling their suppliers and their own operations in developing countries because in economical terms, they are more powerful than most governments in developing countries. Large companies setting or joining supply chains should look beyond the costs cutting and the price advantage offered by the network and consider using their resources to enforce international codes of conduct and contribute to the improvement of work conditions in every country reached directly or indirectly by their operations. Supply chains could become a factor of social development in poor countries and a way to transfer technology and to create job.

[Source: India Food Industry,
Page 56 to 58, Sep 2007]

ARE YOU LISTENING

Communication Skills For Every Agri-biz Exec

Source : Agriculture Today

Communication has become the hallmark in a society that saves nothing success like success and for that have to have certain skills, skills that make you stand out in a crowd. Management guru Ajay Sharma starts a series from this article for the agri-executives who have MNCs on one hand to deal with another poor marginal farmers on the other..

Skill 1 : Speaking

Effective speaking has been a "plus" in the business world and is now expected. And the higher one goes in a company, the more crucial this skill becomes. Today, public speaking is the norm for senior executives. However, even if you are not a senior executive explaining a crisis to a group of line managers or investors, you often will find yourself speaking before peers in your day-to-day responsibilities. And as a small business executive, you may speak for a living; that is, you may talk to customers and clients daily to sell your products or services. Your speaking success relates directly to your bottom line.

Remember, that it is not necessarily the brightest or most capable who get ahead. Often it is those who make a strong impact on people who end up in positions to buy from them. People who speak well generally are considered more intelligent, forceful, and respectable than their quieter counterparts.

Outside the business world, you will continue to find chances to put your speaking skills to use-at fund-raisers, on political issues, at farewell gatherings' for departing colleagues and friends, and on behalf of nonprofit organizations and causes.

The most important thing to remember is that you speak in the language of the person standing in front of you and if you can make him understand in his language you are successful. Speaking well is no longer just a nice-to-have skill-it is a must for the successful individual and particularly for the sucessful agri-business executive.

Skill 2 L Listening

Listening means the difference between making or losing a sale, gaining or losing a client, motivating or discouraging a team, mending or destroying an employee relationship. Not a passive state of mind, listening is the precursor to all successful business activity as an owner and manager. Remember these words always know how to listen, and you will profit even from those who talk badly.

Skill 3 : Writing

Everything official sooner or later gets written down. Unfortunately, to the small agri business executive most of the difficult writing-or at least reviewing of others' drafts ends up on your desk: Large customer proposals, important supplier agreement, strategic partnerships, Policy statements, Press releases to the public, Letters to investors. What you say is what you get. It has to be clear, concise, and correct.

Skill 4 : Leading a Meeting

Meeting can bring the world to peace-or kills hours a week for even the best time manager. Business executives meet with clients to sign the big contract, meet with suppliers to negotiate better terms, brain storm with the own teams to set strategy for the quarter or year, and lead staff meetings to tackle day-to-day issues. How well they lead determines who follows and what they achieve-time wasted or valuable outcomes.

Skills 5 : Resolving Conflict

Agri business executives, unfortunately, have plenty of conflict. If not with clients, the among internal teams. If not with internal among teams, then with the governmental agencies and regulators. If not with agencies and regulators, then with warning divisions and stakeholders, then with warring divisions and stakeholders about expectations and means to the desired outcomes. As business executive, you serve as referee.

Skill 6 : Emotion, Logic, and Character

According to Aristotle, the father of modern persuasive thought, not only are these the three cornerstones of

successful persuasion, they are absolutely fundamental in interpreting the messages of others as well as winning them to your way of thinking.

Simply defined, emotion is "a strong surge of feeling marked by an impulse to outward expression.' It's our passionate side. Logic is "the science concerned with the principles of valid reasoning and correct inference." This is our rational side. Character is "the combination of qualities or traits that distinguishes an individual." This is the sum total of which we are. Think about it. Who doesn't prefer Listening to a compelling speaker who exudes passion and heart? And wouldn't you rather discuss an issue with someone who knows ths ins and outs of a subject rather than the person who relies on guesswork and good intentions? And who wouldn't consider it wise, if not essential, to investigate a communicator's character before believing his contentions?

Few would disagree with the importance of the three elements of persuasion. Problems occur, however, when one of the three is either overused, lacking, or over shadowed. As it's been wisely said, "Truth shadowed. As it's been wisely said, "Truth out of balance is error." So too, communication lacking the correct persuasive balance can be equally erroneous and ineffective. Like the expert juggler, effective communicators must keep the essential of their craft in constant balance or every thing will come tumbling down.

Let's get a bit more personal. Do you have a cause to which you'd like your friends to donate time or money? Using the three persuasive element, you'll need to make your friends feel compassion for the group in need (appeal to emotion), show them exactly where and how their money and time will be used (appeal to logic), and demonstrate your own integrity, concern, and commitment in seeming the effort succeed (appeal to character).

The next time you want to influence someone in your way of thinking, balance the three essential of persuasion. Also agri-business is different from run of the mill business. Because agri-biz executive have to deal with illiterate farmers on one hand and English speaking bosses of MNCs on the other. So being an agri-biz executive you will have to hone your communication skills to be the best in business.

[SOURCE: Sopa Digest vol1, page 34 & 35, Oct 2007]

MORE OF NANO

Food nano bio-technology: An Overview of the Developing Research Area

Nanotechnology is the technology to measure, manipulate and manufacture things, at the scale of atoms and molecules i.e. between 1 and 100 nanometers. The term "Nanotechnology" was first introduced by a Japanese engineer, Norio Taniguchi. The term originally implied a new technology that went beyond controlling materials and engineering on the micrometer scale, which had dominated the twentieth century. Ir exploits the fact that some materials have different properties at this ultra small scale than from those at a larger scale. Nano-science and nano-technologies made their fist tentative appearance about two decades ago. Today, more than 200 Companies around the world are active in nano scale research and development. USA is the leader followed by Japan and China. BY 2010 Asia with more than 50 percent of the world population will be the biggest market for nano technology in food sector with the leading of China. In the last several years, nanotechnology has progressed from passive nanotechnology (i.e, coatings and structured nonmetals) to active nanotechnology (i.e targeted drug delivery) and nano systems (i.e. robotics and guided as sembly). Nano particles are ow applicable to foodstuffs and food ingredients, nutraceuticals, diagnostics, bio-sensors, enzyme catalysts, medicine and ecology, etc. In the changing market environments, keeping leadership in food and food processing industry, we will have to implement nano technology in the future.

Under present scenario of increasing competition for generation of food resources, further breakthroughs in crop DNA decoding and analyzing enable the industries to predict, control and improve the agricultural production. With the technology of manipulating the molecules and the atoms of food, the future food industry has a powerful method to design food with much more capability and precision, lower costs and sustainability. The combination of DNA technology and nano-technogy generates the new nutrition delivery system, which bring the active agents more precisely and efficiently toe the wanted parts of the human bodies and cells. Apart from food and agriculture the nonotechnology market impacts several industries, from energy to pharmaceuticals. According to Helmut Kaiser Consultancy, the nano food market is currently a

$2.6 billion industry, has potential to be more than $20.4 billion industry by 2010.

Although development in nanotechnology has led to many promising applications, industries using nanotechnology are becoming aware of the risk in rushing commercial products to market.

Inter-disciplinary research:
A revolution in food science

Food nano-biotechnology has developed as interdisciplinary research area; it has progressed through its application in molecular medicine and targeted drug delivery, and now it is employed in food packaging, food safety, and nutraceuticals. This technology has important role to play in nutritional therapy as well.

Two major uses of nanotechnology in the food industry include creating sensory value (e.g., manufacturing texture and manipulating flavors) and using amine-based nano sensors on a packaging substrate (e.g. plastic foil that would biodegrade) to ensure food preservation, food safety, and bio-security. Nano-technology can be used to protect food while using fewer preservatives and to make vitamins and nutraceuticals more effective by improving bioavailability. Many active ingredients have limited absorption because they are fat soluble or insoluble.

Current research and development priorities in food nanotechology

Current interest of nano-research in food sciences deals mainly with 'Food safety aspects like production of food antimicrobial encapsulation systems based on developments in nanotechnolgy and colloidal sciences, utilization of metal nanoparticles as carrier for poly-peptide antimicrobial and as probes for detection/characterization of microbial cells. 'Food processing' aspects like development of high-intensity ultrasound as a food processing technology, inactivation of microorganisms, physico-chemical modification of biopolymer functionality e.g. reduction of molecular weight of carbohydrates and modification of enzyme activity, 'Food nanotechnology' aspects like development of nano-strcutured food systems using ultrafiltration and electrospining as formation methods, and as nutraceutlicals use of nano-based food particles in certain disease conditions to enhance immunity and/or achieve therapeutic responses. Minuscule nano machines, which are able to circulate through the blood stream and clean out fat deposits from arteries, reverse cancer, could be delivered to the human body through foods. This will put in a new perspective, the health promotion role of foods and nutritional therapy.

Few other common application of nano technology today are Nano-biosensors, Nano-dispersion, Nano-capticles, Nano-laminates, Nano-tubes and Nano-fibers etc.

Nano-Biosensors serve as detectors of food pathogen and other contaminants. 'Nano dispersion' and 'nano-capsulatioon' method are used as ideal mechanism for delivery of functional ingredients (Tarver, 2006) and such types of nano-structures include Association colloids, Nano-emulsions and Bio-polymeric nano-particles. An 'Association colloid'' is a of smaller molecules. It is used to deliver polar, non polar and amphiphillic functional ingredients, at the scale of 5 n m to 100 n m (Tarver, 2006). Surfactant miscles, Vesicles Bilayers are examples of such association colloid. 'Nano-emulsion' is a mixture of two or more immiscible liquids, where size of the dispersion phase is of order of <500 nm. It can encapsulate functional ingredients in nano-droplets and prevent degradation. Such technology offers multiple encapsulating ability and form a single delivery system that can carry several components.

Bio-polymeric nano particles like Poly lactic acids (PLA) and Poly ethylene glycol (PEG) are biodegradable polymeric nano-particles and are often used to encapsulate and deliver drugs, vaccines, and proteins. PLA has been found to have reasonable stability under storage condition with minimum influence of temperature and humidity (Chai, 2006). Nanoaminates are commercially viable products of material with nanometer dimension and form extremely thin food grade film. They are made from polysaccharide, proteins or lipids and acts as oxygen/air barriers, or moisture barriers or mechanical barriers, depending on the type of the material used. Nano-laminates are used in preparation of edible films. It protects food from moisture, lipids, and gasses from moisture, lipids, and gases and improves textural properties color, flavor etc. Nano-tubes and nano-fibers, (Tarver, 2006) are in early stage of application in filed of food science and they too have wide scope of research in future.

However, there is a lack of sufficient knowledge and agreement among experts about the best way to conduct toxicology studies on nano-particles, and how best to distinguish between ambient and engineered nanoparticles. And it requires standards to be established for products, manufacturing processes, and risk assessment methodologies.

Applications of various nano-tools in food technology

There are several nano tools which are used to modify target materials to bring desirable change. The most commonly used tools are nan-otubes, nanofibers, nanocomposites, biosensors, quantum dots, nano-structured fluids etc. Few which have been used most commonly in food industry are discussed below.

Quantum dots in biosensing and analytical application

Because of their unique chemical, physical and electronic properties, Quantum dots (QDs) are being used now a days and are important nano-materials in bioanalytical applications. For example CdTe-QDs are designed with the size of about 3 n m and are being used to make electrochemical biosensing platform of glucose based on CdTe-QDs/CNT (Carbon Nano-tube) electrode (Qing Liu et al., 2007). It is an inexpensive and quite sensitive platform based on CdTe-QDs/CNTs electrodes which provides wide potential applications in environmental, and food analysis.

Fluorescent semiconductor quantum dots have recently emerged as a novel and promising class of fluorescent labels in immunoassays for quantitative detection for biological applications like food borne patheogenic bacteria e. g. Sallmonella from carcass wash water (Yang L and Li Y, 2005) and this way it can have important role to play in HACCP in meat plants.

Carbon nanotubes have variety of application in food science

Nanotubes result from a special arrangement of carbon atoms and connected in a honey comb like pattern that are rolled in form of tiny cylinders. Fibers of nanotubes are strongest known fibers.
Carbon nanotube (CNT) is a very attractive material for the development of biosensors because of its capability to provide strong electrocatalytic activity and minimize surface fouling of the sensors. The excellent electrocatalytic activities of the CNTs on the redox reactions of hydrogen peroxide, nicotinamide adenine dinucleotide (NADH), and homcysteine has already been demonstrated and the concept leaves a wide room for further research.

By fusing wet and dry nano technologies to control the flow of water into pure drinking water by ultrafiltration.

Biosensors in food technology

Biosensors are designed to detect substances with extreme sensitivity. It consists of synthetic membrane chemically gathered to a thin film coated on to a piece of plastic or substrate. There have been several bio-sensors developed to detect bioprocesses and fermentation for beverage production too. For example Ferricyanide-medicated Gluconobacter oxydans cell ethanol biosensor for ethanol detection was prepared by surface modification of a glassy carbon electrode (Tkac J et al., 203, 2002). The biosensor was successfully used in the off-line monitoring of ethanol fermentation. The selectivity of this biosensor towards alcohols was better compared to previously used enzyme biosensors based on alcohol oxidase or alcohol dehydrogenases.

Silver nanopartilces for water purification

Silver nanoparticles can be coated on common polyurethane (PU) foams by overnight exposure of the foams to nanoparticle solutions. Repeated washing and air-drying yields uniformly coated PU foam, which can be used as a drinking water filter where bacterial contamination of the surface water is a health risk. This technology is highly efficient combined with the low cost and effectiveness in its application (Jain P and Pradeep T. 2005)

Future and scope of nano-research in food science

The difficulty of communication between macroscopic and nanoscopic entities is the central issue in the development of nanotechnologies. Increased sensitivity to environmental effects, as dimensions are diminished towards nanoscale, represents a major challenge.

This area has a lot to explore in such a way, that it should impose minimum nano-toxicity concerns in future. In agriculture, nano-technology promises to reduce pesticide use, improve plant and animal breeding, and create new nano-bio-industrial products.

The study of nano structures in biological materials of plant and animal origin will enable scientists to establish relationships between macroscopic properties and molecular properties such as molecular structure, degree of order, and intermolecular forces. Generation of foods by non-biological means using advanced nano-technology could be another future development, meant to ensure enough nutrition with limited resources. In food systems it is possible to envision self assembling molecules capable of building very well defined food structures; the manipulation of molecular conformation to deliver active compounds precisely to sits needed; the development of specific bio-sensors, understanding the origins of supra molecular structure and strategies for improvement. Other examples include mechano-chemical coupling in the enzymes responsible for cellular metabolism and cellular transport.

There are opportunities for new sensors and diagnostics for quality assurance and improved food safety; new concepts for process innovation that will lead to improved products; and better packaging materials for longer freshness which also explains about the product inside. In the field of product engineering, nanotechnologies can be used to create additives that enhance the nutritional value of food products and therefore contribute to the health and wellbeing of the consumers.

However, there must be an open discussion with scientists and industrialists, for a clear understanding of how products are moving from the laboratories and farms to the society and environment. To facilitate the necessary analysis and risk research around nano-technology agro-food to provide practical and sound policy choices, scientists need to come to common opinion and conclusion.

Until such standards, toxicology practices, and risk assessment methodologies are developed, the regulation of nano materials and nano products in the food and agricultural in the food and agricultural industry will pose a serious challenge for government agencies and policy makers.

Effects of using nano-technology methods in food production: Public health concerns and government regulations

Effects of such modified food depend on several factors. Converging technologies and "atomically-modifieda" foods may compromise with the flavor of ingredients and are spontaneously dissociated it diluted. Bio-degradable bio-polymeric nano-partices like PLA or PEG are quickly removed from blood stream. While certain compounds like nano-laminates can add to colour, flavour and textural property. In general with broad sense, like any other technology, food nano-bio-technology does have its own advantages as well as disadvantages. its impact on the environment and the society depends on how precisely it is regulated.

The potential advantages of nanotechnologies include the following: (Uskokavie, V. 2006.)

- Opportunities to produce devices that could select and recognize atoms and molecules of the bio-sphere with the aim of remedying unbalanced environmental relationships.

- The possibility of preparing technological products in a "bottom-up" style without producing wasteful and dangerous by-products, as typically occurs with most of today's current manufacturing processes.

- The ability to produce more functionally efficient materials and devices with higher strength to weight rations. These could eventually eliminate the need for massive infra structural power generation systems, stimulate the introduction of renewable, more efficient energy source, and lead t a reduction of human ecological footprints.

Following disadvantageous effects of nano technologies also exist (Usko koviae, V. 2006):

- A more realistic scenario of unsustainable applications of nanoproducts could further destabilize the already endangered diversity of the biosphere.

- They could further extend the existing gap between rick and poor.

No government has developed a regulatory regime that addresses the nano scale or the societal impacts of the invisibly small. FDA does not have a restriction on the nano manufacturing process as such; however

FDA does impose some regulation on such products meant for consumption. European countries have some regulations for nano molecular engineering in food industry. Public resistance to nano food and agricultural products may not only be in response to health fears but also to social and economic concerns. Though there is no scientific evidence of harms caused by nano-tubes (Schule, 2004), still there is no consensus among scientists whether nanomaterials are risk free. The perceived risks of nanotechnology are likely to overestimate the risk of nanotechnology. Some of the concerns expressed in the media by environmentalist groups, and by a handful of scientists as well, happen to be the trigger points that lead to risk overestimation (Schule, 2004). On the other hands a few studies have claimed the toxic effects of nano molecules (Rebert F Service, 2003).

Synthetic biology and nano-materials will dramatically transform the demand for agricultural raw materials required by processors. Nano-products are coming to the market in the absence of regulation and societal debate. The merger of nanotech and biotech has unknown consequences for health, biodiversity, and the environment. Potential damage to humans does not come directly through digestion or contact with modified foods but instead through disrupting naturally diverse ecosystems. So, a regulatory eye should always be maintained not only on narrow and short-term frames of reference but also on wide-context and long-term influences on the biosphere as a whole.

Hence unknown consequences of such technology should not be simply ignored and sufficient research should be funded by government and regulations be provided to ensure the safe production of new generation nano-structured food.

Impact of nano-research in food sciences on the global market

Nanotech has profound implications for farmers. The number of nanotechnology food products currently being sold appears to be relatively small, But with millions of dollars are being spent globally by both government and industry to apply nanotechnologies in areas such as food processing, food safety and packaging, and agricultural production. Likewise, a number of pesticides formulated at the nano-scale are on the market and haven been released in the environment. The main source of increasing the speed of these technologies within the next few years are climate change, cost efficiency, population growth, and also new applications using food as drugs and nutrition.

Molecular technologies are disruptive technologies and change the conventional production faster than most scientists expect. It can make the products, cheaper, the production more efficient, safer and more sustainable using less water and chemicals, producing less waste and using less energy. The change is dramatic, the potentials are immense and the risks too. Such changes would definitely affect demand-supply balance in long term; on the other hand it would invite government to reform regulations in manufacturing and marketing to keep economy balanced and watch public health risks.

Summary

The nano-technology is study of materials at nano scale (10 m scale) and exploits the fact that some materials have different properties at this ultra small scale than from those at a larger scale. Nanotechnologies clearly offer exciting possibilities, which could benefit society as a whole. This interdisciplinary research area has already spanned various fields in science including its application to foodstuffs and food ingredients, medicine, ecology, diagnostics, biosensors, enzyme catalysts, etc. it has bought a revolution in food technology, food processing, packaging food safety concerns, nano structured food and nutraceuticals etc. Nano-biosensors, nano-dispersion, nano-capticles, nanoaminates, nano-tubes and nano-fibers are few examples of nano-materials often being used to modify food materials now a days. Mechanochemical coupling in the enzymatic and minuscule nanomachines, which can be delivered through food, will put in a new perspective the health promotion role of foods. Quantum dots and carbon nanotube based CdTe/CNTs electrodes and ultrafiltration units and other biosensing nano devices have promising applications.

There is great scope of research to develop newer products, and at the same time assessment of potential risk and study of toxicological parameters is inevitable. Very little has been done so far, and there is lack of common opinion on its public health issues of nano labelled foods. Merger of nanotech and biotech has unknown consequences for health, biodiversity and the environment, which has to addressed by scientists in terms of its risk potential and toxicity, and by government in terms of regulations on product

standards and production,

Food nano-bio-technolog has taken a leap but still there is a long way to go. There is lot of research needed in various directions. The interests on emerging nanotechnologies are each consumer's committed to facilitate the necessary analysis and risk assessment research around nantoechnology agri-food to provide practical and sound policy choices. Days will come when food will be designed by shaping nano-molecules and atoms. Food will be wrapped in "Smart" safety packaging that can detect spoilage or harmful contaminants. Future products will enhance and adjust their color, flavor, or nutrient content to accommodate each consumer's taste or heath needs at cheaper costs.

[Source: Indian Food Ind., Page 36 to 40 Mar 2007]

"CONTROL MEASURES"

Distributed Control Solutions

A Tool To Improve Efficiency

Technology has always aimed to make like easier for humans. Now with the advancement in technology eve the by-products used to produce goods can be reutilised again. This helps the company to stay remaining after sugar cane juice is extracted to generate electricity. Energy Ventures, an authorised Rockwell Automation system integrator helped Dhampur Sugar Mills Ltd (DSML) dramatically reduce maintenance costs and enhance system reliability. A case study...

Sugar production, an important industry in India for centuries, experienced dramatic growth during the post-colonial period. In the last half of the 20th century, the number of sugar mills operating in teh country tripled and the installed capacity increased by more than ten times. Currently, India, ranks second only to Brazil as the world's largest producer of sugar. The country generates between 15 and 20 million tonne (mt) of sugar each year, and nearly all of these are consumed domestically.

DSML leads the way

India's dramatic production gains were achieved in large part due to forward-looking companies, such as Dhampur Sugar Mills Ltd (DSML). Established in 1933, with a cane-crushing capacity of 300 tonne cane per day (tcd), DSML expanded from its initial site at Dhampur to four locations throughout Northern India and Nepal. Currently, the combined crushing capacity of its facilities is 32,000 tcd, which makes the company one of India's largest sugar producers.

While most industries rely on external power sources to fuel their operations, sugar manufacturers can produce their own energy by using a processing byproduct. Bagasse-the fibre of sugar cane that remains after it has been crushed and the juice extracted-can be converted into an eco-friendly boilder fuel for cogeneration. Congeneration is the simultaneous production of process steam and electricity.

Historically, sugar mills in India were allowed to produce only the amount of energy needed for their own operations. However, in the mid-1990s, the Indian ministry of Power permitted companies to cogenerate surplus energy and export it to the state electricity board or other manufactures. DSML was one of the first Indian companies to take advantage of this new opportunity.

The company is a $111-million organisation employing more than 6,000 individulas. In order to make its operations more sustainable, the group has diversified its offerings in recent years to include chemical manufacturing and cogeneration export.

Challenges encountered

Before the Ministry of Power changed its policy, Indian companies traditionally installed inefficient boiler and turbines in their captive power plants and created power only during the sugar season. Since they had an abundance of fuel and no opportunity to sell excess energy, sugar companies had no incentive to install efficient cogeneration system. Once exporting energy became a possibility, DSML began to look for ways to increase the efficiency of its power plants.

To increase its energy producing capability and facility year round production at its Rauzagaon facility, DSML replaced the low-pressure boilders (21ata/3400C) and backpressure, turbo alternators with two high-pressure boilers (65ata/4800C), one extracting cum-condersing turbine and one back pressure turbine. A distributed control system (DCS) running on Modbus

was installed to controlled the system

Working mechanism of DCS

Initially, the company was satisfied with the performance of its new system. However, ongoing maintenance proved to be very costly. The DCS system was designed using complicated Function Block Diagram (FBD) and Standard Template Library. S(TL) programming languages. Despite extensive training, the company's staff discovered that making even minor adjustments, to the system logic was difficult. On-site support by the system's supplier was often required, but the work was frequently delayed because the supplier had few senior project engineers on hand to troubleshoot the system. In fact, the supplier often resorted to flying an engineer from Banglaore/Mumbai to teh Raugzagaon site, which added transportation costs to the already expensive service charges.

In additions, the specially analogue proportional-integral derivative (PID) modules, which controlled the temperature and steam pressure within the boilers. often failed and needed replacement. In fact, the replacement cost of the modules soon represented a sjignificant proportion of the initial cost of teh entire system. And even when the modules operated correctly, they allowed a boiler pressure variance of 10 percent, which compromised on the system overall efficiency.

Effective solutions

To improve the output of its cogeneration system and control maintenance costs, DSML required a new user-friendly, reliable control system. The company approached Energy Ventures, an authorised Rockwell Automation system integrator headquartered in New Delhi, for a solution. Since 1992, Energy Ventures has been specialising in designing & installing automation and control systems for the sugar and energy industries. It has quickly built a strong reputation for helping its customers achieve stable operation and maximum production minimal cost.

An integrated process

After reviewing the existing cogeneration system, Energy Ventures provided DSML with both distributed control and centralised control options that would meet their requirements. Ultimately, DSML selected a Rockwell Automation integrated process solutions based on Allen-Bradley FlexLogix DSML directed Energy Ventures to apply the new control solution to one of the two boiler systems in the power plant.

FlexLogix a highly adaptable multiloop controller is modular in nature and allows each segment of the cogeneration system to be controlled by a separate FlexLogix unit. The system is based on open technology and can be easily expanded and networked in the future. The controller is programmed with user-friendly RSLogix 5000, a Rockwell Software tag-based programming language that simplifies documentation and integration with visualisation programs.

Finally, Rockwell Software RSView 32 - an integrated, component based human machine interface (HMI), monitor the system. Designed for Microsoft Window environment, RSView32 utilises open technologies to provide unprecedented connectivity to other Rockwell software products and third-party applications. To cost effectively monitor boiler temperature, third party temperature scanners were integrated into the monitoring system via a Modbus communication port. The RSView 32 software collects temperature data from these scanners, displays temperature values on color graphic screens and finally, logs the data to generate multiple graphs.

The area outlined with a brown dash line represents the present automation level under discussion in this document. The remaining portion illustrates a host of solutions that Rockwell Automation can provide to integrate the plant floor with the enterprise and beyond.

The result

With the new FlexLogix solutions running on one boiler system and the old control system running on the other, DSML can easily evaluate the new systems effectiveness. With improved PID control. the temperature and pressure within the boiler utilising the new system is much less volatile. In fact, the variance within the boiler controlled by FlexLogix is percent. This improved efficiency reduces the per unit generating cost. In addition, since the new system is less volatile, the costly boiler and turbine are less prone to wear & tear.

Reliable performance

Due to ease in use, RSLogix 5000 and RSView32,

DSNL's engineers and operators were quickly trained on the new system. And since the company's engineers can easily make adjustments in the system themselves, there is little need for filed support. The new system's hardware modules continue to perform reliably- service calls have been substantially reduced and costly spare parts are rarely needed. The overall reduction in maintenance expenses is dramatic. In fact, the new system costs less to install than the annual maintenance on the previous system.

The boiler upgrade was just the first of the many successes at the Rauzagaon mill. DSML also chose to convert its existing condensing turbine control system to the same FlexLogix system as the boiler. And an additional FlexLogix solution was installed to control a new, load-cellbased system for juice weighing. It also control various operations in the sugar refinery and the mill house.

The road ahead...

Currently, the boiler, juice weighing sugar refinery and mill house FlexLogix are integrated on the same network. All systems send information to the master control room where hourly management information systems (MIS) reports are generated and sent to the central office server and can be accessed by the executive office and quality control. In the near future, DSML plans to use V-sat communication to transmit the MIS reports to its corporate office in Delhi,

Discussions are also underway to upgrade and integrate the second boiler system at the Rauzagaon facility. In addition, DSML has contracted with Energy Ventures to install FlexLogix systems at its chemical plant at Dhampur and sugar mills at Dhampur Mansurpur and Asmoli.

Courtesy: Rockwell Automation Inc

[Source: Modern Food Pro., Page 70 to 72, Sep 2007]

SOUND ADVICE

Rethink Bio-Fuel Policies

It's time to factor in the full environment costs

In a recent article in Bioenergy Business, Marcel Silvius of Wetlands International argued that planting oil palm on peat releases massive amounts of carbon dioxide and that the palm oil produced is very fam from carbon-neurtral and should not be considered for bio-diesel. As a result, there have been calls for a ban on the use of palm oil for bio-diesel in Europe.

In this article I will show that the figures used by Silvius are not very reliable. However, he does make a valid point, and it is worth noting that Europe's bio-fuel policy may raise more environmental questions than it answers.

The central point raised by silvius is valid-it is well known that drained peat shrinks because of oxidation, so the CO_2 released must be added to greenhouse gas (GHG) emissions. In addition to natural oxidation, there is the damage caused by fire; in the past, extensive peat fires have been a major factor in the occurrence of haze over parts of Southeast Asia. To understand the article by Silvius better, one needs to refer to the original report on which it based (Delft Hydraulics report Q3943,2006). This shows that there are many uncertainties in the data, some of highlighted in the report.

In particular, the area of oil palm planted on peat and the rate of oxidation of peat after drainage are both uncertain. The report estimated that 25% of plantations in Malaysia and Indonesia are on peat, but in Malaysia the figure is only 6% (MPOB). For Indonesia, the estimate was based on oil palm and timber concession areas on peat, rather than actual plantations.

The rate of oxidation of peat is very variable, as the Delft Hydraulics report shows. The assumption is that the deeper the drainage, the greater the oxidation, and a straight line through the origin is shown in Fig 12. However, the line is a very poor fit to the data. which do not support the implicit assumption that without drainage CO_2 emissions are zero. Nor do any of the individual classes of land use show a strong upward trend with drainage depth. A CO_2 release of 100 tonnes/ha/yr after drainage to a depth to a depth of 1 m is estimated by extrapolation from Fig 12; this is used in subsequent calculations, but may well be a considerable over-estimate.
Direct comparisons of oxidation rates under different types of land use are also inconclusive. A table in the Delft Hydraulics report lists results of 18 different studies on CO_2 emissions from peat soils in relation to drainage depth. Four points described as forest have a mean emission rate of 51 tonnes/ha/yr, while two

points for oil palm plantations have a mean emission rate of 54.5 tonnes/ha/yr. A direct comparison of forest and oil palm plantations in Sarawak actually found slightly higher emissions from forest (see Table).

It is difficult to distinguish oxidation from soil respiration (by soil fauna and flora). Soil respiration rates measured under oil palm in three studies on other soil average 51 tonnes CO_2/ha/yr/ On such mineral soils, oxidation should be a small component, yet the overall CO_2 emission rates are not dissimilar to those on peat.

In summary therefore, although silvius' projections are based on superficially plausible assumptions, the data supporting these assumptions are weak. The area of oil palm on peat is probably over-estimated, the effect of drainage depth on peat oxidation rate is unclear, and there is some doubt as to whether CO_2 emission rate is much increased by conversion of peat forest to plantations (provided that burning is avoided, of course).

Over-simplified debate

However, Silvius drawn attention to dangerous over-simplification in the energy debate. It is not enough to say "vegetable oils are renewable, so bio-diesel is good" - the whole production system for the raw material must also be considered.

Following calls for a ban on bio-diesel made from palm oil, the European Parliament has prosed that imported oils should be subject to certification scheme; various organizations in Europe are working on such schemes. As long as this applies to all bio-fuels, not only those from imported raw materials, it must be a good thing.

For palm oil, the Roundtable on Sustainable Palm Oil (RSPO) has defined criteria for sustain ability. The best way for concerned importers to improve standards in palm oil production is not to boycott the oil, but to demand adherence to RSPO standards in its production. The guidance to RSPO criterion 7.4 specifically mentions that development on deep peat soils should be avoided, while criterion 7.7 specifies that fire should not be used for land clearing.

Although criterion 5.5 includes reduction of GHG emissions, CO_2 from long-term oxidation of peat is not specifically mentioned. For bio-diesel, this criterion is particularly important; to serve its intended purpose the raw material must be not only 'sustainable' but truly 'carbon neutral.' In other words, the net result of producing and burning the fuel should be to leave atmospheric CO_2 level unchanged.

In more general terms, both the palm oil industry and NGOs must recognise that the current palm oil boom has been created by the Eus bio-fuel policy. To encourage production. bio-fuel policy. To encourage production, bio-disesl in Europe currently receives a subsidy in the form of reduced tax; in the UK this amounts to about 20% of the pump price. Without the subsidy, raw material costs would make bio-diesel uncompetitive: palm oil price of US$700/ tonne is equivalent to a petroleum price of about US$110/barrel.

The EU targets are for bio-fuel to make up 5.75% of road transport fuel consumption by 2010, and 20% by 2020. In Europe at present, most bio-disel is made from rapeseed oil. Meeting the 20% target with rapeseed would require over 60% of Europe's arable land area or current average yields and allowing for conversion costs and fuel used in production. This is clearly impractical, and the demand can only realistically be met with palm oil. Over 40 million tonnes of palm oil could be needed to meet Europe's 20% target, roughly equivalent to a further 12 million ha of plantations.

This is good news for palm oil producers, provided they remember that the demand is driven by subsidies. But if all the new plantings were to be in Borneo, 20% of the island would have to be converted to plantations - not what environmental NGOs would want.

Silvius makes the sensible point that there are millions of hectares of idle or waste land available for development;

one estimate is that there are 8 million ha of Imperata grassland (known locally as lalang) in Indonesia.

Despite the uncertainties in his data, if Silvius helps to direct plantation development away from forest onto idle land, it can only be beneficial for biodiversity and the environment. Replacing grassland with oil palm also increases the amount of carbon locked up ij biomass, so it is better than carbon neutral. However, the idle land alone is probably insufficient to meet Europe's targets' and at present it is not being used anyway.

Thus Eu governments and campaigners for renewable bio-fuel need to understand that subsides for bio-diesel may in effect be subsidies for deforestation in Borneo.

Singling out palm oil is not the answer, though as Dr Yusopf Bariron of MPOC has pointed out (GOFB vol 3, Issue 4), the environmental consequences of expanding production if other, lower yielding oilseeds would be even more disastrous.

What is needed is a complete rethink of bio-fuel policies. Bio-diesel may have a part of play in future energy supplies, but the full environmental costs and true carbon balance of production must be taken into account.

Hereward Corley
UK

[Source: Global Oils & Fats, April, Page 13 & 15, 2007]

Single Bio-Fuel Standard On the Way

Experts in the US government and bio-fuel industry are working to harmonise international standards for bio-fuels, starting with discussion of methods and definitions.

The goal is reportedly to arrive at science-based transparent and consensus driven outcomes

The group will first engage the EU and Brazil in talks before including China, India and South Africa, under the auspices of the International Bio-fuel Forum.

[Source: Global Oils & Fats, April, Page 45, 2007]

Exhibition / Networking Stalls:

15 sq. Mt. Air-conditioned and carpeted stalls are available. Each stall will have a partitioned Exhibition area of 6 sq. Mt. and a Networking room of 9 sc. Mt. Each stall will be equipped with a counter and a chair in the Exhibition area and a table and four chairs in the Networking room. A charge of Rs. 200,000 will be payable for each exhibit area.

Poster Presentation

Delegates who wish to participate in poster presentation should send the abstracts before 31st July 2008. The poster presentation should be technical in nature on the conference subjects.

Also each participating country will have poster presentation displaying statistical information about demographics, population, economical indicators, industry, market overview and future trends etc.

Conference Proceedings

Conference proceedings will be available in the form of CDs and will be distributed to the delegates along with the conference kit.

Additional CDs will be available at a fee at the registration disk or at the secretariat

For further information, please contact us at

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”DO WE?”

Understanding Oils and Fats

No commodity is improved by transport. The best that can be expected is that it should arrive in unchanged condition.

Edible oils can suffer during transport in three ways: oxidation through contact with air, particularly at higher temperatures; hydrolysis through the action of traces of water, cataysed by acidity or by enzymic action from microbiological contaminants such as moulds or yeasts; and foreign matter such as dirt or residues from previous cargoes.

Most of the major vegetable oils are transported as crude oils at ambient temperature. Malaysian palm oil is mainly transported in fully refined form. It needs to be kept warm to prevent excessive crystallisation. Any loss of quality has to be rectified by a second refinery treatment resulting in extra costs to the purchaser. Any chemical changes will occur faster at temperatures above ambient.

In its early years, the Palm Oil Research Institute of Malaysia (PORIM, now the Malaysian Palm Oil Board or MPOB) collected information on the extent and causes of quality changes during transport. The transport chain usually involves a number of steps.

In some ports, unloading also involves the use of barges. At each stage the transfer involves pumps, pipe lines and tanks where contamination by previous cargoes or foreign matter can occur.

Each stage of the transport chain is under different management. In order to provide an assurance of good practice, independent surveyors are employed to approve the condition of the various facilities.

PORIM undertook to obtain first hand information by sampling and anyalysing oil at various stages of transport. Some results are summarised in Tales 1-3.

The shipment to New Zealand (Table 1) arrived in unchanged condition. The Pakistan shipment showed some increase in acidity. The South Korea shipment showed appreciable oxidation which had occurred partly during the journey and further during transfer by barge at the port of arrival.

Samples were taken from several ships' tanks during a voyage and analysed on board. Measurements were made of the level of oxygen dissolved in the oil and of the peroxide value.

The high iron content in the crude palm oil stearin catalysed oxidation of the oil, so that the dissolved oxygen was nearly all used up and oxidation was appreciable. The refined stearin had much lower iron content, and oxidation was quite moderate. A substantial proportion of oxygen remained in solution.

Samples were drawn from a pipeline delivering oil into a shore tank at a foreign destination Clearly the pipeline was not clean, but contained some water and a quantity of some strongly coloured oil. From the rate of pumping it was calculated that the first 30-40 tonnes of product were sub-standard.

As discussed in our second article (GOFB Oct-Dec 2006), a fully refined oil is expected to have a free fatty acid (ffa) content below 0.10%. Evidence on a number of shipments showed that it is a case of the 'the lower the better;. A follow-up study of 20 shipments showed that when the acidity was 0.05 or less at loading, then 75% landed with ffa below 0.10%. If the initial ffa was 0.05-0.10% (still within acceptable limits), only 20% landed with ffa below 0.10%.

Inspection of some ships showed wide variation in conditions, from clean tanks with a perfect protective coating to those showing somewhat rusty surfaces. However clean the latter are, they catalyse oxidation reactions.

The overall conclusion was that the effect of transport varied, with significant effects on quality in some instances.

The overall conclusion was that the effect of transport varied, with significant effect of transport varied, with significant effects on quality in some instances.

Preventing loss of quality

Quality loss during transport is avoidable provided that exceptional care is taken in the cleanliness and condition of the equipment, and that access to the air is prevented. The later requires the provision of nitrogen gas throughout the transport chain from the refinery to destination.

Storage tanks and ships' tanks are flushed with nitrogen before being filled, and a nitrogen atmosphere is maintained in the head space above the oil. Gas is 'sparged' into the oil as it is pumped through pipelines. This involves fitting an inlet tube so that nitrogen is forced into the oil under pressure. Excellent results can be achieved, as the example in Tables 4 and 5 show.

Clearly nitrogen-blanketing largely prevented oxidation, but it also prevented any increase in acidity. This is because the 'sparging' removes some of the low level of water dissolved in the oil (no more than about 0.2%), which otherwise promotes some hydrolysis.

Arrival of oils in perfect condition can be achieved, especially if the cargo is protected by nitrogen throughout. However, nitrogen use involves extra costs and this has prevented its use for the majority of cargoes. Still, the costs can be at least partly offset by avoiding any reprocessing to clean up the oil. At present only small quantities of oil are shipped with nitrogen protection. The reputation of Malaysian Palm oil is enhanced when such quality maintenance is achieved, and the adoption of this handling procedure could form the basis of brand image that could not at present be matched elsewhere.

For speciality products shipped in smaller quantities, ISO tank containers may be used. These are stainless steel tanks conforming to specifications laid down by the International standards Organization. They hold about 21 tonnes of oil, have external heating coils, top and bottom discharge points and are easily cleaned. Their use is more expensive, but the likelihood of deterioration of the cargo is reduced.

SHIPPING CONTRACTS

FOSFA Contracts

The quality of Malaysian palm oil intended for export is controlled by government regulations and monitored by MPOB. Issues of quality are ate the forefront of shipping contracts and are dealt with in government and international regulations.

The Federation of Oils, Seeds and Fats Associations (FOSFA), based in London, prepares formal shipping contracts, Clauses relate to the quality and specification of the oil and the responsibility for cleanliness of the ship's tank. The ship's surveyor and the analytical chemists are expected to be members of FOSFA. The ships master is required to complete a certificate regarding the suitability of the tank, heating system and pipelines and the cleaning procedures used. The thee previous cargoes carried in the tank must be specified.

The surveyor in turn completes a certificate of the cleanliness and suitability of the ship's tank. Loading and discharge procedures and the method of sampling for analysis are also laid down. FOSFA provides training courses for the junior and middle management of surveying companies.

The FOSFA operating procedures emphasise the control of temperatures of the cargo. This is of particular importance for palm oil products. At ambient temperatures, palm oil would set solid and become virtually impossible to unload. However, to keep it totally liquid, a temperature would be required which would risk a serious level of oxidation.

FOSFA requires temperatures to be controlled according to minimum and maximum limits laid down by the International Association of Seed Crushers. Some crystallisation occurs during the voyage, and controlled reheating is therefore applied some time before discharge to raise the temperature by no more than 5^{0}C/day, so that the oil arrives in a homogenous liquid condition.

It is the surveyor's responsibility to ensure this condition has been reached at the time of arrival and sampling. In the past, disputes have arisen due to inadequate reheating. In consequence, the palm oil had partially fractionated into olein and stearin, and there were variations in composition of the oil throughout the tank.

In the Us, the National Institute of oilseed Products (NIOP) carries out functions similar to those of FOSFA. It prepares contracts, and its trading rules contain detailed requirements regarding the quality of the shipping operations.

FOSFA has recommendations for the handling temperatures for palm oil and palm kernel oil products, Substantially, the same temperatures are advised by Codex Alimentarius

The Palm Oil Refiner Association of Malaysia (PORAM) also has a shipping contract for processed palm oil which is frequently used.

The latest revision in 2002 uses the oil specification as shown in our second article (GOFB Oct-Dec 2006). Other items relating to quality are essentially the same as those given in the FOSFA contract.

Code of practice

The quality aspects of transport were discussed at an international oils and fats technical conference in 1982. As a result ma number of large industrial firms and some surveyor's organisations collaborated with PORIM in preparing an advisory booklet on transport. It covered design of pipework, tanks and heating systems, and operating procedures.

As a further step, the Codex Alimentarius Committee on oils and fats was requested to put a Code of Practice for storage and transport into its programme of work. The advisory booklet was used as a starting point.

The question of possible contamination by previous cargoes required detailed study. Most vegetable oil transport is from east to west, and ships carry a variety of chemical cargoes on the return trip. Contamination of edible oils with traces of previous cargoes in undesirable and may be dangerous.

Discussion in the Codex Committee identified a number of questions to be answered, including: which cargoes are toxic, which products can be removed during a clean-up process of the oil, which products are absorbed by the tank coating and how can they be removed, and what analytical methods are to be used. FOSFA was asked to co-ordinate the extensive work programme required to provide answers.

Document CAC/RCP 36 entitled 'Recommended International Code of Practice for the Storage and Transport of Edible Oils and Fats in Bulk' was issued by Codex in 1987 and most recently revised in 2005. It covers the design and operation of the facilities involved in the transport. An important recommendation is that the condition of equipment involved in every transfer of the oil should be inspected by a qualified superintendent.

Previous cargoes

On the question of previous cargoes, it advised that the three previous cargoes carried in a ship's tank should be declared. Previous immediate cargoes are divided into those that are banned and those that are acceptable. FOSFA adopts a similar ruling.

The NIOP rule is different. It only lists acceptable prior cargoes. A limited is permitted prior to the shipment of edible oil that may or may not be reprocessed before use, while a somewhat longer list is allowed for oils that are intended for reprocessing.

These lists continue to be reviewed as necessary.

The European Community (EC) has also adopted a positive list of acceptable previous cargoes, but believes that a negative list of banned immediate previous cargoes can cause confusion in administering the system. Oils that are not to be further processed must be carried in tanks that are (a) of stainless steel, or lined with epoxy resin or similar coating and (b) have been used for food stuffs on the three previous voyages. Where the oils are to be further processed, using tanks as in (a), only the immediate previous cargo must be foodstuff or from the permitted list. In due course an evaluation of the acceptable list will be required by the EC's technical committee.

The IMO haw a number of regulations which impact indirectly on the quality of transport. It is chiefly concerned with preventing pollution of the environment. Cargoes cause pollution if there is leakage due to an accident, and when tank washings are discharged. Vegetable oils are classified by IMO as hazardous, because they harm sea birds and marine life. They must thereof be carried in vessels with double bottoms and in tanks of stainless steel or suitable coatings. An exception is made for cargoes from destinations only served by smaller, older vessels.

Recent experience indicates that contamination by previous chemical cargoes is rare. Occasional quality problems occur due to the ingress of sea water, resulting in elevated ffa, and also from overheating, resulting in some oxidation. Overheating may be due to a rapid heating-up process before discharge or from

heat passing from adjacent tanks.

KG Berger
Food Technology Consultant, UK

[Source: Global Oils & Fats, Page 47 & 51, Jan 2007]

Understanding Oil & Fats

In the previous three articles, we discussed the chemical composition of fat, ho its quality is measured and how we can ensure it reaches the end user in good condition.

We will now consider the functions of fat in food products. Nutritionally, fat is an efficient provider of energy and also provides some essential components that the body cannot synthesise. These are the poly-unsaturated acids and some vitamins.

A second function is to contribute to the flavour of food, both directly-for example, in the use of butter or olive oil - and indirectly, as a result of chemical changes and interaction with other ingredients during cooking.

The third function, of particular interest to the food technologist, is the part that fat plays un developing the characteristic structure of various food products. Some specific examples are described in this article.

Biscuits and pastry

The major components of these products are flour, fat and sugar in varying proportions, together with a small proportion of water. Minor components such as dried fruit or chocolate chips are added to give a particular flavour. The eating properties, the texture, of biscuits and pastry are varied over a wide range (Figure 1). Think for instance of a ginger biscuit, with a crisp, tough character, and at the other extreme a shortbread biscuit which has a crumbly 'dissolve in the mouth' character.

To understand how these different textures are achieved we need to know something about the composition of the largest ingredient, the wheat flour. Its main component is starch, but it also contains 7-11% of proteins (depending on the variety of wheat). One of these proteins, the gluten, readily swells up in water and develops a sticky, elastic character. This is very important in bread, where the kneading process of dough is designed to stretch and develop the gluten so that it can maintain the structure of baked bread.

In biscuits and pastry the different textures are obtained by controlling the extent to which the gluten is enabled to develop. By using a high proportion of fat and ensuring that the flour particles are well coated with fat, the access of water to gluten can be minimised.

The characteristics of the fat are also important. If liquid oil is used, it fails to coat the flour particles efficiently, because it has a tendency to form droplets. A fat blend must have small crystals and a smooth easily effective spreadable texture. Palm oil is very effective as a major component of such a blend.

AIR CONTENT AND ROLE OF FAT

We do not generally appreciate that air is an important component of many foods for example, a loaf of white bread contains about 60% of air by volume. Without the air you would have a hard flat biscuit.

Flaky or Puff pastry

Its distinctive character is derived from thin layers of a crisp pastry separated by large air spaces. Dough is made containing little or no fat and is formed into a flat rectangle. A layer of special pastry margarine is then placed on one half of the dough area. The other half of the dough is folded over and the parcel is progressively rolled down in thickness through a pair of pastry rollers. The dough is folded over once, turned through a right angle and rolled down again. A complete sequence of rolling, folding and turning results finally in many thin layers of dough inter-leaved with layers of fat. This pastry is baked in a very hot oven. The steam generated within the dough is retained by the layers of fat and can only escape after it has lifted the thin layers apart. They then cook to give an attractive crisp texture.

The properties of the fat must be rather special. It is essentially important that the fat does not mix into the dough during the rolling process. It must therefore be very resistant to work-softening. A high degree of plasticity is required. A somewhat high melting point is required. Palm oil and palm stearin are suitable components for pastry margarine. Figure 2 shows puff pastry samples prepared in a comparison of two fats.

Cakes

Shortening used in cake manufacture perform two important functions. Firstly they enable air to be incorporated in the batter, and secondly they contribute to the tender 'short' eating quality of the baked cake. Good aerating properties require a sufficient liquid oil content to enable air bubbles to be formed, and also the presence of solids in the form of small crystals.

In a typical two-stage mixing process for a Madeira type cake, the fat is first mixed together with about one half of the flour. This represents about one quarter of the batch weight and is aerated to 40-45% air. Examination under the microscope shows that the air bubbles are surrounded by fat. Next the remainder of the flour and the aqueous ingredients are added and mixed. The air content of the batter has now been diluted to about 15%. Figure 2 is an electron micrograph of an air bubble in a cake batter, magnified about 5,000 times. We are looking at the internal surface of the bubble, which has been cut in half. This surface consists of liquid oil and looks smooth; however it shows a number of sharp lines. These are the edges of fat crystals lying on the exterior surface of the bubble. They stabilise the bubble.

When baking starts and the temperature rises, water vapour is generated and goes into the existing air cells, as does the carbon dioxide from the baking powder. The air cells become larger. At this stage they are still surrounded by fat. As the temperature reaches about 40^{0}C the fat melts and the air bubbles move into the aqueous phase. Here the viscosity is increasing due to the swelling and gelling of the starch, so the air bubbles are retained. Eventually the egg protein sets and the cake structure is fixed. Measurements under the microscope give an average diameter of the air bubbles in the batter of 20 microns (1 micron = 1 millionth ofa meter) and in the baked cake of 110 microns, so still very small. The final air content is 65%. Figure 4 shows a slice of a Madeira cake with its very fine air bubble structure A tested formula for a cake shortening consists of 60% palm stearin (Iodine Value 44) and 40% of rapeseed oil, but many other palm oil-based formulae have been successfully used.

Aerated dairy products

Whipped cream

Whole milk contains about 4% of fat which is present as small globules averaging 7-8 microns in diameter. Each globule is enclosed by a coating or membrane of milk protein. Cream is traditionally made by skimming the upper layer from milk that has been allowed to stand. In effect the fatty emulsion phase has been concentrated. In modern practice this concentration is achieved efficiently in a centrifuge is achieved efficiently inn a centrifuge and can be taken to the stage of single cream (18% fat) or double cream (about 42% fat). If the cream is agitated sufficiently the fat globules impact on each other ad stick together. In due course the fatty phase becomes more or less continuous and butter is obtained. If the cream is agitated in such a way that air is incorporated, then it is possible to form a rigid structure containing about 50% by volume of air. The continuous phase which gives the product its stability is the fat that has coalesced during the agitation.

If homogensied cream is agitated in the same way, a whipped cream of similar air content is obtained. Its structure however is somewhat different. During homogenization the individual fat globules are broken down to a size of about 1 micron. The natural coating around the fat globules is ruptured but a similar protein membrane reforms. During the aerating process the small globules cluster together and impart sufficient strength to the air-cell walls to produce a stiff aerated cream. The relatively low melting point of butter, means that the aerated cream has limited stability above 250c in the European summer and in warmer climates.

Imitation cream

Imitation cream are made by homogenizing an emulsion of vegetable fat in skimmed milk with added sugar. Their behaviour in aeration is then very similar to that described for homogensied real cream. By an appropriate selection of the fats used, aerated structures of greater stability than real creams can be produced.

A formula for the fat of particular interest consists of fully hydrogenated palm kernel oil (HPKO) together with palm stearin (Idoine value 19). In this, 66 parts of the HPKO and 34 parts of the palm stearin are chemically interesterified. This process causes mall the fatty acids to change places in a random manner, and alters the melting properties of the mixture. The whipped cream made using this fat was stable at a temperature of 35%C. For even higher ambient temperatures an increase of a few percent of the stearin proportion can be used.

Ice cream

Ice cream is made from an emulsion of fat with milk protein and added sugar. The fat may be butter fat or vegetable oil. A typical formula for ice cream contains 9-10% fat, 10-11% skimmed milk and 16% sugar, 0.5% of minor components, the rest being water. This mix is homogenied so that very small fat globules are formed. This fat content is much lower than in the cream described earlier. The rigid structure of ice cream is dependent partly on the ice formed on freezing and partly on a lining of fat globules round the air cells.

This structure illustrated in Figure 5, an electron micrograph of ice cream. The frozen sample has been cut across and what wee see is one half of an air bubble. It is lit from above, so that the top part is in shadow, the lower part is brightly lit. The surface is smooth, consisting of a layer of liquid oil. The 'bumps' in the surface are small fat globules (A) sitting on the outside of the oil layer. An ice crystal (B) can be seen protruding into the air bubble. The scale is indicated by the one micron bar. The air bubble is about 5 microns in diameter, while fat globules are 0.5 microns or smaller.

From a number of measurements it has been calculated that 1 gm of ice cream contains about 10 million air cells, a similar number of minute ice crystals, but a million fat globules. No wonder it feels smooth on the tongue!

calculated that 1 gm of ice cream contains about 10 million air cells, a similar number of minute ice crystals, but a million fat globules. No wonder it feels smooth on the tongue!

Palm oil and palm oil-palm kernel oil blends are used in vegetable oil ice cream.

KG Berger
Food Technology Consultant, UK

[Source: Global Oils & Fats, Apr., Pg. 50 & 52,2007]

"COUNT THE PRICE"

Economics Of Biofuel

Energy "pundits" guestimate that crude oil production is likely to be past its peak by the year 2050. Availability of alternative fuels and environmental concerns are most likely to impact its future demand. So also, a volatile international situation and/or production cuts by OPEC will impact its market price and affect growth of alternative fuels industry.

The current world consumption of oil is around 84 million bpd and is expected to rise to 116 million bod in the year 2030, even if the demand for crude is "restrained" for extraneous reasons, it is not expected to fall below 84 million bpd. Share of oil in the total energy mix in the year 2030 is expected to be 33% from 35% currently. Oil will, therefore, continue to play an important and dominant role in the economies of developing and poor countries.

Oil prices which hit a record high of USD 78.40/brl last year are likely to rise in the future years. Though, for various reasons, including weakening of global oil consumption in the year 2006 prices are currently hovering between USD 57-62/brl (Prices touched USD 69/brl at the end of the fiscal due to Iran development and then came down to USD 61/brl on easing of tension. The global oil demand is very sensitive to high prices. The benchmark price for crude oil for ethanol to be competitive with petrol is in the region of USD 70/brl. International Energy Agency assumes that crude oil could hit USD 130/brl in the year 2030 if billions of dollars required for exploration and production are not available for whatever reasons. As currently assessed, oil, gas and coal reserves are adequate to meet 4.7 trillion brls of oil equivalent of energy demand expected by the year 2050.

Energy forecasters see a great future role for alternative sources of energy like biofuels ethanol and biodiesel, nuclear, wind, solar power, oil from tar sands and vast global reserves of coal. In the given scenario of increasing energy demand, high prices and environmental concerns, improvements in technology will be the key stimulant to the development of alternative fuels. Although it is expected that the demand would rise to 116 million bpd and prices to USD 130/brl in the year 2030, it is not going to be a smooth journey. There will be shortages and gluts, high and low prices. A variety of factors other than supply and demand will corne into play and determine production and price levels.

Basically, the future of biofuels-both ethanol (petrol) and biodiesel will depend on crude oil prices and innovative technologies for production of biofuels. The current crude oil prices are undercutting production costs of biofuels. Malaysia, top palm oil producer, is

recently on record saying that the most of its 86 approved biodiesel plants were unlikely to come on stream during the next 2/3 years due to price squeeze/ Another factor is input costs. Sugar, corn, grain and palm oil prices are either holding or rising in the short term.

Biofuels craze has created a surplus of ethanol in the USA. America is flush with ethanol. Farmers, riding piggyback on huge subsides and import tariffs are sending corn to proliferating refineries to turn it into ethanol fuel, uneconomic process of conversion notwithstanding. Automakers in the USA have already built millions of cars, trucks and SUVs and are on course to make millions more. By 2012, US car makers have agreed that 50% of their cars will be designed to run on a petrol. ethanol mixture in the ratio of 85:15. The declared US government policy is to cut petrol consumption by 20% in ten years by increasing use of ethanol. A looming biofuels glut and ailing crude oil prices are hurting the biofuel industry but prices of corn and other inputs are spiraling. Such a situation is likely to create social upheavals like in Mexico where the government had to mollify consumers by price control on corn.

The answer lies in development of technology. Making ethanol from corn needs a great deal of energy and, in the end, the energy balance is marginally higher. You "harvest: about one third more energy than yo use. As against this, making ethanol from cane generates energy balance almost eight fold as in Brazil. But the real giant leap forward will be development of revolutionary "Cellulosic ethanol" technology which will convert cane juice as well as bagasse and even giant grass into ethanol. Similarly, biodiesel can be made from edible oils like palm oil and also inedible oils like palm oil and also inedible oils like Jatropha. But in case of edible oils, cost implications would be a major hurdle. SULZER CHEMTECH AG have developed a break through technology to extract value added products from palm oil before recovery of biodiesel from the residual oil. We present an outstanding article. Biodiesel Fuel from Palm Oil. Too Good To Be Used as Fuel?

[Source: Lubricant India, April, Page 10 & 13, 2007]

WHEELING

Biodiesel "Classroom On Wheels" Rolls Out

Fueled by the growing interest in clean, renewable energy sources, a portable pilot plant that will be used as a classroom on wheels to provide hands-om training in biodiesel production was officially opened March 23 by the Canadian International Grains Institute (CIGI) in Winnipeg.

The plant, which is housed in an 8 x 20 ft (2.4 x 6.1 m) trailer, hit the road in April with short courses taking place in Manitoba, Saskatchewan, and Alberta. More courses will follow post-harvest 2007 along with demonstrations at various agricultural fairs and exhibitions.

"we're offering products, rural communities and other interested individuals and industry members a one-of-a-kind learning opportunity," say Dr. Rex Institute (CIGI) Director of Feed and coordinator of the biodiesel course. "No other facilities in Western Canada currently provide biodiesel production training, technical support, and assistance in understanding the value-added used and market potential for the by products such as canola meal and glycerol. The CIGI biodiesel project will significantly increase the amount of information and resources available o producers and researchers alike.

The man who doesn't read good books has no advantage over the man who cannot read them.

While courses held in Western Canada will focus on the use of canola, the potential exists to offer courses in Eastern Canada where the emphasis would be on different oilseed crops such as soybeans.

[Source: Inform AOCS, May, Page 321, 2007]

"NOT SOAPS ONLY"

DHA MayDelay Onset Of Alzheimer's Disease

A type of omega 3 fatty acid may slow the growth of two brain lesions that are hallmarks of Alzheimer's disease, University of Clifornia-Irvine (USA) scientists have discovered. The finding suggest that diets rich in docosahexaenoic acid (DHA) can help prevent the development of Alzheimer's disease later in life.

This study with genetically modified mice is the fist to show that DHA, an omega-d fatty acid, can slow the accumulation of tau, a protein that leads to the development of neurofibrillary tangles. Such tangles are one of two signature brain lesions of Alzheimer's disease. DHA also was found to reduce levels of the protein beta amyloid, which can clump in the brain and form plaques, the other Alzheimer's lesion.

Previous studies have shown that DHA may have therapeutic value for Alzhemier's patients, but this research is among the first to show that it may delay the onset of the disease. DHA is found in fish, eggs, organ meats, micro-algae, fortified foods and food supplements.

"We are greatly excited by these results, which show us that simple changes in diet can positively alter the way the brain works and lead to protection from Alzhemier's disease pathology," said Frank Laferla, professor of neurobiology and behaviour and co-author of the study.

LaFerla and his research team studied the effects of DHA in mice bred to develop the plaques and tangles associated with Alzeimer's disease. Mice in the control group were given food that mimics a typical American diet, with the ratio of omega-6 fatty acids to omega-3 fatty acids being 10:1 Studies indicate that a proper ratio is important to maintain health, with the ideal being 3:1 to 5:1. Typical Western diets contain unhealthy ratios ranging from 10:1 to 30:1. Omega-6 fatty acids are found in corn, peanut, and sunflower oils.

Mice in three test groups were given food with a 1:1 ratio of omega-6 fatty acids to omega-3 fatty acids. one of these groups received supplemental DHA only, and two groups received DHA plus additional omega-6 fatty acids. After three months, mice in all of the test groups had lower levels of beta amyloid and tau than mice in the control group, but at nine months, only mice on the DHA diet had lower levels of both proteins. These results suggest that DHA works better on its own than when paired with omega-6 fatty acids.

[Source: Inform AOCS, May, Page 330, 2007]

HOW ABOUT OURS?"

MODEL COST CALCULATION FOR BIODIESEL PRODUCTION IN EUROPE, SOUTHEAST ASIA, AND THE U. S.

	FAME * EUR/mt	RME EUR/mt	Palm Methyl Ester USD/pmt Ester	Soya Methl USD/pmt
Vegetable oil price ex mill	501.0	560.0	640.0	703.0
Semi-refining cost	20	20		25
Loss (3%) + credit for acid oil sale	5.7	6.3		7.9
Cost of refined vegetable oil ex refinery	526.7	586.3	640.0	735.9
Freight to biodiesel plant	15	15	10	65
Cost of semi-refined vegetable oil DDP biodiesel factory	541.7	601.3	650.0	800.9
Methanol useage (11%) delivered	30.3	30.3	38.0	39.6
crude glycerine credit 10% at 100% concentration ex factory	-11.3	-11.3	-16.9	-10.0
Material cost of biodiesel ex works	560.7	620.3	671.1	830.5
Variable production costs	50	50	50	65
Out of pocket cost of biodiesel ex works	610.7	670.3	721.1	895.5
Biodiesel price ex works pmt	645.5	685.2	730.0	910.0
Fixed cost contribution/margin of biodiesel production	34.8	14.9	8.9	14.5

Harmonization Of Biodiesel Standards

On May 18, 2007, representatives from the American National Standards Institute (ANSI), the National Institute of Standards and Technology (NIST), and ASTM met to discuss a "road map" for harmonizing biodisel standards for a global market-that was proposed initially in April by ANSI and NIST. First the United States, Brazil, and te European Union will establish biodiesel Working Groups composed of technical experts from both the private and public sectors. These Working Groups will be charged with the following.

1. Identify areas within existing standards where greater compatibility can be achieved in the short and long term.

2. Identify the need for additional performance data and testing that may be required to justify differences or changes in specifications.

3. Review consistency of test methods to ensure compatibility of results.

4. Analyze costs and benefits of modifying existing standards.

5. Make recommendations to develop consistent terminology.

Technical experts from the ASTM Committee DO2 (Petroleum Products and Lubricants) Subcommittee E are taking the lead in accomplishing points 1 and 2 for the United States, and the Brazilin and European governments are engaging their technical experts through (CEN (Comite Europeen do Normalisation) and ABNT (Associaca Brasileira de Normas Technical) committees, respectively. The ASTM experts are collecting standards they have already developed or are developing for biodiesel, as well as the related regulation, and identifying the possibilities for aligning the various standards.

[Source: Inform, Page 433 & 434, July 2007]

"BEWARE"

Specification for Biodiesel (B100) - ASTM D6751-07a			
Property	ASTM Method	Limits	Units
Calcium & Mangensium, combined	EN 14538	5 max.	Ppm (ug/g)
Flash Point (closed cup)	D 93		93 min.Degrees C
Alcohol Control			
(one of the following must be met)			
1. Methanol Content	EN 14110	0.2 Max.	%volume
2. Flash Point	D 93	130 Min.	Degrees C
Water & Sediment	D 2709	0.05 max.	% vol.
Kinematic Viscosity, 40 C	D 445	1.9-6.0	mm^2/sec.
Sulfated Ash	D 874	0.02 max.	% mass
Sulfur			
S 15 Grade	D 5453	0.0015 max. (15)	% mass (ppm)
S 500 Grade	D 5453	0.0015 max. (500)	% mass (ppm)
Copper Stril Corrosion	D 130	No.3 max.	
Cetane	D 613	47 min.	
Cloud Point	D 2500	Report	Degrees C
Carbon Residue 100% sample	D 4530*	0.05 max.	mg KOH/g
Acid Number	D 664	0.50 max.	mg KOH/g
Free Glycerin	D6584	0.020 max.	%mass
Total Glycerin	D 6584	0.240 max.	% mass
Phosphorus Content	D 4951	0.001 max.	% mass
Distillation, T 90 AET	D 1160	360 max.	Degrees C
Sodium/Potassium, combined	En 14538	5 max.	ppm
Oxidation Stability	En 14112	3 min	hours
Workmanship	Free of undissolved water, sediment, & suspended matter		

REALLY

Next Generation Crop's Herbicide Resistance

Ongoing research has resulted in the possible development of the next generation of GM crops carrying the trait for dicamba herbicide resistance. Such products could offer farmers an alternative for crop cultivation in areas where glyphosate-resistant weeds, such as giant ragweed (Ambrosia trifida), have become a problem.

Some 90% of soybean crops in the United States and 60% of its cotton have been engineered to resist the herbicide glyphosate, but, as certain critics propheszied, glyphosate-resistant weeds have appeared and are on the rise, particularly on land that is not tilled. Consequently, there is a need for alternative herbicide-resistance in crops, Dicamba (3,6-dichloro-2 methoxybenzoic acid)is an established common herbicide used primarily for controlling broadleaf weeds in grass (including corn) crops and pastures, and has found wide application. If functions as a plant growth regulator by upsetting the normal hormonal balance and so causing abnormal growth, resulting in death. Dicamba has the advantage that is survives only a few months in soil, being rapidly destroyed by microbial degradation.

Researchers at the University of Nebraska at Lincoln, USA, have reported the isolation of a gene from Pseudomonas maltophilia, tomatoes, and mouse-ear

cress (Arabidopsis thaliana) confers resistance to dicamba. Details of the research were published in the May 25 issue of Science (316:1185-1188, 2007).
The dicamba technology has already been licensed to Monsanto Co. and is expected to be available in GM crops within possibly three years, subject to approval from the USDA, EPA, and the FDA, Soybeans and cotton are the primary crops for application of this technology.

This dicamba resistance technology is considered to be a useful expansion of current herbicide resistance technologies and should extend their effective lifetime. It is expected that Monsan to will stack the dicamba resistance trait with its Roundup Ready resistance, allowing versatility in herbicide applications.

[Source: Inform, Page 454 & 455, July 2207]

"GET GOING"

Biofuel Production Effects

In a conference at the University of illinois Urbana-Champaign (UIUC) (USA) on May 23 and 24, twelve speakers considered the impact of using soybeans and corn for fuel production on (i) the livestock and poultry industries, (ii) the sustain ability of agricultural efforts to produce food and fuel, and (iii) the use of by-products from fuel production as feed in the livestock industry.

Darryl Brinkmann, chairman of the National Biodiesel Board (Jefferson City, Missouri, USA), indicated that sales of biodiesel in the United States, primarily in the form of low-level biodiesel blends, will replace 5% of the diesel demand by 2015. Sustain ability of the industry will depend on the price of petroleum diesel, supplies o feedstock (soybeans in the middle of the country, palm oil along the Atlantic and Pacific coasts), federal legislation in the form of tax credits, and consumers confidence.

Similar considerations pertain to bioethanol, according to Vernon R. Eid-man, an economist from the University of Minnesota. Implications of increased ethanol production include a switch in 2007 to corn from acres ordinarily planted in soybeans, cotton, rice, and minor amounts from pasture and hay. Subsequent years may see additional acres being withdrawn from wheat and CRP (Conservation Reserve Program) to be planted in corn. One concern is whether average corn yield per acre can continue to increase. Another is increased price volatility as carryover amounts of corn and soybeans decrease, and a third is the environmental impacts of increased corn production. Eidman estimates that the food vs. fuel conflict will be tamped down once ethanol derived from cellulose becomes available, but he considers this will not happen before 2015.

A disquieting presentation came from Kenneth Cassman, director of the Nebraska Center for Energy Sciences Research at the University of Nebraska-Linocln. A subtitle of his talk might have been, "the biofuel revolution no one predicted." On the plus side, he views the biofuel boom as the most exciting opportunity for agriculture since World War ll; this boom is happening globally, for example in Brazil, Indonesia/Malaysia, Europe, and Canada.

There may be "Biofuel Busters," however, including high consumer food prices due to insufficient grain and oilseed crops for both food, feed, and biofuel; reduced water quality resulting from increased fertilizer rates; net increases in greenhouse gas emissions; expansion of cropping to marginal land, resulting in increased erosion and habitat degradation; and expansion of cropping into fragile lands in other countries.

On the basis of the National Corn Growers Association's production goal of 15 billion gallons of corn-ethanol in the United States by 2015, Cassman calculates that the rate of gain in corn yield which has been increasing linearly since 2965 - plus expansion in area planted to corn and genetic improvement in grain short-ages.

Cassman characterized ways to accelerate yields and protect the environment as Ecological Intensification: (i) customized controlled release fertilizers; (ii) increased water use efficiency in irrigated systems; (iii) management techniques that are site-specific and keyed to soil characteristics; (iv) management techniques that can respond to in-season changes, such as needs for nitrogen fertilizer, insect and disease control, irrigation scheduling, and the like; use of improved hybrids and cultivars.

Two take-home thoughts were: If there is a measurable increase in environmental degradation as a result of intense corn production, public support and favorable tax incentives for biofuels will disappears. And, the amount of water needed to irrigate all of this corn plus the amount needed to produce ethanol (about 3 gal of

water per gal of ethanol (must be matched by new development in water resources.

Darrel Good, professor and Cooperative Extension economist at UIUC, considered corn and soybean acreages and prices from an historical viewpoint in both the United States and the world and the projected them through 2010. In considering the relation of corn to soybean prices, he said soybean prices will have to be high enough to encourage expansion of plantings in South America; he estimates this would be reached when soybeans are $8poer bushel. Similarly, corn prices will have to be high enough relative to soybeans to encourage increased plantings, or $4/bushel.

Good compared actual annual corn yields with predicted yields (e.g., USDA data on predicted plantings) since 1960. In one year out of five, actual yields were 20% less than predicted, and in one year out of 12, shortfalls were 20%. These observations have serious consequences when calculating the amount of corn in reserve, especially with respect to corn bioethanol. In a closing remark, Good said,
"At the margin, genetics will buffer the effects [on yields]", but weather trumps all.
"We cannot compensate completely for lack of rain."

Another potential oil source for biodiesel

Although Camelina sativa (false flax; gold of pleasure) seeds were crushed to produce lamp oil as far back as Neolithic times, cultivation of this mustard family member started to decline in medieval times. It has been grown in small amounts in recent years for use mostly as an emollient in skin and hair care products.

Now researchers are indicating that camelina, planted on millions of acres of marginal farmland in the United States from eastern Washington state to North dakota, could be an important source of oil for making biodiesel.

Targeted Growth, a Seattle, Washington, USA, biotechnology firm has been working to increase camelina oil yields significantly. The seeds contain more than 40$ oil, and their fatty acid composition is similar to flaxseed oil, with a high content (38%) of linolenic acid, an omega-3 fatty acid.

The plant reportedly can grow in more arid conditions than other major oil-producing crops; does not require extensive use of fertilizers, herbicides, and pesticides; and can produce more oil than canola, by some estimates for half the price. Unlike oilseed rape, the seedpods are much more resistant to shattering, thus making the crop less weather dependent.

[Source: Inform, Page 385 & 386, June 2007]

"HOW CAN WE TOO BETTER THIS"

Patent

Published Patents

Enzymatic modification of lecithin

Schmitt, H. and Heirman, M. Cargill, Inc., Wayzata, Minnesota, USA, 3/13/2007, Us7189544

The disclosure pertains to enzymatic modification of lecithin and to hydrolyzed lecithin products obtained by such modification. One particular implementation provides methods fro producing a hydrolyzed lecithin product containing hydrolyzed phospholipids, monoglycerides, and diglycerides. For example, such a method may include the steps of: (a) contacting a lecithin material, which includes a phospholipid component and a triglyceride component, in an aqueous or organic solvent medium, with a first enzyme effective to hydrolyze the phospolipid and (b) subsequently contacting the product of step (a) with a second enzyme, effective to hydrolyze the triglyceride under reaction conditions effective to inhibit esterification of the hydrolyzed phospholipid with released fatty acids.

[Source: Inform AOCS, Page 513, July 2007]

Don't Be Critical

Supercritical Fluid Extraction By Co_2

Supercritical fluid extraction using CO2 is fast gaining popularity as a technology for rapid and contamination free extraction in the food and pharmaceutical industries. Chemtron Scince Lab Pvt. Ltd offers complete system for supercritical CO2 extraction.

The system consists of CO2 pump up to 400kg/cm2 pressure, extraction pressure vessels, pressure regulators, efrigeration unit for CO2, gas, gas cylinders, etc. The extraction vessel is made of SS 304 with pressure rating uo to 700 kg/cm2. The volume of

the pressure vessel can be selected from 250 ml to 10 ltr, Higher volume extraction vessels can also be manufactured as per customer's requirement.

The technique has huge potential for extracting flavours and active material fragrances from biomaterialsIt is specifically used in the extraction of herbal medicines; spice aroma or flavour (essential oil/essence) of red chilly, paprika, ginger, nutmeg, black pepper vanilla, cardamom, fennel, coriander, garlic, cinnamon, etc.

The technology can also be used for decaffeinating coffee & tea, stabilization of fruit juices and decholesterolisation of egg yolk & animal tissues, among others.

[Source: Moderm Food Pro., Page 24, July 2007]

"THE TRICKS"

Optimising Biodiesel Production

With the rapid growth of the biodiesel production market, new plants will have to operate at near 100% plant utilisation, which will demand the utmost in quality control. Dr Mike Simpson of ABB Analytical writes on the target analytical properties in biodiesel production.

The most remarkable feature of the biodiesel production market is its rapid growth, probably unequalled anywhere else in the chemical sector. This is driven largely by increasingly detailed political directives to achieve biodiesel substitution in petrol-diesel fuel blends. Unlike petrol-diesel, the burning of which release ancient stored carbon as CO2, biodiesel use release only that carbon trapped during the recent photosynthesis of the biomass. It is therefore possible to claim that it is effectively carbon-neutral, and offers the quickest route to achieve overall transport fuel carboun emission reduction on the scale being fixed into the economic and political agenda

Biodiesel prodiction capacity has quadrupled between 2001 and 2005 and the current plant build rate implies at least a further doubling from 2006 to 2008. For year end 2008, EU capacity will be 10M tonnes/year and Southeast Asian capacity anywhere in the range of 5M-15M tonnes/year (the typical plant size), this implies 300-500 plants by the end of 2008. Thus, 1000 plants by 2012 is a conservative estimate.

The standard analytical methods are slow (requiring hours or days) and often require multiple physical analyses per sample. FTIR offers rapid multi-property analysis. There is a high probability of an upcoming capacity constraint in the biodesel production industry, due to the mismatch between planned plant investment (already high) and stated political objectives for exchange of petrol-diesel with biodiesel.

A key factor in the industry will be near 100% plant utilisation. This will push quality constraints very hard.

Biodiesel production process

The base biodiesel process is the conversion of raw vegetable oils (triglycerides) to their fatty acid methyl esters through a process called transesterification. This can be a batch, continuous or semicontinuous process Transesterification is based on the chemical reaction of triglycerides with methanol to form methyl esters and glycerine in the presence of an alkaline catalyst. This reaction is carried out in a two-stage mixer-setter unit

Transesterification takes place in the mixing section, while the subsequent settling section allows for the separation of methyl esters. A subsequent counter-current washing/neutralisation step for the methyl ester removes minute by-product components and produces a biodiesel 'ready for use' after the final drying step.

The surplus methanol contained in the glycerine water is removed in a rectification column which yields methanol in a condition and purity ready for use as a recycle stream to the process. For further glycerine water purification, additional steps of chemical treatment, evaporation, distillation and bleaching may follow optionally.

The biodiesel production process gives a very high yield, with 1kg of vegetable oil generating 1 kg of biodiesel, with consumption of approximately 10% of that quantity of methanol to yield glycerol.

ABB FTIR application

The target analytical properties for biodiesel production monitoring, end-point determination and final product quality qualification are percentages of methyl ester; residual methanol; free glycerol; moisture; and by-product mono-, di- and triglyceride

Viscosity	3.5-5.0 mm2/s
Flash Point	120°c
Cetane Number	>51
Water	<500 ppm
Acid Number	<0.50 mgKOH/g
Iodine Value	<120 gl2/100g
Methanol	<0.2% mol%
Monoglyceride	<0.8% mol%
Diglyceride	<0.2% mol%
Trilyceride	<0.2% mol%
Free Glycerol	<0.02% mol%

In addition, bulk oil and fuel properties such as viscosity, acid number, flash point and cetane number are specified in the relevant ASTM and EN norms, particularly for final product quality control.

All these analyses can be performed using Fourier Transformed Near Infrared (FT-NIR) lab or on-line methods.

The benefits of using rapid near real-time analytical methods to streamline biodiesel production lie in avoiding the need for routine, slow and expensive wet-chemical or chromatographic methods which, while suitable and necessary for final product quality assay against standard methods, are unsuitable when pressed into service for at-line process monitoring, end-point determination and rapid quality screening.

Process monitoring:

- Gives oil feedstock quality characterization
- Tracks progress of transesterification and monitors by-products
- Pinpoints the endpoints for improved production yields
- Assesses product quality prior to decanting or blending

Product Verification

- Prevents product cross-contamination during line transfers
- Screens the final product prior to the full EN/ASTM quality assay
- Verifies product quality before rundown to tankage

Blending Control:

- Allows feedstock and B100 product validation
- Measures the pre-assay blend
- Measures the FAME% in diesel blends
- Covers point-of-use blending

FT-NIR is a rapid sampling method capable of screening biodiesel production samples, final product and blended biodiesel samples for key quality variables and process monitoring parameters.

The biodiesel production process is a complex catalytic dynamic equilibrium process, with no guaranteed end-point. The use of an at-line monitoring tool such as FT-NIR avoids the need for expensive, slow, and frequently off-site wet-chemical quality screening measurement for production process monitoring, thereby improving the reliability and throughput of both batch and continuous biodiesel transesterification reactors.

[Source: Oil & Fats Intn..., Page 35, July 2007]

THE ALOE VERA MIRACLE

Aloe Vera - Therapeutic and food applications

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Aloe, a popular plant, has been used for traditional medicinal purpose. The plant has gained popularity over the last several decades for its medicinal and nutritional properties. Present market is flooded with lot of medicinal and cosmetic products containing aloe extract nas a functional ingredient. In food sector aloe has been utilized as a functional ingredient, especially in the development of health food drinks ad other beverages. health benefits of aloe include its application in wound healing, treating, burns minimizing frostbite damage, protection against problems, reducing blood sugar in diabetes etc. Photochemistry of aloe include its application in wound healing, treating, burns, skin damage from x-rays, lung cancer, intestinal problems, reducing blood sugar in diabetes etc. Photochemistry of aloe vera gel (AG) have revealed the presence of more than 200 active substances including vitamins, minerals, enzymes, sugars, saponins, sterols, amino acids and salicylic acid. Aloe gel is extracted from leaves, but appropriate processing conditions have to be maintained during extraction as well as preparation of the products. Although, India is rich in aloe production, its industrial exploitation has been very limited. regulatory bodies

also need to look into the safety and toxicological issues relating to aloe before its large scale exploitation as food supplements.

Introduction

Aloe has been used for its medicinal value for several thousand of years. It has been recorded to be used in many ancient cultures; from Egypt, greece, Rome to China and India. In biblical times the Egyptians hailed Aloe vera as the plant of immortality, the Chinese called it their elixir of youth. The plant has many common names and is often referred to as Aloe vera, burn plant, first aid plant or medicine pant. Its name is most likely derived from the Arabic word 'Alloeh' meaning 'shining bitter substance' Aloes, thought to have originated in tropical Africa, are now being cultivated in warm climatic areas of Asia, Europe and America as well. Aloe has been extensively grown in the Caribbean islands as well as Mexico since the early 1800s. In US, it is cultivated commercially in the Rai Grande valley of Texas, Southern California and Florida.

For centuries, this plant has been used for its medicinal and therapeutic properties. It has a history of use in folk medicine for treating skin and other disorders. In the food industry, it is being used as a ingredient for functional foods, mainly in the development of health drinks and beverages like tea, etc. Other applications of aloe include in healing of wounds and burns, minimizing frostbite damage, protection of skin damage from x-rays, lung cancer, intestinal problems, reducing blood sugar in diabetes etc. A recent market analysis will spend almost $40 billion, up 38% from 2003, on functional foods, drinks and supplements for the improvement of their appearance, as well as health issues such as hypercholesterolemia and diabetes. Aloe products would be among the Aloe industry is flourishing and the gel is being used in many products, such as fresh gel, juice and other formulations for health, medical and cosmetic purpose. But the expanding aloe industry urgently needs a way to regulate itself by developing test procedures and a reliable database so that a product claims to be tested, verified and certified. This certification procedures reduce fraudulent claims, and also build consumers confidence in Aloe products.

Physical appearance

Aloe vera is a spiky cactus-like, xerophytic plant, It is not a cactus but a member of lily family, It has now been designated as its own family, known as Aloaceae. It is a clump forming, perennial plant with thick fibrous root which produces large basal leaves, usually 12-16 per plant, weighing up to three pounds when mature. The plant matures when it is about 4 years old and has a life span of about 12 years. The leaves are thick, succulent, one to two feet long, two to three feet wide and gradually tapering to a point. They are whitish green on both sides and bear spiny teeth on the margins. A transverse section of the leaf shows a slightly concave appearance on the adazial surface, whereas the lower abaxial surface is distinctly concave. The leaves are covered with thick cuticle, beneath which epidermis and mesophyll are present. As the rosettes mature, successive leaves have fewer whitish spots and fully mature leaves are spotless grey-greenish in colour. The plant can be harvested every 6 to 8 weeks by removing 3 to 4 leaves per plant. Red, yellow, purple or pale striped flowers are present most of the year; growing in a long raceme at the top of the flower stalk which originates from the center of the basal leaves. The flower stalk grows up to four and a half feet in height. The fruit is a triangular capsule containing numerous seeds.

There are over 250 species of Aloe grown around the world. However, only two species are grown today commercially with A. barbadensis Miller and A. aborescens, being the most potent ones. There are at least two other species that ave medicinal properties, A. perryi Baker and A. ferox. Most Aloe plants are non toxic, but a few are extremely poisonous containing a hemlock like substance (Atherton, 1998). A variegate is a dwarf species which is only a few centimeters in diameter and is a popular house plant. Mesophyll is differentiated into chorenchyma cells and thin walled parenchyma cells which contains the transparent mucilaginous jeely. The vascular bundle contains the yellow sap having laxative properties. Aloe vera has two major liquids present in it, yellow latex (exudates) and a clear gel (mucilage). Thus, there are three portions of Aloe vera leaves, yellow sap containing mainly anthraquinones, internal gel matrix or the fillet and the rind which consists of outer rinds, tips, bases and thorns.

Phytochemistry

The investigations on the photochemistry of A. vera gel have revealed the presence of more than 200 substances that work together to provide energy to the

body, so that it can defend itself. The Aloe plant, being a cactus like, contains about 99 to 99.5 percent water with pH in the range of 4.4 to 4.7. The remaining solid material contains over 45 different ingredients including vitamins, minerals, enzymes, sugars, anthraquinones or phenolic compounds, lignin, saponins, sterols amino acids and salicylic acid (Table 1)

Table 1
Chemical/Nutrient composition of Aloe vera

Chemical Composition	***Nutrient Composition***
Aloe emodin	Aloesin
Amino acids	Chloride
Anthraquinones	Chromium
Arabinose	Magnesium
Antibiotic principles	Manganese
Barbaloin	Vitamin B-3
Carbohydrates	Folic acid
Galactose	Vitamin B-12
Gluco-mannam	Zinc
Gum	B complex
Vitamins	
Lignin	
Proteolytic enzymes	
Rhein	
Polysaccharides	
Saponins	
Wound healing hormones	
Cathartic anthraglycosides	
Xylose	
Steroids	

The total solid content of Aloe gel is 0.66% and soluble solids are 0.56% with some seasonal fluctuation. The protein content as determined by kjeldhal method indicates a level that corresponds to about 0.013% in commercial Aloe gel products.

The plant contains many vitamins excluding vitamin D but including the important antioxidant vitamins A, C, and E. Vitamin B (thiamine), niacin, vitamin B2m (riboflavin), choline and folic acid are also present. Some authorities also suggest the presence of vitamin b12 (cynocobalamin) in trace amount which is normally only available from an animal source (Coats, 1979 and Atherton, 1998).

Sugar are derived from mucilage layer of the plant under the rind, surrounding the inner parenchyma or gel. They constitutes 25 percent of the solid fraction and comprise both mono and polysaccharides. The most important are the long chain polysaccharides, comprising glucose and mannoose, known as the glucommannans [b (1,4) galactose and arabinose or fucose are also present in trace amounts along with lupeol (a triterpenoid), Structural studies on A, ver gel polysaccharides have shown that the gel was composed of at least four different partially acetylated glucomannans, being linear polymers with no branching and having 1-4 glycosidic linkages with glucose and mannose in the ratio of 1:2.8. The viscosity of gel was reduced upon hydrolysis of these sugars. When taken orally, some of these bind to receptor sites that line the gut and form a barrier, possibly helping to prevent 'leaky gut syndrome.'

Other reports exist stating the presence of glucose and a polyuronide consisting of a high molecular weight glucose mannose polyose (MW up to about 2.75 x 10 5) and hexuronic acid, along with traces of galactose, arabinose and xylose (Gjestad, 1971). Hexuronic acid yields glucose and mannose upon hydrolysis. However, Ovadova, et. al., (1975) reported the presence of uronic acid, which gives glacturonic acid and oligosaccharides upon fermentative hydrolysis.

Meadows (1980) reported that at least six enzymes were present in the A. vera gel, including bradkinase, cellulase, carboxypeptidase, catalase, amylase and an oxidase. One important enzyme, a carboxypeptidase, inactivates bradkinase and produces an anti-inflammatory effect. During the inflammatory process, bradkinase produces pain associated with vasodilation and therefore, its hydrolysis reduces these two components and produces an analgesic effect (Shelton, 1991). The gel also contains glutathione peroxidase as well as several isozymes of superoxide dismutase.

Wang and Tung (1993) studied the mineral composition of Aloe vera juice and reported that potassium and chloride concentrations appeared to be excessive for most plant products, whereas the sodium content was less than average. Calcium and magnesium were also found along with manganese, copper, zinc, chromium and iron. Magnesium lactate inhibits histidine decar-boxylase and prevents the formation of histamine from the amino acid histidine (Shelton, 1991). Histamine is released in many allergic reactions and causes intense itching and pain. The prevention of its formation may explain the antipyretic effect of Aloe vera.

Anthraquinones are the phenolic compounds presents in the sap. Aloe latex contains a series of glycosides known as anthrquinones, the most prominent being Aloe in A and B (Tyler, 1994). The better Aloes consist of free anthraquinones and their derivatives i. e. barbaloin -IO (1151-anhydroglucosyl)-aloe-emodin-9-anthrone, isobarbaloin, anthrone-c-gycosides and chromones (Fig 1-5). These compounds exert a powerful purgative effect in large amounts, but when low in concentration, they appear to aid absorption from the gut and are potent antimicrobial (Sims et. al., 1971) and powerful analgesic agents. Isolation and structure determination of these chromones from the Aloe leaves were also studied and these compounds were identified to be 8-c-glycosyl-7-o-methyl1(s)-aloesol, isoaloeresin D and aloeresin E.

Recently a glycoprotein with antiallergic properties, called alprogen was isolated from Aloe gel. In addition, a novel anti-inflammatory compound, C-gycosyl chromone, has also been isolated from Aloe gel (Hutter and Salman, 1996). Saponins are the soapy substances, form 3 percent of the gel and are general cleansers, having antiseptic properties (Hirat and Suga, 9183). The sterols include compesterol, b-sitosterol and lupeol (Coats, 1979), whereas salicylic acid is a aspirin anti-bacterial properties. About 20 out of 22 necessary amino acids and seven of the eight essential amino acids required by human body are also present in Aloe gel.

Aloe was evaluated for antioxidant potential and the study showed significant presence of antioxidant in aloe extracts. The 3 year old plant extract exhibited the strongest radical scavenging activity of 72.19%, which is significantly higher than that of BHT at 70.52% and alpha-tocopherol at 65.65%. It is suggested that growth stage plays a vital role in the composition and antioxidant activity (Yun et al., 2003).

[Source: Indian Food Ind., Page 43 to 46, May 2007]

INTRIGUING

Zero Budget Farming

During your next vacation please spend sometime in a Jungle, preferably below a Mango Tree, Tamarind Tree or a Jamun Tree. For thousands of years there is no cultivation, there is no plouging, there is no usage of ammonia, urea or N.P.K. or other fertilizers, no spraying of pesticides in these Forests. In spite of all these you have a dense, good forest and the fruits bearing trees give excellent quality of fruits (Mangos, Jamuns, and Tamarid etc) in abundant quantity in Forest. How has it become possible? The answer is: “ALMIGHTY GOD IS THE SUPER FARMER” and has ensured sustained availability of all nutrients for the crop growth during all seasons! If this is the case why are we using chemical fertilizers and pesticides in our farming?

Mr. Subhash Palekar, Amravati, Maharastra (Mobile no. 09423702877) is a very renowned and highly respected Agricultural Scientist. He has done research for over 10 years and come out with the following findings:

1. For the plant growth, crop development, the nutrients required are carbon, oxygen, hydrogen, nitrogen, potassium and other minerals.

2. Of the above nutrients the major requirement of 98% is that of carbon, oxygen and hydrogen. The balance 2% constituent is nitrogen, phosphorus and other minerals.

3. Micro organisms and earthworm in the soil assist in covering the nutrients available in the soil into a form that can be absorbed by the roots of the tree/plant and through photo synthesis produces carbohydrates and release oxygen in to atmosphere as per the following equations:

$$6Co2 + 12H2o \xrightarrow[\text{Chlorophyll}]{\text{Solar Energy}} C6H12O6 + 6H2O + 602$$

Carbon dioxide + water
Carbohydrate + water + Oxygen

4. Mother Earth is essentially Annapurna and contains all the nutrients required for plant/crop development in abundant quantities, but they are not in the form fit for absorption by the roots of the plant.

5. Birds dropping, the animal droppings and urination, the decade leaves, branches and fruits produce micro organisms and earth worms. These micro organisms multiply and assist in production of earthworm as well as conversion of micro nutrients in Mother Earth in required form for absorption by trees and plants.

6. Indian breed of cow's cow dung and urine mix contains trillions and trillions of bacteria and micro organisms and they facilitate conversion of available micro nutrients in Mother earth and make it available to plants in required form

7. From Akash (space) the required quantity of carbon dioxide and nitrogen is available.

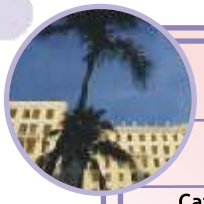
8. Solar energy is also freely available to all plants and hence only things externally to be supplied to the plant by the farmer are water, Goumaya (cow dung) and Goumutra (Cow urine)

The farmer should possess at least 2 cows (Goumatas) and a Bull (Nandi) and look after them properly to ensure adequate supply of cow dung and cow urine. Two Goumatas and one Nandi will produce enough goumaya and goumutra for a very good cultivation of 30-acre land. Dear Farmer, Ammonia, Urea, N.P.K. and other fertilizers are not required. They may give you good result only for 1 to 5 years but they will destroy the earthworm and microorganisms from the soil and make the soil barren.

So awake before it is too late. Protect, preserve and propagate Indian breed of Cows, adopt Zero Budget Farming by utilizing Gods freely given Carbon dioxide, water, sunlight. Air, abundant nutrients in Mother Earth together with Goumuthra and Goumaya, a free supply by Gowmatha

Contributed by, **Mr. M.K. Janardan**

Managing Director,
Japro, Mumbai



Hotel Information

Hotel	Travel time by coach to Kala Academy	Hotel Rates (INR) per room / per night	
		Single	Double
Category "A"			
Marriott			
Garden View Room	10 mins	8250	8800
Bay View Room		9800	10350
Hotel Cidade de Goa	15 mins	7250	7900
Category "B"			
Vainguinim Valley Resort	15 mins	4700	4700
Hotel Mandovi	10 mins	3850	3850
Hotel Fidalgo	12 mins	4750	4750
Taj Ginger	15 mins	3300	3300
Category "C"			
Hotel Swim Sea Resort	20mins	1850	1850
International Centre	20 mins	1850	1850

Inclusions:

- Accommodation in centrally air-conditioned rooms with Television and cable Network.
- Telephone in all rooms.
- Buffet Breakfast on next day of arrival.
- To and fro airport transfers.
- Service charges and all currently applicable government taxes inclusive.
- Any change in the tax, if levied by the Government will be charged as applicable.

For hotel reservation and cancellation policy please visit our website : www.rsdc-otai.org

Participants who wish to pay hotel charges by cheque can issue the same in favour of "Otai 2008 Conference a/c."