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NEWS LETTER

OIL TECHNOLOGISTS' ASSOCIATION OF INDIA
WESTERN ZONE

Inside This Issue

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

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OIL TECHNOLOGISTS' ASSOCIATION OF INDIA WESTERN ZONE

From the Editors's Desk

Happy New Year 2012

It was a spectacular event at the Nehru Centre, Mumbai. Speakers were at their best in presenting their subjects eliciting appreciation and applause from the audience. To cap it, the dance ballet on the theme of Meera, the devotee who surrendered to her Divine Lord Krishna made the audience glue to their Seats in the central auditorium. Kudos to the dancers. The next couple of days saw the organisers bending their energies to ensure an immaculate presentation of the national and international speakers with the District Collector setting the pace. Many new sustainable ideas were thrown in the ring and had many a taker pick them up. The subjects chosen had to cover home care products. The effort of all the top honchos received rave applause. They deserved it in full.

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Corporate Responsibility: Sustainability of Vegetable Oil Industry.

Dr. K T Achaya Memorial Award Lecture
By
Dr.B.R. Gaikwad
Director & President –Special projects
VVF LTD, Mumbai -400 022

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Ladies and Gentlemen,

Good Morning to all of you!

It is a pleasure to be here with so many familiar faces in the audience and a pratlege to deliver Dr K.T. Achaya memorial Award lecture in the 66th Annual convention of OTAI and International seminar on Innovations in Oils, Fats and Allied Products towards sustainability. I very much thank IICT-Hyderabad & OTAI-South Zone for giving me this honour. Late Dr K.T. Achaya is known to all of us as a doyen of Lipid Chemistry in India. Today, I feel proud that as his "Grand Student" (as my PhD guide, Prof V.V.R Subrahmanyam was his Ph.D student) I got this opportunity to talk at this institute, in which he established the school of Lipid Chemistry and Technology.

I compliment IICT & OTAI-South Zone for creating an endowment in the name of Dr K.T. Achaya for conducting scientific activities related to the field Lipid Science and Technology.

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Applications of Oils

- Food
- Oleochemicals
- Biofuels
- Other

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Today I was requested to talk on "**Corporate Responsibility: Sustainability of Vegetable Oil Industry**" Sustainability is one of the biggest challenge that we have to address in years to come. It is in every field! Every application! And it is confronting many Companies. But, I am confident, that we all together can make a difference; we can change things for better and make an impact on the future while still creating economic value.

The precondition: partnering along the entire value chain for innovative, sustainable production and consumption.
When we are talking sustainability of Vegetable Oil Industry, we need to understand the value chain starting from Oil Seed cultivation /Oil Plantations till the oil is processed for its end application. Therefore, I will take you through various slides giving my views on this subject.

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Global Oil Disappearance

Food Biofuels Chemicals Other

	MMT
Food	126.6
Biofuels	20.5
Biochemicals	17.1
Other	6.8

Global Demand In Food Segment is Strong , China and India Together Itself Needing Incremental 2 MMT Per Year.

Source OAI world

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Vegetable Oil Industry

- Global Oil Scenario
- Indian Oil Scenario
- Way for Sustainability

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Vegetable Oil Industry

- Global Oil Scenario
- **Indian Oil Scenario**
- Way for Sustainability

Global Oil Scenario

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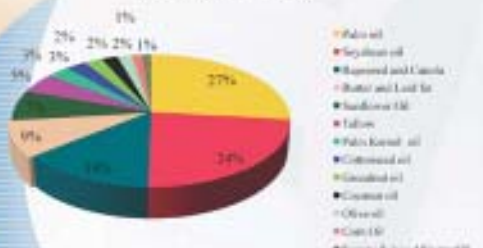
Global Oil Production



World Production Of Oil is 171 MMT

Source Industry sources

Indian Oilseed & Oil Production Scenario

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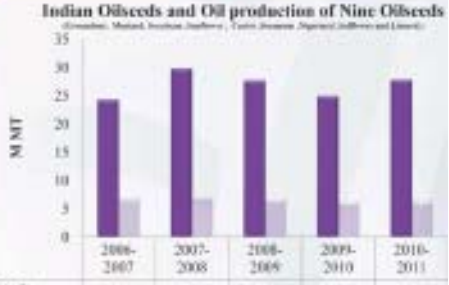
Indian Oilseeds and Oil production of Nine Oilseeds



	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Oilseeds production(MMT)	24.29	29.76	27.72	24.93	27.8
oil production(MMT)	6.9	7.15	6.7	6.26	6.4

Average Yield of Oil from Oilseeds is 25% , still 8-9% Remains in Oil Cake

Indian Vegetable Oil Demand and Supply

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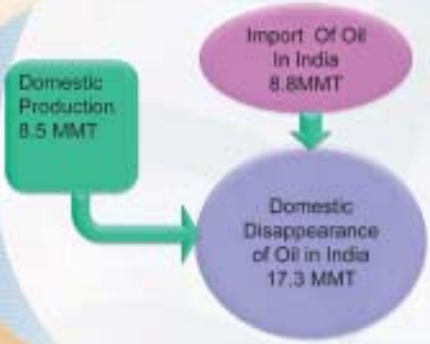

Source SEA

Indian Identity in Vegetable Oil

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Indian Vegetable Oil Economy

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- India Fifth largest Vegetable Oil Economy in World After USA, China , Brazil and Argentina.
- Oilseed contributes 1.8 % of GDP and 8% of value of all Agricultural Products
- Indian Vegetable Oil Market is estimated to be of $ 22 Billion (Rs 110000 Cr)
- 50%-52% of domestic demand is fulfilled by Indian Production &balance is Imported from rest of the World.
- Almost 75% of the imports are of Palm oil from South East Asia

Mustard Oil

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- India produces 4-7 MMT of Seeds and 1.5-2.0 MMT of Mustard oil
- Indian Mustard / Rapeseed is High in Erucic Acid (HEAR) unlike western countries which grows only zero Erucic Acid containing ("00") varieties used for edible purpose
- India does not export Seeds and Oil, however Meal is exported.
- Rapeseed & Mustard is a Rabi Crop (Oct to Mar)
- Crop is highly weather dependent
- The major growing states are Rajasthan (40%), Uttar Pradesh (16%), Haryana/Punjab (15%)
- The oil content of the seeds varies between 36-42%,
- Average oil recovery of 30-35%.
- India Exports around 4 lakh MTs of Meal.

Indian Vegetable Oil Economy

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Mustard Oil

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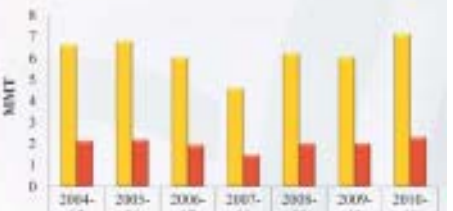
Mustard Seeds and Oil Production In India



	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
oil seeds	6.6	6.77	6.02	4.59	6.2	6.03	7.1
oil production	2.1	2.2	1.8	1.5	2	2	2.29

Oil recovery From Mustard Seeds is 30-35%

Castor oil

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- India Is the largest producer of Castor Seeds and meets 80% of global Demand of Castor Oil.
- India , China and Brazil are the Major producers of Castor Seeds.
- Total area under cultivation in India is 0.859 Million Hectors.
- Production of Castor Seeds in India for year 10-11 is estimated to be 1.19 MMT .
- Average Yield per hector is 1385 kg/Hector

India Is Gifted with an ideal climatic conditions for Castor Crop

Way For Sustainability

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Castor oil

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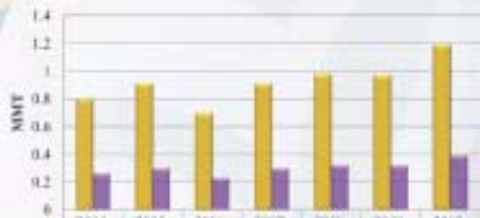
Castor Seeds and Oil Production In India



	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Oil seeds	0.8	0.91	0.7	0.91	0.98	0.97	1.19
Oil production	0.3	0.3	0.2	0.3	0.3	0.3	0.4

Need Improvement in Increasing yield per hector

Maximum Yield Maximum Sustainability

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- New Breeds of high yielding Oilseeds need to be introduced for plantation which will be suitable for regional climatic conditions
- Process of fertilizer and pest control to be improved
- Latest process technologies in oil extraction needs to be used in order to reduce the Losses of oil in meal cake. Large Corporate Houses can set up R & D laboratories for the more research on the viable methods.
- Government in collaboration with large Corporates , Trade Bodies and NGO's can set up Regional District Level bodies, which can :
  - Give technical support to farmers for promoting oilseed cultivation
  - Infrastructural support to adopt better farming techniques
  - Guidance on effective management of available Land and Water

Oil extraction and Processing

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- Crushing
- Solvent Extraction
- Oil Refining
- Conversion to Oleochemicals
- Conversion to Biofuels

Way For Sustainability

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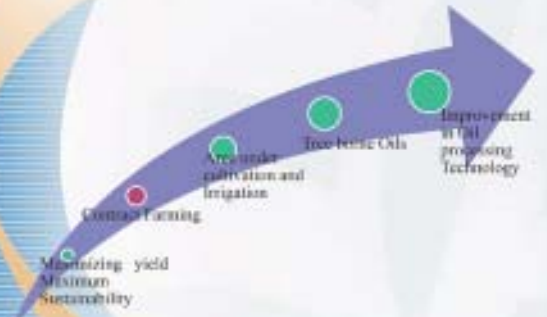

Vegetable Oil Industry

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- Global Oil Scenario
- Indian Oil Scenario
- Way for Sustainability

Contract Farming

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- Contract Farming in Agricultural Product is carried out according to an agreement between a Buyer and Farmers, which establishes conditions for the production and marketing of a farm product or products.
- In order to produce more oilseeds, large Corporate can take an initiative to bring small Farmers together to achieve the economies of scale
- This will lead to increase in profitability of small Farmers , improve their social economic status and large Companies will have a security of material availability.
- Good examples are countries like Ghana , Indonesia (Palm Oil) and Europe (for HEAR)

Way For Sustainability

Tree borne Oilseeds

- India is having various Tree Borne Oilseeds such as Neem, Karanj, Kokam, Jojoba, Mahu, wild Apricot, Cheura, Tunga etc.
- Many of these are known for having Cosmeceuticals and Medicinal uses as mentioned in Ayurveda due to the presence of various non lipid constituents
- India is having potential of producing 5.0 MMT of Oilseeds.
- Presently only 0.8-1.0 Million MT of Oilseeds are being collected which resulted in 0.15 to 0.2 Million MT of Oil.
- The Tree Borne Oils could be a better source to meet Indian Biofuel requirements

Area Under Cultivation and Irrigation

- Present area under oilseeds cultivation is about 26-27 Million Hectors.
- Average Yield per hector is 950-1000 Kgs
- It is worth to note that using only 6% of the Global area under cultivation , Oil Palm meets 28% of World demand .
- Government can take initiatives to bring more land under Oilseed plantation by incentive schemes.
- More Fund allocations under NREGS and JNRY can be considered to explore Oilseeds plantation on barren land

Food Vs Fuel Battle

Indian Fuel demand

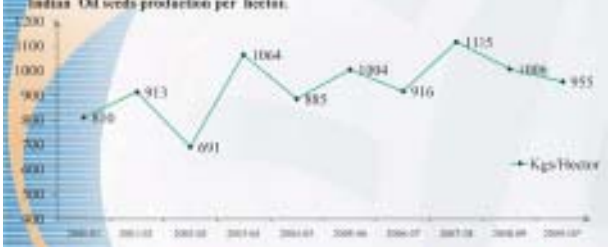
	Million MT
Indian Crude oil demand	186
Indian Crude Oil import	153
Indian Diesel requirement	56

Source economic survey of India 10-11

- Biodiesel blending mandate could be 5%.
- Indian Biodiesel demand estimated 2.5 MMT
- India can target to use Tree Born Oilseeds to meet this demand.

Indian Oil seeds Yield

Indian Oil seeds production per hector.



Indian Average Oilseeds production is 950kgs/Hector
Where as it is 1777kgs/ Hector for World

Way For Sustainability

Way For Sustainability

Indian Vegetable Oil Extraction Industry Scenario

Segment	No of Units	Annual Capacity Million MT
Oil Mills (Primary Crushing)	15000	36
Solvent Extraction Plant	600	31
Vegetable oil refiners	650	20
Vanaspati (Hydrogenated) Units	250	3
Feed Mills	200	16

Source SEA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Improvement in Oil Processing Technology
•Strong need for more Efficient and Cost Effective processes
•Reduction of by-products /side streams and losses
•Maximum retention of Nutritional Qualities.
•Economics of Large Scale
•Larger capacity plants
•200-300 TPD to 1000-2000TPD
•Flexibility of processing Multiple Oils.
•Fully automated - consistency of Operation and lower manpower cost.


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Improvement in Oil Processing Technology
•Modernization of Indian Oil processing plant is Must
•To protect Environment
•To save power
•To reduce losses in low value by-products
•To improve oil Extraction Processes
•New Concepts in Chemical Refining
•Use of Nano acid Degumming and Neutralization technology
•Potential saving in Oil Loss to the tune of 2-3kg/ Ton
•Further elimination of Phosphoric acid- thus less acidic effluent and Saving in Chemicals


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Improvement in Oil Processing Technology
•Environmental Compliance
•Less Chemical and more Physical treatment.
•More Sustainable and less Energy consumption.
•Less environmental impact; Zero Discharge- Liquid and Solid Waste.
•Uses of Enzymes in the refining process
•More eco-green alternative


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Thank You

Trade & Commerce

NOTES & VIEWS

Keep Your Skin Wrinkle free

AROONA REEJHSINGHANI

TO maintain beautiful and winkle free skin you should take regular care of the skin. Sensitive and dry skins are more prone to wrinkling since they require extra attention so that you do not fall a victim to premature wrinkling.

Sensitive skins should not use soap, since the chemicals contained in soaps can harm them beyond repair, instead apply on your face powder of Indian gooseberry or amla mixed to a paste with skimmed milk powder and a little water, add a pinch of turmeric powder and apply on the face using upward movements, wash off after 5 minutes. This pack not only cleanses the face but also whitens and brightens it.

Never use hot or chilled water on sensitive skin. Always wash it with ordinary tap water. Always pat the cream on the face instead of massaging it as this will unnecessary stretch the skin and cause winkling of the skin. To prepare your own moisturising cream take a big jar of cold cream and mix in 5 drops each of lanolin, almond oil and the contents of 5 vitamins E capsule. This is an extremely rich cream which makes the skin soft, smooth and wrinkle free.

Extremely dry and cold weather dries up this type of skin therefore in this weather you must take the utmost care of your skin. Never wash your face more then twice a day washing often drains away the natural oils from the skin, drink plenty of water at least 8 to 9 glasses per day to keep the skin well hydrated. A good wrinkle chaser is an egg white mixed with lime juice. Apply this mixture on the face and neck, when it dries wash off to avoid tightness of the skin. Mash a banana mix with cream and honey and apply on the face, wash off after 20 minutes.

Poor vision can be the cause of crow's feet around the eyes. To cure this, first correct your vision by visiting an ophthalmologist. You can also take an egg white mixed with little honey and cream found on top of boiled milk and apply softly around the eyes. When dry, wash off then apply a good moisturising cream.

Another cause of wrinkles is pursing the mouth. To remove lines from around the mouth put some oil on a warm cloth and apply on the mouth for five minutes, you will achieve results within a few months. Prolong use of vitamin B 2 and poorly fitting dentures cause tiny groove lines over the upper lips.

(Courtesy : Soaps, Detergents and Toiletries Review, August 2011, Pg 26)

Marketing Matters

WITH the care proposition to offer consumer a unique brand experience, ITC personnel care business has engaged in a slew of consumer contract programs:

•Fiama Di Wills collaborated with Wait Disney to launch a limited edition Fiama Di Wills Hannah Montana pack for Indian teens. This association with Walt Disney's teen popstar provided a unique opportunity for Fiama Di Wills to engage with a younger demography. Fiama Di Wills "Shine in Style Hannah Montana Packs received an overwhelming response, says the company.

•The Vivel Active Fair within months of its launch received extremely encouraging consumer response. The brand, in a special initiative for consumers in Kerala, gave young women an opportunity to be the next gorgeous face of the Malayalam film Industry, Reputed Malayalam director Lal Jose was roped in for the selection process.

•Vivel Soaps undertook the Vivel Lakshadhikari contest in Andhra Pradesh. The contest offers consumers an opportunity to win Rs.5 Lakh on completion of a simple slogan Vivel should make your dream come true because....' And along with it, send any three Vivel soap wrappers / cartons to a mailing address. The first couple of Vivel Lakshadhikaris were announced recently and felicitated by brand ambassador and Tamil actor Trisha Krishnan.

•Superia recently announced its 'Su-peria Saundarya Sakhi' initiative in Uttar Pradesh. It is an initiative to enhance skills of women entrepreneurs in the business of beauty across the state of Uttar Pradesh. As a part of this initiative, Superia will reach out to 4,000 beauty parlour owners in more than 30 districts of Uttar Pradesh.

•Superia has also announced the 'Superia Chamakta Sitara' campaign in Uttar Pradesh. The contest in association with schools across 29 districts of Uttar Pradesh, aims to recognize all-round development among students. Students from grade 7 to 12 will compete to become the Superia Chamakta Sitaras'. These students will be judged on the parameters of grooming attendance, academics and extracurricular activities. The campaign will reach out to more than 1,000 schools.

(Courtesy : Soaps, Detergents and Toiletries Review, August 2011, Pg 30)

"GUIDELINES"

Organic Farming Principles and Concepts

Dr.G.K. Veeresh,
Former Vice-Chancellor & President (APOF)

ALTHOUGH, there is no single International organic production regulation, all generally accepted organic rules prohibit use of synthetic fertilizers, pesticides, growth regulators livestock feed additives and emphasis on long term soil management. The ethics of organic farming is to generate all the required plant nutrients within the farm and adopt crop protection using local resources, restricting external inputs to bare minimum, if not avoid. The organic farming is essentially a soil building mechanism, to make the soil living and sustainable. If takes 3-4 years before the soil to become living, if the principles of organic farming are applied faithfully. When once a satisfactory condition is reached it will take care of itself with minimum maintenance cost and requiring no eternal inputs.

The United States Federal Trade Commission (FTC) defines organic food as production of food grown on humus-rich soil, whose fertility has been maintained organically with no fertilizer, pesticides and synthetic additives.

USDA defines organic farming as " a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and live stock feed additives" (Gold, 1994). Organic farming relay upon rotations, crop residues, animal manures, legumes, green manures, off-farm organic waste, biological or mechanical control of pests, diseases and weeds.

IFOAM-Principles: The worldwide umbrella organization of organic agriculture (International Federation of Organic Agriculture Movement) founded in 1972 in Versailles, near Paris, France, By Five organization from three continents, Flurope, USA and Africa, has now grown to over 600 members from more than 100 countries. The main principles of IFOAM organic agriculture include all agriculture systems that promote the environmentally, socially and economically sound production of food and fibres. It aims to optimize quality of all aspects of agriculture and environment keeping soil fertility as a key to successful agricultural production.

In India, organic agriculture is as old as Indian Agriculture and no set standards were existing except the traditions set by our ancestors and handed down from generations. Our traditional agriculture closely followed nature, in a way defined in recent times as 'nature farming', rooted on sound principles of sustainability. Sir Albert Howard, who came to India as an Imperial Fconomic Botanist in 1905 to work at the Imperial Agriculture Research Institute, Pusa, Bihar had all the admiration of Indian peasantry, who followed "good farming, faithfully copying

nature in their agriculture. Live stock were not merely source of nutrition in the form of milk and meat or of energy in the form of draught animals, their urine and dung was crucial cog in the progress of growth. So were growing leguminous crops, ploughing back crop residues and the extensive use of green manure" (Howard A 1924). Howard also developed a scientific method of composting,now known as Indoor method of composting, which later spread to Europe, Latin America and Africa. His writings on Indian sustainable agriculture influenced several farmers in the west and began to be known as 'organic agriculture'.

However, the centuries old sustainable agriculture took a turn towards chemical agriculture in the early fifties of the last century, as several compelling factors emerged simultaneously including the acute shortage of food. It met the demand of food, but left many questions unanswered satisfactorily. A new thinking began in 1990's when agriculture production started declining in spite of all the modern, high tech inputs like high yielding varieties, fertilizers, pesticides, irrigation were available, backed up by good monsoon. A task force on farming was constituted by the Government of India in the year 2000 to find out the causes for the decline in yield and immediate steps to be taken to promote organic farming in the country on the line with worldwide trend.

The Indian National Programme for organic production (NPOP) recognizes that the fertility of the soil is to be maintained and increased with the biological activity of the soil held intact; the farmers must become self sufficient in producing organic manure to avoid fertilizers; the seed and plant material must be sourced from the existing organic farms or to be obtained from other organic farms, all species and varieties of plans that are cultivated should be adopted to the soil an climatic conditions that of they are introduced and an innate resistance to pest and disease must emerge in such varieties; the pest, disease and weed must be managed either, mechanically, biologically or by rotation of crops or companion planting, avoid contamination of pesticide, weedicides and other chemicals through irrigation and drainage. The organic produce must be stored, transported and conveyed to the final consumer in its pristine state.

A member of alternate agricultural methods similar to organic agriculture is being advocated in different countries under different names. Some of them are discussed here under.

Biodynamic Agriculture: Biodynamic agriculture was developed by Dr.Rudolf Stenier (1861-1925), an Austrian philosopher and scientist. Its principles are based on the natural phenomenon that cosmic and terrestrial forces to enhance the growth, quality and nutritive value of plants and animals. Biodynamic preparations are derived from a varictv of herbs, silica and cow manure. The preparation are said to vitalize the living activity and fertility of soil in addition to proper breakdown of compost. The utility of this system depends on the relative position of the stars, planets, sun and moon on the growth and development of planets. A biodynamic calendar gives guidance to farmers for sowing vegetables and other seeds (Biodynamic Farming and Gardening Association: 3, Gold 1994).

Low External Input and Sustainable Agriculture (LEISA): LEISA is a Dutch concept to promote ecological agriculture in many countries through local participation using local resources, local knowledge and experience. In this system external inputs are included, but advocates judicious use supported by scientific knowledge. In addition to soil and water harvesting, agro-forestry, integrated pest management, intercropping, crop-livestock integration, microclimate management and use of local species of animals and plants in food production are included in LEISA.

Permaculture: It is also known as permanent agriculture. The concept of permaculture, developed by an Australian, Bill Mollison in 1970's, is to creat sustainable human environment (Mollison and Shay, 1991). Permaculture emphasizes on a design to include each element in landscape to produce an efficient low-maintenance integration of plants, animals people and structure. It can be applied to home gardens as well as large farm.

Regenerative Agriculture: It is the concept of Robert Rodale of USA. It aims is to ecologically restore a farm or an agriculture system through the use of resource efficient and ecologically sound farming system.

Sustainable agriculture: It is attributed to Brundtland (1987) who stated that "Sustainable development is the ability to ensure the needs of the present without compromising the ability of future generations to meet their own needs". Sustainable agriculture include all the practices advocated in organic agriculture such as crop rotation, intercropping, biological control of pest and weeds, no-till or reduce tillage, integration of livestock with crops, use of organic manure, leguminous crops, compost, etc., in place of chemical fertilizer.

Nature farming: This is based on the teachings of the Japanese philosopher Mokichi Okada (1882-1955), featuring a belief in the productive powers of soil, fire and water elements and devised to contribute to an ideal civilization. The principle is nearer to our vedic principles, wherein the 'Pancha Bootas' the five elements, fire, earth, water, air and ether (Akasha) are known as the building blocks of every life, including plant, on earth and therefore they are worshiped or revered.

Nature farming is an integrated system of production, marketing and consumption that builds upon the inherent life giving principles of the soil, water and fire(sunlight), Mokictu Okada began experimenting with nature farming in 1936 in his own garden in Tokyo. Subsequently, people followed his methods in gardening and found to be highly productive and spiritually satisfying in building link between humans and nature. He moved his base of operation from Tokyo to Hakone, acquired land in Atomi, and established nature farming society in 1953. Mokichi Okada association (MOA) was established in 1980, 25 years after his death and started MOA, Ohito nature farming experimental farm. MOA has more than 36 branches world over and every year people come here for training where too had the privilege of undergoing training. MOA India branch started during 1990s at Bangalore created good awareness about nature farming and is importance on 'healthy soil, healthy food and healthy people" (Anonumous).

Nature's agriculture: Albert Howard (1940) enumerates the principles underlying in 'Nature's agriculture'; operating in our woods and forests. In the forests, biodiversity exists in every form and there is never any attempt of monoculture whether plants or animals. Soil maintains strict economy, nothing is lost, the sun's energy is made use of both of canopy and of the undergrowth, the rain reaches surface gently, preserving the litter and soil. The pore space of the forest soil is at its maximum. The forest manures itself, makes its own humus and supply itself with minerals, there is no deficiency of any mineral. The humus provides the organic manure, the soil supply mineral matter. "There is no hand to mouth existence in nature's agriculture". Here and there all kinds of pest and disease are found but never assume large proportion. Nature's rule in these matter is to live and let live. Howard conclude that "Mother earth never attempts to farm without livestock. She always raises mixed crops, great pains are taken to preserve the soil and prevent erosion, the mixed vegetables and animal wastes are converted into humus, there is no waste the process of growth and the process of decay balance one another, ample provision is made to maintain large reserves of fertility, the greatest care is taken to store the rainfall, both plants and animals are left to protect themselves against disease.

Thus, true Nature Farming is to be in tune with the above principles. All the above, Nature's principles may not have been followed in our present day 'nature farming'. It is a good towards which we aim at to be nearer to nature through the organic farming principles. In every form of present day farming we are going away from the Nature's principles, the trend needs to be reversed and organic,^ farming is a step in this directionary.

(Courtesy : inform, September 2011, Vol. 22 (8) / 505.

GOOD ANALYSIS

Food Security - A Dilemma

Dr. Prem Nath

TODAY the world produces adequate food for everyone but the unequal distribution has created a gap between the countries who produce food more than they consume, and those countries with deficit production.

Some of the rising challenges facing the food security are; fatigue on the soil because of heavy

fertilization and heavy cropping, shortage of water and indiscriminate use, over-use of pesticides creating pollution, imbalance between agriculture and horticulture production and natural resources; post-harvest losses upto about 30%; subsistence farming for food security vs. commercial farming for export; and health improvement.

Food security is attained when all people, at all times, have the physical and economic access to sufficiently safe and nutritious food to be healthy and active (FAO). The food security is difficult to be attained when poverty prevailed in the households. Among other factors, access to food remained a dominating force in the frame of food security, where economic accessibility played an important role. (Nath, 2002). Food insecurity and malnutrition will persist in 2020 and beyond. (IFPRJ, 1999). 334 million children in developing countries are malnourished. One billion people across the globe are suffering from hunger and malnutrition; about 640 million in Asia and about 230 million in India (FAO, 2009). More than 70% people are engaged in agriculture in developing countries. (World Bank, 2008). No one would dream that 370 million citizens of a fast growing economy like India could go bed hungry. India has the dubious distinction of ranking 94 among 119 countries in the Global Hunger Index. This is all the more ironical in a country with a surplus stock of food grain, and is clearly result of skewed government policies and vision. Grain worth Rs. 60,000/- crore is destroyed annually due to inadequate storage facility. Agricultural production and research systems will be challenged to keep abreast of changing dietary preferences in coming years.

The constraints in production and utilization are;

1) Lack of Governance- lack of priorities, insufficient funding, inadequate infrastructure, lack of efficient market network both domestic and export; inefficient database on socio -economic studies, lack of human resources;

2) Technology Development-narrow spectrum of improved varieties, lack of seeds quality standards, lack of export-quality products, non-exploitation of indigenous technology, lack of integrated crop management (nutrient, protection, irrigation), natural resource constraints in production system, lack of sanitary and phyto-sanitary standards (Codex Allimantarius). The food security of humans can not be attained without plants and plants security can not be achieved without soil and water, and it is impossible to keep secured soil and water without economics of management (Nath,2010);

3) Technology Transfer-non-efficient-system and transfer, lack of informadon Disseminadon and Management;

4) Post Harvest handling

5) Policy Development and Programmes on Food and Nutrition Security.

The policy makers and planners have to augment efforts to midgate the dilemma arising out of relevant emerging issues like; Food Security vs. Nutridon Security, Policy vs. Beneficiaries, Subsistence vs. Commercial farming, Technology Development vs. Technology Availability, Food Availability vs. Accessibility, Rural vs. Urban Populadon, and Food Security vs. Household Income.

A serious attempt by governments in ardculadng the policies and programmes in agriculture, food, nutrition, health security and employment and income generadon will go a longway in overcoming insecurities.

(Courtesy : Plant Horti Tech, March - May 2011, Pg 32).

"SAVE OH! SAVE"

Saving the Indian Edible Oil Industry

ON September 13, the SEA delegation met Prof. K.V. Thomas, Minister of State with Independent Charge for Consumer Affairs, Food & Public Distribution, Govt. of India regarding change in export duty structure by Indonesia on palm products and its impact on Indian vegetable oil refining sector and appraised him about current situation. The Minister positively responded and assured to look in to this matter.

Below is the copy of memorandum.

Prof. K. V. Thomas,
Hon'ble Minister of State with Independent Charge
For Consumer Affairs, Food & Public Distribution,
Government of India, Krishi Bhavan,
NEW DELHI-110 001.

Hon'ble Sir,

SUB: Request to take urgent steps for Saving the Indian Edible Oil Industry.

Please refer to our representation dated 12th May 2011 for revision of Tariff Value on Refined Edible Oils\RBD Palmolein so that the difference between the Crude Edible Oils & Refined Edible Oils be maintained at 7.5% at least.

Due to low Tariff Value (USD 484/- PMT) fixed by the Govt. for the purpose of levy of Import Duty as against the current Import Price of USD 1200 PMT, the actual duty being levied on imported Refined Oils comes to around 3% only, thus, making import of Refined Edible Oils more competitive than Crude Edible Oils, which has already affected the Refining Industry and import of Refined Edible Oils have increased over last 2-3 years.

The Tariff Commission of India has also justified the minimum duty difference between Refined & Crude Edible Oils to be kept at least 7.5%.

In addition to above anomaly in the Policy of the Govt. of India, the Indonesian Govt. has now announced change in the Export Duty structure of various Palm Oils when exported from Indonesia.

The New Export Duty Structure of the Indonesian Govt. which will be implemented w.e.f. 15.9.2011 is as follow:

Product	Old	Export Duty New
CrudePalm Oil	15%	16.5%
RBD, Palmolein (Bulk)	15%	8.0%
RBD Palmolein (Consumer Pack)	10%	2.0%

Thus, Govt. of Indonesia wants to discourage export of Crude Palm Oil and encourage export of Refined Palm Oils or even Refined and Packed in Consumer Packs from Indonesia.

The basic aim of the Indonesian Government in implementing above duty structure is to encourage setting up New Refining & Packing Industries in Indonesia to generate more employment opportunities in Indonesia. They want value addition to be done in Indonesia and to earn more revenue by way of local Taxes etc. as many more allied Industries will be set up for packing material, etc. However, this will lead to closure of Indian Edible Oil Industry.

After Sept 15 2011, India will be flooded with imported RBD Palmolein from Indonesia. The Indonesian Refineries will also earn huge profits by keeping prices of RBD Palmolein marginally lower than the cost of production of RBD Palmolein in India through CPO route not

EDIBLE OIL

Only killing Indian Refining Industry, but also earning huge margins for themselves (export duty advantage). The following table will show the Export Duty advantage to be Indonesian Refineries:

	CPO	RBD Palmolein (Bulk)	RED Palmolein (Packs)
Base Price USD/PMT	1,017	1,100	1,150
Duty %	16.50%	8.00 %	2.00 %
Duty USD/MT	167.80	88.00	23.00
Difference USD/MT		(79.80)	(144.80)

Thus, as per above chart there is an clear advantage of USD 145 PMT (Rs. 6700/-PMT) on export of RBD Palmolein in Packs from Indonesia. The cost of RBD Palmolein for export from Indonesia will be cheaper than the cost of Crude Palm Oil be at least USD 65/-PMT.

Sir, Presently India already has Edible Oil Refining Capacity of over 12 Million tonnes per annum at the Ports itself which is being expended by additional 3 million Tones. Against above Capacity India Imports around 7 million tones thus utilize only 60% of its installed Capacity. The low Tariff value on Refined edible Oils has already resulted into increased import of about 1 million Tonnes of Refined Edible Oils.

Now due to revised Export Duty Structure by Indonesia, the import of Refined Oils will increase to around 5 million Tones.

The above scenario is a sure short death warrant for the Indian Edible Oil Industry having investment of more than 10,000 Crores in fixed assets, employing more than 500,000 people directly and many more indirectly and generating huge revenues for the Government by way of Taxes etc.

Sir, during the last five years, thousands of farmers in Andhra Pradesh/ Tamil Nadu/ Karnataka/ Orissa/ Bihar & North Indian States have taken up Palm Plantations in the hope selling fresh fruit bunches to local Refining Industries. Govt. of India is encouraging Palm Oil Plantations in all the States and thousands of more farmers are being encouraged to start Palm Plantations.

The Closure of Edible Oil Industry in India will also adversely affect the Palm Plantation Industry and thousands of farmers will be forced to uproot the existing plantations. The sickening of Indian Edible Oil Industry will also have effect on other Oil seed farmers like Soybean.

The vision of the Government to make India self sufficient in Edible Oil Industry will take a big hit if immediate steps are not taken by the Government to save the Industry.

Thus, in the interest of Domestic Edible Oil Industry, it is requested that:

1) Govt. of India levy the same duty on import of Refined Edible Oil which is the export Duty being put on Crude Palm Oil by the Govt. of Indonesia i.e. 16.5%

2) Increase the Tariff Value on the Refined Edible Oils to USD 1200/- PMT in line with the current market Price.

3) Completely Ban the import of Edible Oils in Consumer Packs.

We would like to assure the Govt. that the above steps will not have any impact on Edible Oils Prices in India since the Refining Capacities in India is significantly higher than the total import of Edible Oils and the competition due to over capacity among the Refineries ensures that they work on very low margins.

Thanking you,
Yours faithfully,
For THE SOLVENT EXTRACTORS' ASSOCIATION OF INDIA,
Sushil Goenka, President

(Courtesy : SAARC OILS & FATS TODAY, September - October 2011).

"LOOK OUT"

Sustainabilitv watch

THIS month's Sustainability Watch column was provided by Marguerite Torrey, inform technical projects editor. Following is her summary of the hot topic on sustainable technologies presented on Tuesday, May 3, at the W2nd AOCS Annual Meeting & Expo.

That sustainability has become a watchword for the industries in which AOCS members work is no longer news. Indeed, entire meetings and courses are dealing with the topic. This year's Hot Topic Symposium considered sustainability in detergents as well as other products.

Jere Kolstad, president and chief financial officer of Rivertop Renewables (Missoula, Montana, USA), talked about "Glucaric Acid in the Detergent Business." His company, founded in 2008, is developing products from renewable resources to be used, for example, as replacements for phosphate builders in automatic dishwashing products. The company has patents on the chemical oxidation of glucose to form o-glucaric acid (Fig. 1). Capital costs are low, product yield is high, and Kolstad claims there is no waste. As a builder

in an automatic dishwashing detergent, glucaric acid reduces spotting and filming on dishes, glassware, and flatware. Sugars such as glucose are inexpensive feedstocks, and Rivertop anticipates using other sugars as well in its processes. Glucaric acid also works well as a corrosion inhibitor for materials wetted by water; cooling towers could be a potential market. Additional uses might be ice-melting materials for public streets in winter, additives for building materials, cosmetics, and exfoliants. Further in the future, Rivertop and its partners expect

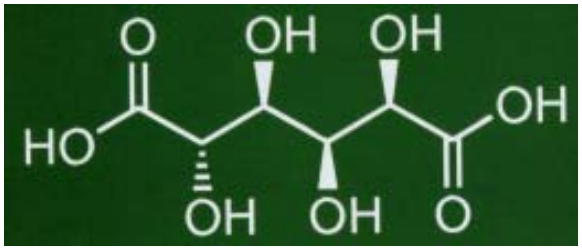

FIG. 1. Glucaric acid.

to develop products using glucaric acid in adhesives, controlled release fertilizers, and fire and flame retardants.

Shireen Baseeth, who worked as a post-doc under AOCS member Milton Rosen, spoke on "Innovative Products for Bio-based Solutions" from the perspective of her work with Archer Daniels Midland Co. (Decatur, Illinois, USA). The bio-based products on which she works are made by "green" chemical methods designed to reduce and even eliminate negative environmental impacts. She indicated that early market penetration of these products will be greatest in the categories of specialty and fine chemicals; in 2011, less than 4% of US chemical sales are bio-based products. The potential by 2025 is 25%. Much of her talk concerned surfactants containing phospholipids derived from soybeans. These products are used as agricultural adjuvants to increase biological activity and to improve spray applications of pesticides by altering droplet size and reducing wind drift. Another application being explored for phospholipids is as dispersants in paint, allowing for use of less pigment. Baseeth emphasized that bio-based solutions are not just "replacements." There can be no compromise on functionality of these biobased products, she said.

Andy Shafer explained how Elevance Renewable Sciences, Inc. (Bolingbrook, Illinois, USA) is using olefin metathesis reactions in "Transforming Consumer and Industrial Applications— Novel Products and Technology Being Commercialized Now." The reactions are keyed to points of unsaturation, and can be carried out at low pressure and low temperature, making them less expensive than similar reactions without these properties. Metathesis is based on Grubbs' catalysts, which lead to modifications by vegetable oils through branching, chain extension/ termination, oligomerization or polymerization, functional group insertion, or functional group exchange. Elevance and Wilmar International Ltd. are in a 50:50 joint venture to build a manufacturing facility in Surabaya, Indonesia. Production will start in the fourth quarter of 2011, and full-scale manufacturing is scheduled by 2014. The plant is being designed to produce specialty chemicals—9-decenoic acid is a key product—as well as olefins and oleochemicals. Elevance is also collaborating with Dow Corning in personal care products and Stepan in surfactants, quaternary biocides, and polyols for polyurethanes. "Next Generation Oleochemical Products" was the subject of Wei Huang, vice president of process development and engineering for LS9 (South San Francisco, California, USA). The company is using fermentation of natural products to develop fuels and sustainable chemicals through synthetic biology. LS9 is presently using carbohydrates as the starting point in its fermentations to generate fatty acids (FA); genetic modifications of Escherichia coli allow the company to selectively produce lighter FA (C6-C10) or heavier FA (C,0-CJ. The process can also be controlled to select

the degree of unsaturation in the FA. LS9 has made cc able progress in making renewable fuels that compare fa with petrodiesel, Huang said. The company is also devf processes to generate fatty alcohols, to be used in surfa by manipulating the biochemical pathways in cyanob; LS9 has been operating on a pilot scale since 2008; it anti> demonstration-scale production by the third quarter of One topic that came up in discussion among the pre< was the differences between the terms "sustainable" vs. "t able" vs. "green" chemistry. Unfortunately, the cc that the topic would require its own symposium.

"LOSER IS WEEPER"

Cotton's Loss in Acreage is gain for soyabean

DELAYED rainfall and a drop in cotton prices have ensured that cotton has not eaten into the soyabean acreage as expected before the beginning of the kharif season. In fact, the situation has reversed in favour of the latter.

According to the statistics available with the Maharashtra agriculture department till August 1, cotton acreage has fallen short by four lakh ha than the government target while the soyabean acreage is higher by three lakh ha than the target and more by one lakh ha than the actual acreage of the previous year.

As cotton prices touched historic high levels in 2011, a record increase in cotton acreage was expected. The expectation has come true across the nation as cotton acreage has gone up by 4% according to the latest statistics available from the Ministry of Agriculture. (The Economic Times, 4th August, 2011).

(Courtesy : AICOSCA Newsletter, August, 2011)

"PERFORMER"

Poor states perform well during llth Plan period

Poorer states like Bihar, Chhattisgarh, Jharkhand and Uttarakhand are estimated to have outperformed their richer counterparts in meeting economic growth targets in the llth five-year plan period that will end in March, 2012, Several other states including Gujarat, West Bengal, Andhra Pradesh and Karnataka are posed to miss the growth targets, Minister of State for Planning Ashwin Kumar told the Lok Sabha in a written reply. The Financial Express,

(Courtesy : AICOSCA Newsletter, August, 2011)

"HURRAH"

Industry expects bumper oilseeds crops

EDIBLE oil industry body Solvent Extractors' Association of India (SEA) expects bumper oilseeds production in the kharif season of the 2011-12 crop year, like last year, on the back of higher acreage under cultivation.

India produced a record 31.1 million tonne of oilseeds in the 2010-11 crop year (July-June), out of which 20.84 million tonne of output was achieved in the kharif season.

The overall area under oilseeds has increased to 168.8 lakh hectares so far in the current kharif season, compared to 164.5 lakh hectares last year, Solvent Extractors' Association of India President Sushil Goenka said in a letter to its members.

"The overall crop is shaping well and we hope to have a good crop similar to that of last year," he said. There has been a substantial increase in the area under soyabean, sesame and castor, but the area under groundnut and sunflower has reduced significantly, Goenka said.

The country imported over nine million tonne of vegetable oils in the 2009-10 oil year (November-October) to meet domestic demand. The Financial Express, 26th August, 2011.

(Courtesy : AICOSCA Newsletter, August, 2011)

"WELCOME"

Karnataka Beckons palm oil farmers

The Karnataka government is working on modalities to provide assured returns to palm oil cultivators. India is the world's largest buyer of palm oil, which accounts for more than 80% of its edible oil imports.

"We are in discussion with companies which are promoting oil palm cultivation. As the Centre

had earlier rejected to fund the project partially, we are now looking at providing subsidy or some other intervention," said Karnataka horticulture director Poovel Hemalata. She added that the proposal would be finalised before farmers take up new plantations. Across 18 districts of the state, oil palm is cultivated on over 10,000 hectare. The state is looking to expand cultivation by 5,000 hectare along the coast this year.

The industrial houses which are working with farmers include Godrej Oil Palm, Ruchi Soya, Food Fats and Fertilizer, Bhadravati Balaji Oil Palm and Simha Puri Agrotech. The companies are citing the Goa government's move to fix the support price of 7,000 per tonne for oil palm fresh fruit bunch (FFB). According to the state-sponsored support price scheme, any difference between the price fixed by the Project Management Committee and 7,000 would be made good by the Goa government. "In July, farmers got Rs 6,200 per tonne of FFB. We are demanding that the government declare an MSP of Rs 8,000 per tonne and provide some support to ensure that farmers go in for the plantation crop. The decision is likely to be made by September," said Bhadravati Balaji Oil Palm director Gayathri Murugadel. The company is working with more than thousand farmers across six districts of Karnataka on over 6,000 hectare for the past six years.

The prices are fixed every month based on the crude palm oil price. For an FFB, a farmer gets 12% of crude palm oil price plus 16.5% of the realised value of palm nut. As against the potential 1.05 million hectare of potential area suitable for oil palm plantations identified by Dr Chadha panel, only about 15% has come under oil palm to date. With over 75% of palm oil yield arriving in the April-September period and sowing continuing till December, companies working with farmers are eager to get assured returns for the farmer. "After initial diversification, farmers uprooted their oil palm plantations as the yield started coming only after three years. An assured support price scheme would ensure farmers to further diversify and increase acreage," said Godrej Oil Palm Ltd director RR Govindan. The Economics Times, 5th August, 2011.

(Courtesy : SEA News Circular, Vol. XIV, Issue : 4, July 2011).

"FEED SONG"

FEED & FEED INGREDIENTS CONCLAVE - 2011
3rd - 4th July 2011 at Jaipur
KEY NOTE ADDRESS

N. B. GODREJ
Managing Director,
M/s. Godrej Industries Ltd.

In growing cereals we are proficient
And so far we've been self-sufficient.
And so we can bask in glory
But proteins are a different story.
The cereals themselves provide a base.
And wheat indeed is a special case
With a protein content that is high.
But with other cereals we have to try
And find another major source
And pulses, come to mind of course.
But pulses' yield has always lagged
The production has quite often sagged.
And imports then come into play.
From nearby and far away.
Our needs aren't met on our own
With the decline in area sown.
Do we have any alternative?
There is one crop that could give
All of us enough protein
And that of course is soya bean.
And nuggets have been made and sold
And some of us who are quite bold
Venture forth and try it out.
But there is still a major doubt
If it can be a staple food.
I don't want to appear rude
But I safely say sales are subdued
Not everyone thinks that it's food.
No doubt we should give it support.
And all of us really ought
To try tofu, nuggets, soya milk
Soy burgers, tempe and all their ilk.
Although through time much has been tried
Directly plants cannot provide
Much more by way of protein
Than wheat, pulses and soya bean.
Do I hear in the audience, now
Someone evoke the holy cow?
And milk can play a role indeed.
But then our cows require feed.

It's true that cows don't compete
For food that you and I would eat.
And that is a major factor
The rumen is a bioreactor
That can digest cellulose.
But as the demand for milk then grows
Much more fresh fodder will be needed
But so far we have not succeeded
In increasing fodder land.
Of course we have to understand
There is demand from every crop
So milk production growth will stop
Unless the yields of fodder rise.
And in addition the farmer tries
Methods to improve the digestion
Silage is a good suggestion.
But in these modern times
We could also try out enzymes.
And fodder could be modified
Newer varieties should be tried.
Fortification with more nutrition
And a shorter time to fruition.
With multi cropping, we believe
In a year one could achieve
Two hundred tons of fodder yield
In a one hectare field.
The dry matter surely would be less
But this would still count as success.
We must perforce enhance supply
But no matter how hard we try
Shortages are here to stay
For we will always find a way
To use the extra cellulose
For with the right enzyme dose
We can surely break it down
With glucose we can go to town.
Make fuel, chemicals or food.
And this is how it will be viewed.
Of all the many routes to go
Is making milk the best we know?
Today the rumen's most efficient
And that is a quite sufficient
Reason to make milk from cellulose.
But everyone surely knows
That milk is bound to cost much more
When we finally win the war
And learn to crack cellulose.
And all of this only shows
That milk may take up too much land
But there's something else at hand.
Now poultry is the way to go.

There are two products as we know
There is the egg and then there's meat.
And both of them are good to eat.
The egg is an amazing thing
And I for one could always sing
Its praises, for it is packaged well,
With its own protective shell.
And in it you will surely find
Nutrients of every kind.
It can be cooked in many ways
Prepared in minutes, not hours or days.
And I don't want to sound contrarian
But sterile eggs are vegetarian.
This isn't just my estimation
But Bapu, father of our nation
Conceded that since life's not taken,
It would appear quite mistaken
To think that eggs are non-veg.
If milk can be, then eggs are veg.
For both eggs and meat you should know
That poultry feed conversion's low.
Now unlike cows they don't eat grass
But in a sense, they also pass.
Soya meal and corn are fed
And though perhaps it could be said
This is food that we might eat
No one would think it a treat.
On soya I have said enough
And hybrid maize is not the stuff
That humans, normally would eat.
So why not eat as eggs and meat.
And can we make the case much better,
Not just in spirit but in letter
And make a feed that won't compete
With any food, that humans eat.
Can we fulfill such a dream?
With newer enzymes it would seem
That digestibility could be bettered
Locked nutrients would be unfettered.
And what would be your reactions
To feed made from cheap extractions?
And SEA I'm sure will be delighted
Now that a golden era is sighted
With rapid poultry growth in store
And the ability to feed much more
Without the use of added land.
And so the gap in protein demand
Could be met by smarter feeding.
As for dairy, in my reading,
There's little scope for expanding herds
So how will we get milk and curds?

If we study the needs at every stage
And feed appropriate to the age.
We can expect improving health,
Which will lead to farmer's wealth,
More milk produced from every cow.
And I for one think that is how
We'll overcome the lack of land.
And now we need to understand
Why agriculture growth is slow
And how we need to make it grow.
Nine percent's the growth of GDP
But Agriculture's at a mere three.
The available land has surely peaked
So can the growth then be tweaked?
If we don't change crops in the field
We can still improve the yield.
And I find it quite surprising
How quickly yields of corn are rising.
But bigger gains can be achieved
If a simple truth is well perceived.
The value of the crop does count
And the growth rate will surely mount
If low value crops are set aside
And higher value crops are tried.
As a percentage of GDP
Eleven percent is what we see
For the field crop economy
And four for animal husbandry.
But with poultry as part of the mix
The rate of growth approaches six
But there is no reason why
If all of us together try
We can't get to a rate of nine
And then we'll do just as fine
As the rest of the economy.
And this is something we'll soon see.
Agriculture's now in favour
And that is something we can savour.
With management and technology
A renaissance is what we'll see.
Our industry will then stand tall
As we provide protein to all.

Mr. N. B. Godrej
delivered Key Note Address in his signature poetry at Feed & Feed Ingredients Conclave 2011 held at Jaipur on 4th July 2011.

(Courtesy : SEA News Circular, Vol. XIV, Issue : 4, July 2011).

"HOW CLEVER"

Malachite Green Contamination in Rape-seed Meal exported from India

WE have received a communication from Indian Embassy, Beijing, informingthatthe Chinese Phytosanitary department has traced malachite green in Indian rapeseed meal in the range of 0.5 to 2.0 ppb in the recent shipments. This is a very serious matteras Malachite Green isconsideredto be a highly toxic chemical. In this regard the association organized an emergency meeting of leading surveyors and main exporters of rapeseed meal on 13th July 2011 to deliberate on this issue and find out the probable cause of malachite green contamination. Though many thoughts emerged out, the experts were unable to arrive at any cogent or specific reason for this contamination. Keeping in view the importance of the Chinese market to our industry and the rising demand for our products,

SEA have decided to analyze samples of rapeseed, rapeseed cake and rapeseed extractions drawn from different regions of the country, especially from those areas which produce the exportable quantities. Whilst these efforts are in progress, the Association has requested the Indian Embassy at Beijing to enquire from the Chinese authorities the test procedure being followed fordetermin-ing malachite green content and also to ascertain the acceptable limits of Malachite Green. This would enable the exporters to test the rapeseed meal before loading the cargo to ensure compliance of the contractual terms in this regard. The Association is fully seized of this issue and as always, would put its best possible efforts to find a solution to this problem. In the meanwhile, till this issue is resolved, I would like to advise the exporters of rapeseed meal, to only enter into contract with the buyers with the condition of the load port analysis being final. This would obviate them from any hardship or financial losses arising out of rejection of cargo at the Chinese ports.

(Courtesy : SEA News Circular, Vol. XIV, Issue : 4, July 2011).

"ONCE ONLY"

A door is knocked twice.
Wise man enquires' Whose there?'
Visitor replies 'Opportunity'
Wise man: 'Wrong'
Visitor asks 'How did you know'
Wise man asserts:
'Opportunity never knocks twice!

(Courtesy : SEA News Circular, Vol. XIV, Issue : 4, July 2011).

"GOOD NEWS"

2010-11: Better prices & good monsoon boost grain production to record high

SPURRED by attractive prices, India's farmers produced record grain in the just-concluded 2010-11 farm year, even as the world struggled with shortages. The country produced record 242 million tonne of foodgrain in 2010-11 farm season (July-June), the fourth advance estimates released on Tuesday showed. Foodgrains comprise rice, wheat, coarse cereals and pulses. In 2009-10, the total farm output was 218 million tonne as compared to 234 million tonne in the year before. However, sustaining the record output may be difficult this year because of the poor rainfall in July may affect sowing and eventually the output.

The record foodgrain output was largely because of a sharp rise in production of wheat to 86 million tonne against 81 million tonne in the year before. "The record output only proves that the sustained focus on foodgrains and pulses in recent years by the Centre has paid off rich dividends," said P K Joshi, senior programme manager, IFPRI.

The production of pulses and oilseeds, two key consumption items India is not able to produce enough, also hit a record high. "We can easily produce 20 million tonnes of pulses by bringing follow land under cultivation and also through inter-cropping system...! do not think we have to import pulses after 3-4 years," Agriculture Secretary P K Basu told reporters here after releasing the data.

The sharp increase in minimum support prices, or MSP, for a number of crops has allowed farmers to apply more inputs to their crop, helping lift output across crops.

The record high oilseeds production of 31 mt will also help cut India's vegetable oil imports by about a million tonne. India had imported 9.2 million tonne of vegetable oil last year to meet the domestic shortfall. Experts have urged the government to allow larger exports to help farmers get higher prices.

As on July 1, the Food Corporation of India had over 64 million tonne in stock, much above the buffer norm. (Source: Economic Times dAted 20th Jul.'11)

(Courtesy : SEA News Circular, Vol. XIV, Issue : 4, July 2011).

"LOOK CHIC"

Cotton Volatility helps blends, Chic garments to fashion St

SEVERAL apparel brands, including Marks & Spencer and ITC Wills Lifestyle, are using cheaper and blended garments to woo back consumers chasing low-cost options due to rising apparel prices. With volatile cotton prices squeezing the textile industry profit margins despite up to 40% increase in retail prices, 100% cotton garments are being pushed out of shelves by those blended with man-made fibres such as polyester. There is a lot of value engineering happening on apparels. Apart from passing on the price rise to uers, brands experimented with playing with different blends to come with a winning formula, says Sharad Mehra who tracks fashion and apparel operations at Technopak Advisors.ITC Wills Lifestyle, for instance, replaced a 80s ply giza cotton range with 80s ply non giza cotton, which is 15-20 % cheaper and helps the brand to keep its margin and the MRP intact, Mehra says. Some innerwear makers are looking at carded cotton instead of combed cotton, he adds. Carded cotton is cheaper than combed by 8-10 %.Cotton prices shot up by 64% between October 2010 (when the new crop arrives) and March 2011,but crashed 50% from the peak level to.30,000 per candy by July 2011.Cotton currently hovers around.40,000 per candy. Polyester, one of the most common man-made

fibres, is still 15% cheaper than cotton, hence the rush for blends. Rajiv Dayal, MD of Mafatlal Denim, a vertically integrated textile company, says several mills that predominantly worked with cotton have introduced blends in their product basket, ranging from 10% to 30%,to contain prices.

Retail prices of apparel made out of cotton are 40% higher than last year in the case of local brands and 25% dearer for national brands. Although cotton would continue to rule, price fluctuations have encouraged fabric manufacturers to innovate and blends have walked in, especially in the bottom of the pyramid where the consumer is extremely price-sensitive, says Dayal. Technopaks Mehra says that British brand Marks & Spencer, which is in India through a joint venture with Reliance Retail, now focuses on the cotton poly blend easy care shirt to build its volumes. M & S was selling their tripack of shirts at.2,499 which had a white, light blue and cream shirt. This season they are selling the tripack again at.2,499 but now it has three white shirts only.

The reason being the lower cost of a white fabric as opposed to a dyed one, he reasons. M&S Head of Region (South Asia) Venu Nair, however, asserts that the retailer did not change any of its products as a response to the raw material price rise. Cotton blends have been used wherever there was a need to enhance the overall feel, aesthetic or performance of the product, he says.Most premium brands, (The Economic Times, 26th September, 2011).

(Courtesy : AICOSCA Newsletter, September 2011).

"RICH ROB THE POOR"

FM blames developed nations for high Inflation

HIGH inflation in India is party due to the economic policies adopted by the developed countries is response to the financial crisis, said finance minister Pranab Mukherjee. " Inflation challenge faced by India is partly an offshoot of the policy response in developed countries to the crisis." He said at the lOGthe foundation day celebrations of Bank of India. Mukherjee said the global economy is still trying to cope up with the after-effects of the financial crisis. "The commitment to moderate levels of inflation has led to higher interest rates. In this environment, banks need to keep a strong vigil on their asset quality," he said, Highlighting the importance of financial inclusion, Mukherjee said the government believes it is necessary condition for inclusive growth. (The Economic Times, 8th September, 2011).

(Courtesy : AICOSCA Newsletter, September 2011).

"WEAK TOPS"

RBI has had limited success in lowering inflation: Gopalan

THE finance ministry today said the Reserve Bank's monetary tightening has had only a limited success in lowering inflation, which is hovering near the double-digit mark by moving up to 13-month high of 9.78 per cent in August.

"In India, the policy stance has had to change from being accommodative to one of aggressively combating inflation. The benchmark short-term policy rate was raised in quick succession from March, 2010," Department of Economic Affairs Secretary R Gopalan said here. "While this tightening has been able to anchor inflationary expectation up to a point, it has had limited success in lowering inflation rates to acceptable levels," he added. RBI has raised interest rates 11 times in the last 18 months to tame inflation.

There is no doubt that there are supply side constraints within the Indian economy, Gopalan said, adding that the issue of development — particularly in the area of infrastructure and in poverty alleviation, health and education — remain critical challenges. "We have been addressing them by investing in infrastructure, agriculture and in the social sector and continuing the structural reforms in the economy," he said, (Tecoya Trend, 16th September, 2011).

(Courtesy : AICOSCA Newsletter, September 2011).

"GOOD SHOW"

Vegetable oil imports fell by 23 % in August

INDIA's vegetable oil imports fell by 23.2% to 8.17 lakh tonne last month because of record oilseeds production in the 2010-11 crop year ended June, according to industry data released today.

The country had imported 10.65 lakh tonne in the same month last year.

Imports declined by nearly eight per cent at 68.6 lakh tonne in the first 10 months of 2010-11 oil year (November- October), as against 74.47 lakh tonne in the year-ago period, Solvent Extractors" Association (SEA) said in a statement. (The Hindu Business Line, 16th September, 2011).

(Courtesy : AICOSCA Newsletter, September 2011).

"IN BALANCE"

GDP Growth

CMIE has revised downwards the GDP growth forecast for 2011-12 from 8.6 per centto8.1 percent. The agricultural sector is expected to grow just by 2.2 per cent in 2011 -12 and this forecast is lower than the earlier forecast of 3.2 per cent growth. The downward revision reflects largely, an expected lower output of groundnut and cotton in the states of Gujarat and Andhra Pradesh due to poor rains. As per the 4th advance estimates released by the Ministry of Agriculture, the production of food grains, oilseeds and cotton is expected to touch a record level in 2010-11. However, the production of oilseeds and cotton is expected to fall due to erratic weather conditions in major producing states viz. Andhra Pradesh, Gujarat and Maharashtra. Besides this, production of major crops is projected to fall marginally by 0.4 per percent during 2011 -12.

One of the reasons forthe agriculture growth rates of 2011 -12 to be scaled down is that the fourth final estimates of major crops indicate some exceptionally high growth rates in 2010-11; thus limiting the growth potential in 2011-12. However, this high growth in the output of major crops in 2010-11 also implies that it is possible that the GDP estimates of 2010-11 may undergo some upward revision.

(Courtesy : AICOSCA Newsletter, September 2011).

SMART

"I can't change the direction of the wind, but I can adjust my sails to always reach my destination." *-Jimmy Dean*

"ANY INTEREST"

Back-ended interest subsidy plan for MSMEs

MICRO , Small and Medium Enterprises taking loans for modernization programmes can avail a back-ended interest subsidy scheme at the rate of 3 per cent. Under the scheme, Rs.1o lakhs will be given for each enterprise.

Modernisatin should be in sub-sector/products listed in the guidelines of the credit linked subsidy scheme of the central government. (Source:Business Standard dated 18th Aug. 11)

(Courtesy : SEA News Circular, Vol. XIV, Issue : 5, Aug 2011).

"SHORTAGE OF OILSEEDS AND PULSES"

Demand and Production in Million Tonnes

Year	Oilseeds		Pulses	
	Demand	Production	Demand	Production
2007-08	45.46	29.76	16.77	14.76
2008-09	47.43	27.72	17.51	14.57
2009-10	49.35	24.88	18.29	14.66
2010-11*	51.34	31.10	19.08	18.09

* IVth Advance Estimates.

"STOREWELL"

India needs modern storage to sustain food bill proposals

FOOD minister KV Thomas said that apart from raising x>dgrains production, the country needs modern torage facilities on the lines of China to sustain the implementation of new food bill provisions. The draft National Food Security Bill, which is likely to be introduced in the winter session of Parliament, seeks to provide legal entitlement to subsidised foodgrains to 75 per cent of the country's rural population and 50 per cent of urban India. "Steps are being taken to augment storage capacities, but still I find our storage is not modern," Thomas said at an event organised by the International Rice Research Institute.

With rising foodgrains production every year, the country needs modern storage units like the one used in China to reduce losses, he said. India has storage capacity of 60 million tonnes, the requirement of foodgrains to implement the proposed bill is estimated to be 61 -62 million tonnes. "As we move forward with the proposed bill, there is an urgent need to reduce foodgrains wastage at every level, right from harvesting of grains till storage," Thomas said. Even now, foodgrains go waste during the harvesting as well as transportation through railway wagons to different states for Public Distribution System, he observed. Food Corporation of India (FCI) is the nodal agency that procures, stores and distributes foodgrains to PDS at subsidised rates.

Already, the government has launched a scheme to build 15 million tonnes of additional storage capacity through public-private-partnership mode in next few years. It also plans to set up silos with capacity of 2 million tonnes. On the need for effective PDS for the successful implementation of the food bill provisions, Food Secretary B C Gupta said that the government has started computerising the PDS to reduce leakages and diversion of subsidised grains meant for poor. As many as 10 state governments have reported taking up digitalisation of ration card database. Besides, some states are implementing GPS-based tracking of vehicles that carry PDS food items, he added. Agriculture Secretary P K Basu said the ministry will focus on rainfed areas and the eastern belt for increasing productivity and improving farm income in the coming years. The country is estimated to have produced 241.56 million tonnes of foodgrains in the 2010-11 crop year (July-June) and targets 245 million tonnes this year.

(Courtesy : Business Empire, October, 2011)

"HAIL INDIA"

Record Food grain for India in 2011-12

INDIA, a top producer and consumer of wheat, rice, sugar and lentils, is likely to harvest record food grain in 2011/12 following normal monsoon rains this year. The country, the world's second most populous, exports small amounts of grain and sugar as domestic consumption is robust and the government is keen on keeping supplies at home to fight near-double digit food inflation. Here are some facts about the key Indian crops.

SUGAR

India, the world's top sugar consumer and the biggest producer behind Brazil, is expected to churn out more than 26 million tonnes in the 2011/12 year that began on Oct. 1. The domestic requirement is of about 22-23 million tonnes. Industry officials say the country could export 3-4 million tonnes this year compared to about 2.6 million tonnes a year ago. India is a key supplier of white sugar to Asian and African buyers and competes with Thailand and Brazil.

RICE

Rice is the main food grain in India. The world's second biggest producer is aiming a record 102 million tonnes output against a local demand of about 90 million tonnes. Output from the summer-sown crop is estimated at 87.1 million tonnes. India produces various varieties of rice, but the grain is broadly divided into premium basmati and common non-basmati rice. It allows unrestricted exports of basmati rice, while restrictions on exports of non-basmati rice, imposed in 2007, were lifted this year. India exports basmati rice to the Middle East and Europe, while African and Asian countries are key buyers of its non-basmati rice. It competes with Vietnam, Thailand and Pakistan in the exports market.

WHEAT

India, the world's second-biggest producer and consumer of the grain after China, expects a record harvest of 86 million tonnes in 2012, about 10 million tonnes more than the domestic demand. This means there is enough left for exports. In the current year the country allowed exports of 2 million tonnes after harvesting a record crop of 85.93 million tonnes. Bangladesh is a key buyer along with other Asian and African countries.

OILSEEDS

The world's top importer of vegetable oils cultivates oilseeds like soybean, groundnut, sunflower and rapeseed. For years it has been trying to raise its oilseeds production and cut expensive imports. But imports are rising due to the increasing purchasing power of middle class consumers.

The country's 2011/12 summer-sown oilseeds production is estimated at 20.89 million tonnes, almost steady compared to last year. Industry expects the country's edible oil imports to rise 5.2 percent on year to 8.84 million tonnes in the year to October 31, 2012. India buys mainly palm oils from Indonesia and Malaysia, and small amount of soyoil from Argentina and Brazil.

The country is also a leading exporter of soymeal to Asia and its exports in 2011/12 are likely to rise to more than five million tonnes as soybean output is expected to rise. Vietnam, Japan and China are among key buyers of Indian soymeal.

CORN

India, Asia's second-largest grower of corn after China, generally sells around 2-3 million tonnes a year. It's summer-sown corn production is likely to fall by nearly 3 percent to 15.86 million tonnes in 2011 /12, but exports are likely to remain steady at around 3 million tonnes. Vietnam, Indonesia and other Asian countries are key buyers of Indian corn.

COTTON

The world's second biggest producer and exporters of the fibre is likely to produce a record 35.5 million bales (each of 170 kg) in the crop year that began in October, higher than 32.5 million bales produced a year ago. The country's export potential is pegged at 7 million bales, unchanged from the last year. India is a key supplier of the fibre to neighbouring Pakistan, China and Bangladesh.

COFFEE

The state-run Coffee Board has forecast an output of 322,250 tonnes for 2011/12 ending September, up 6.7 percent on the year. India is the world's fifth-biggest producer of coffee but accounts for only 4.5 percent of global output. The country's exports stood at 358,278 tonnes in the year ended Sept. 30. Exporters say overseas shipments may rise slightly in the current year as there is a good demand from importers due to a shortage in the world market. Italy, Germany and Belgium are the top three buyers of Indian coffee.

RUBBER

The world's fourth biggest producer of natural rubber is likely to produce a record 902,000 tonnes for the year ending March on the back good monsoon rains, compared to 861,950 tonnes a year ago. Despite a record output the country will import as the demand is estimated at one million tonnes. India imports natural rubber from Thailand, Indonesia, Malaysia and Vietnam.

TEA

India, the world's second-biggest tea producer after China, is likely to harvest a record crop of more than 1,000 million kilograms in 2011 calendar year, compared to 966 million kilograms in 2010, industry officials have said. Exports, however, could fall nearly 7 percent in 2011 to 180-185 million kilograms partly due to payments problems with Iran and the unrest in the Middle East. India exports CTC (crush, tear, curl) tea variety mainly to Egypt, Pakistan and Britain, and premium orthodox variety to Iraq, Iran and Russia. India competes with Sri Lanka and Kenya.

LENTILS

The country's output of summer-sown lentils is likely to fall by nearly a tenth to 6.43 million tonnes in 2011/12 as poor rainfall at the beginning of the monsoon hurt sowing. Though India is the world's biggest producer of lentils, it traditionally fails to produce enough to cater to its domestic demand and relies on supplies from Myanmar, Canada and Australia. The shortfall in summer-sown lentils output will force the world's top importer to raise overseas purchases. Source- Economic Times

(Courtesy : Business Empire, October, 2011)

Technology

Post Harvest Management

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Present Status and future strategies:

Under this article, the following topics were covered in last issue of Plant Horti Tech.

- Post Harvest losses and current scenario of post harvest Management.
- Need tor better post harvest Management.
- Research & Development.
- Pre harvest practices for post harvest loss reduction
- Maturity - optimum stage.
- Harvesting.
- Grading of fruits in India.
- Packing.
- Modified atmospheric packing.
- Status of the cold stores in the country
- Storage.

The left over part of the article is given below.

Concept of Cold Chain

Establishment of a cold chain is very much essential for the effective preservation of quality of the fresh fruits from harvesting to the final consumption. It is essential to have refrigerated transport from the form to the pack house, where it has to be graded, packed and pre-cooled to an optimum storage temperature.

The pre-cooled produce has to be shifted in refrigerated trucks to the cold storage for a long-term storage or to the wholesale market in refrigerated containers. Wholesale centers must have cold storage facilities either individually or collectively.

This type of cold chain linkage helps in introducing a systematic approach and it results in reducing the wastage at farm level transport and storage. At present, the cold chain concept is in operation to some extent for the export of mangoes and grapes with encouraging results.

In addition to the cool storage, depending on the commodity, simple methods like skin coating with wax emulsions for the apple and oranges, individual wrapping of the fruit like pomegranate, use of SO2 fumigation of the grapes by packing with grape guards may further extend the shelf life and reduce the post-harvest losses. Use of growth regulators like gibberillic acid and other senescene inhibitors are also reported to enhance the shelf life.

Controlled Atmosphere Storage:

Developing a storage method, with the combination of low temperature and a controlled atmosphere (CA), is an essential step for the maximum extension of shelf life, especially for the tropical fruits, where storing below 12 C is not feasible, as it results in chilling injury. Reduction of the oxygen and the elevation of carbondioxide reduces the respiration and ethylene production rates, which delays the fruit ripening by retarding the biochemical changes associated with ripening. The optimum CA gas compositions are recommended for different fruits at the optimum storage temperature. Optimum CA storage conditions are standardized for Alphonso and Baneshan varieties of mango and Robusta variety of banana at IIHR, Bangalore.

The high perishable nature of fruits and high airfreight cost necessitated the use of refrigerated sea transport using the CA storage technique, which is successfully used for a long term storage and long distance transport of the fruits in

[1] ***Continued from Jan-Feb - soil Issue***

many countries. In India, trials are being carried out by APEDA to export the mangoes (Baneshan, alphonso and Kesar) from Andhra Pradesh and Maharashtra by sea transport using the CA with refrigeration to the UK with partial success. The major problems encountered were the incidence of diseases like anthracnose and stem-end rot oc'cujrrence, injuries due to CO_2, chilling, sap and ^mechanical damage. Although, a shelf life of 30 to 40 days has been achieved, the results of trial indicated that more work needs to be done regarding the pre-and post harvest practices for the disease control, sorting, grading and packaging. Besides, the requirement of a continous cool chain of an optimum low temperature and the maintenance of continous and optimum gas levels throughout the transport period in CA containers is very essential to have the good quality fruits at the end of transport and storage.

Irradiation:

Application of irradiation for suppressing sprouting and extension of shelf life has been permitted in India. Sprouting of onion can be checked by gamma irradiation at a dose rate of 0.06 to 0.1 KGY. In potato. Gamma irradiation at 0.1 KGY can inhibit sprouting and the light induced synthesis of chlorophyll and the toxic alkaloid solanin. Laboratory studies have indicated that irradiated potatoes could be stored successfully for 6 months at 15 C with 10% loss. Fruits of the climacteric class such as banana, guave, mango and papaya where irradiation in the mature but unripe preclimacteric stage is given in doses in the range of 0.25 to 0.75 KGY showed improved shelf life due to delay in the rate of ripening and senescene.

Transport:

Depending on the distance to be covered, fruits are carried as head loads, on the back of animals, carts, trucks and train. Road transport by trucks is faster and it is preferred as train transport has not proved beneficial, because of the track of ventilated wooden or air cooled wagons, which are also not pilfer proof. Existing unventilated steel wagons build up more heat (40 to 500C) causing more loss. Bulk transport is still by the free loads only. Among different types of the containers, shallow plastic crates were found to be better during transportation of fruits from the field to the pack house or to the local market to prevent bruising losses.

Ripening:

Some of the fruits harvested at mature stage, like mango, banana, papaya, sapota, custard apple etc., have to be ripened under ambient conditions to get a good quality edible ripe fruit. This ripening process involves a series of the metabolic activities. There is an increase in the respiration rate of the fruits, conversion of starch to the sugars, reduction in the acidity, removal of the astringency or tart taste, softening of the fruit, development of a characteristic aroma and colour of skin as well as pulp. The ethylene is released during respiration. In some fruits, like grapes, litchi, pineapple, strawberry, plum etc., which are harvested at ready to eat stage, these changes are not significant.

For the commercial ripening of banana, smoking has been adopted traditionally, but it is being replaced with the use of ethylene gas released by ethrel, a chemical available commercially. It may be used for hastening the ripening of fruits without any undesirable changes in quality. For ripening of the mango throughout the country, calcium carbide is being used, which results in a poor taste of the fruits, because immature mango fruits are harvested and treated with calcium carbide to get a good price. In fact, as per the Prevention of Food Adulteration Act, 1955, Rule 44 AA, the Govt. of India bans use of calcium carbide for the ripening. The adverse effect of this chemical on the taste of ripe fruit is more in acidic varieties like Alphonso & Raspuri. Hot water treatment of the mangoes at 52 to 55 c for 5 minutes has been recommended for a uniform ripening, which also reduces the spoilage by more than 50 percent.

Marketing:

Marketing problems are more in fruits due to their high degree of perishability, season bound availability' and bulky in nature. A few traders with huge marketing margins create havoc in fruit trade. Ther is need for streamlining the marketing operations to provide an incentive for boosting the production and assuring proper income to the growers. Field sales to the pre-harvest contractors are in vogue today. An analysis of the mar-

keting cost has indicated that the commission and transport charges account for 80 to 90% of the total marketing cost. Development of the marketing systems is essential to avoid the activities of middlemen and to help the regulation of trade. National Dairy Development Board in Delhi, HOPCOMS in Bangalore, Farmenrs market in Hyderabad and Bangalore are some of the attempts made in marketing of fresh and graded fruits benefiting the grower as well as the consumer.

Market Intelligence:

Information regarding the demand, supply, price, market outlook, knowledge of the consumer's preference, marketing channels and practices are important for the marketing of produce, which are not available at the moment. Development of e-commerce would boost the marketing and export of fruits and vegetables. Export:

India's export performance of fruits and vegetables is only about 1% of world trade. The low performance of Indian Export of fruits and vegetables is attributed to the following factors:

- Lack of infrastructural facilities for post harvest management.
- Non-availability of suitable varieties, low productivity and high prices making the exporters uncompetitive in the international market.
- Lack of proper pre and post harvest management practices, resulting in poor quality' produce.
- Lack of strict grade and quality' standards.
- Lack of trained personnel and quality' awareness.
- Limited air cargo space and high air freight charges.
- Non-availability of proper pre-& post harvest technology protocols for export by sea.
- Lack of adequate export promotion.
- Over dependence on a few commodities.
- Lack o f cold chain &
- Lack of market intelligence.

Promotion of export marketing is essential for the development of horticulture by overcoming the above hurdles. Quality and safety are the two important factors to be maintained for promotion of export in the post liberalization/WTO regime. Codex standards are to be followed. Intentionally accepted quality management, procedures like Hazard Analysis Critical Control Point (HACCP Certification) has to be followed for competing in the international market.

Table-1 Export of Horticultural Products:

Year	Qty	Value
2007-2008	10,157.20	14,212.90
2008-2009	8,535.57	11,999.14
2009-2010	8,883.87	14,507.50

Value in Rs. Lacs, Qty in Mt

Fruit exports, particularly of the mango, have been from several decades and its potential for the generation of foreign exchange has been more emphasized recently (Table-1). The strength of this sector lies in mangoes & grapes.

APEDA is assisting for enhancing the exports by developing the market intelligence reports and survey of the potential export markets, providing infrastructural base at the growing centers and airports, strengthening of the quality control activities including HACCP standards, developing packages of the international standards and air freight subsidy for the products of high value earning potential.

Value Addition:

Processing of fruits and vegetables for value addition is an indispensable part of horticulture industry. At present processing is limited to few crops only in India although we produce wide range of fruits & vegetables. It is estimated that above 2% of total produce is used for processing as compared to 60-70% in advanced countries. Most of the existing processing units are outdated with capacity not fully being exploited. In addition, there is a need to develop cost effective process essential to boost the morale of our processing sector.

At present traditional products like, mango pulp, brined raw mango slices, pickle, chutney, tomato products and dehydrated onion are the major ex-

port items. New products such as aseptically packed pulps of tropical fruits, blended juices, fruit bars, toffee, fruit juice concentrates and freeze dried products can attract wider spectrum of consumer market. Maintenance of quality standards through GMP & HACCP in processed products is of major concern and requires strict adherence in commodities meant for export. With newer advancement, high tech processes such as asceptic processing, ultrafiltration, hurdle process, vacuum concentration etc. are replacing traditional technologies.

Summary & Future Strategies:

Out country has a good natural resource base with a high production of the fruits and vegetables. But the post-harvest scenario of these commodities is not much encouraging. There is an urgent need to look more closely at some basic aspects of the post-harvest management of fruits.

Following thrust areas/future strategies are proposed:

- Availability of the quality produces suitable for the export to get a high price.
- Standardization of different storage systems including controlled atmosphere system specific for the commodity.
- Development of the infrastructural facilities, such as grading, packing, pre-cooling, cold storage, refrigerated transport (cool chain) and marketing to reduce the post harvest losses.
- Development of the environment friendly packages from the cheaper raw materials or agricultural bio-mass. Development and use of biodegradable film for packing.
- Mechanical loading and unloading of the packages using pelletization to avoid damage during handling.
- High airfreight charges and packaging costs are also the deterrents for increasing the export, which should be reduced suitably.
- Create irradiation facilities.
- Newer technologies like high pressure processing, ohmic heating, microwave heating have to be adopted for production of better and intermediate competitive products.
- Adequate budgetary support from Government of India, for the research, trade and exports, is required for a favorable

Road transport by trucks is faster

horticulture development.

Horticulture is no longer a leisurely avocation, but has become a commercial venture. India with several favorable factors like large production base, a wide variety of the horticulture produce, nearness to the major export markets, the seasonal advantages i.e., availability of fruits, when fruits are in short supply in the European and other markets and cheap labour, will certainly emerge with a buoyant fruit industry in coming years.

Future Strategies for Research and Development on PHM:

- Develop varieties of fruits and vegetables with prolonged shelf life with better processing qualities.
- Standardization of modified Atmosphere Packaging and Storage systems for tropical fruits and vegetables.
- Standardize optimum CA conditions for high valued tropical fruits & vegetables.
- To develop biodegradable films for packaging.
- Study the post harvest of quality of organically produced II. fruits & vegetables.
- To standardize protocols c for tropical fruits & vegetables for ^ export by ship.
- To develop Integrated Post harvest Technology (including pre-harvest and post harvest aspects) for different fruits and vegetables to prevent the post harvest loss greater emphasis in safety (pesticide farms) nutrition & quality.
- Development and standardization of minimally processed fruits and vegetables.
- To develop standardize non-destructive quality analysis methods.

Microbial insecticides

An effective biological tool for pest managment

Microbial insecticides are a new form of pesticide that works by infecting selected insect populations with bacteria, viruses and fungi. Though this sounds potentially dangerous, any argue that it is actually quite safe, since the application of microbial insecticides is specific to the species one is trying to kill. Microbial insecticides usually have no effect on animal populations, unless diminishing a certain bug in the area interrupts the food chain. Each type usually works against only one type of insect.

Bacterial microbial insecticides may be used to control certain types of caterpillars that eat crops. They will kill caterpillars of both moths and butterflies, though, and should only be used where one will not diminish a butterfly population. Normally, this preparation is sprayed directly on crops. One bacterial microbial insecticide works specifically on mosquito populations. It is considered extremely beneficial in eliminating populations that might spread the potentially deadly West Nile virus.

Several viral microbial insecticides work to first sicken and kill some insect species. They may affect moths, and sawflies, depending upon the virus used. Fungal microbial insecticides may be used on cockroaches, and create disease among a whole population. While microbial insecticides may be fantastic at killing a single type of insect, those with infestations of several different types of insects may require the use of several different sprays. Since microbial insecticides are so species specific, they are unlikely to harm any other bugs eating up or infesting crops, so they may not reduce all bug infestations at the same time.

Microbial insecticides also tend to be more vulnerable to outdoor elements. For example, long exposure to the sun, or heavy rains can kill certain bacteria. Therefore those attempting to control insect populations must be careful as to when it is appropriate to spray crops to achieve the maximum effect desired. Chemical insecticides have helped keep our agricultural fields free of pests for centuries. However, the toll they have taken on our health and on the environment cannot be ignored any longer. Alternate pest control methods are the way to go if we want to preserve what is left of the Earth's environment, at the same time safeguarding the health of our families. One of the alternate methods of pest control that is gaining popularity is microbial insecticides. They employ microbes as insecticides- what can be more natural and environment-friendly? They are completely non-toxic to other animals and to humans, when compared to chemical insecticides. Microbial insecticides are also called as biological pathogens or biological control agents. They are basically made up of microbes like bacteria, viruses or fungi that produce toxins that are harmful to the pest. Bacterial insecticides function only when ingested by the pest. They may kill a variety of related pests or just one. For example, Bacillus thuringiensis var. Kurstaki can kill in the caterpillar stage of development, a range of moth pests. But, Bacillus papillae can kill only the Japanese beetle larvae but not closely related species.

These insecticides are formulated in such a way that they can be easily applied to the plant just like chemical pesticides. They are available as sprays, powder and in the granule forms. Some microbial insecticides also employ nematodes as biological agents.

The Action of B. thuringiensis var. Kurstaki on Caterpillars

The B. thuringiensis insecticide (Bt) has been in use since the 1960s. The components are produced in industrial fermentation tanks under ideal conditions. It was discovered that the Bt strain that had undergone sporulation was toxic to larvae. This led to the conclusion that some toxic substance must be produced during the sporulation process. This toxin was discovered to be crystalline inclusion bodies with a large bipyramidal structure and a smaller cuboidal inclusion. When, the susceptible crop is sprayed with preparations of B. thuringiensis, the cater-

pillar pest will consume the leaf containing the endotoxin. Once in the gut, the toxin is activated by the alkaline conditions and it binds to the cell surface receptors within the gut. Whether the protein is toxic to the insect or not is determined by the presence of these receptors. The caterpillar stops feeding while the intestinal cells get paralyzed and destroyed. The intestinal wall disintegrates and the toxin enters the blood cavity. The pest itself comes under attack from spores and bacteria, which enter the body cavity. After a day or two, the caterpillar is killed by their action. Since the caterpillar stops feeding almost as soon as it starts, the crops are safe. The crop that is suffering from a caterpillar pest problem may also be genetically modified with the insertion of a gene that produces a crystalline endotoxin.

Advantages of using Microbial Insecticide

• It is completely natural and does not introduce any new or man-made chemicals into the environment.

• It is absolutely non-toxic and safe for the farmer and the consumer. Its toxicity, if any, is directed solely at the plant being treated with the insecticide.

• They do not affect beneficial organisms. Although they contain microbes, microbial insecticides are not pathogenic in nature and do not affect the other animals or plants that are not targeted by it. This is one of its strongest advantages. ® In some cases, the microbial insecticide can be sprayed along with the chemical insecticides- they are usually not affected adversely.

• They can be applied at almost any stage of the planting, even at the harvest stage. These pathogens may also help act as a control for the future.

• They are extremely stable if stored under the right conditions and can last years in storage. The crystals are not inactivated by UV light.

Disadvantages of using Microbial Insecticides

• The microbial insecticides are highly specific in nature. An application of a particular microbial insecticide may be toxic to a highly specific type of pest. So, to treat a combination of pests, a combination of microbial pesticides may be required.

• The specificity of the microbial insecticides limits their distribution and popularity. They may also be more expensive than chemical insecticides

• Some environmental conditions may be unfavorable for the optimum action of microbial insecticides. These may include high heat and desiccation. It is of utmost importance to time the application of the insecticide precisely.

• Preparations of some formulations may be complex and the storage of some of them can be tricky.

• The action of the Bt toxin may be inactivated under some weather conditions. A few repeated applications of the preparation may be required.

• To ensure that the larva will ingest required amount of toxin, a large amount of the preparation may need to be applied.

• The speed with which they kill the pest may be slower than the chemical pesticides and this may lead to the supposition that they are less effective.

Microbial insecticides battle damaging insects by enlisting the aid of microscopic, living organisms - viruses, bacteria, fungi, protozoa, or nematodes. They are "unconventional" insecticides, but they can be applied in conventional ways - as sprays, dusts, or granules. Microbial insecticides are essentially nontoxic. They also do not pose a disease risk to wildlife, humans, and other organisms not closely related to the target insect. In fact, they can be applied when a fruit or vegetable is almost ready for harvest. Another disadvantage of microbial insecticides is that heat, drying out, or exposure to sunlight reduces the effectiveness of several types of microbial insecticides. Therefore, proper timing and application are especially important for some products.

The most popular microbial insecticides in the United States are preparations of the bacterium known as Bt. Bacterial insecticides must be eaten by the pest to do their job. The most widely used

Bt products are pathogenic and toxic only to caterpillars - the larvae of butterflies and moths. Other varieties of Bt are available to control Colorado potato beetle larvae and certain mosquito larvae. Viruses also must be ingested by the insect. They often cause dramatic natural disease outbreaks among insect populations. But unlike bacterial insecticides, the development of virus-based insecticides has been limited. Some important pests for which viral insecticides have been developed include the gypsy moth, pine sawflies, and the codling moth.

Like viruses, fungi create natural epidemics among insect populations, often killing a high percentage of the population. Only a few fungal insecticides are currently available in the United States. One is the Bio-Path cockroach control chamber-a fungus is the active ingredient.

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(Courtesy : Plant Horti Tech, Aug - Sep 2011).

"CAN WE AFFORD ?"

Palm Biodiesel: Development and Current Status

Harrison Lau Lik Nang*; Choo Yuen May* and Lim Weng Soon*

INTRODUCTION

BIODIESEL is one of the liquid biofuels that has been successfully evaluated as diesel substitute and gained worldwide acceptance (Choo etal., 2005). Today, many countries have mandated or given incentives for the use of biodiesel, whether derived from palm, soyabean, rapeseed or other feedstock in their diesel fuel. The leading countries in producing and promoting the use of biodiesel through mandates and incentives are the European Union and the United States. Other countries in Southeast Asia such as Thailand, Indonesia, Malaysia and the Philippines have also introduced the use of biodiesel in recent years. The major reasons for the use of biodiesel in these countries are to enhance energy security by reducing dependency on fossil fuel import, to reduce greenhouse gas (GHG) emissions and to support the agricultural sector which supplies the biodiesel feedstock. At the current moment, most of the engine manufacturers and original equipment manufacturers (OEM) of fuel injectors have provided warranty to use biodiesel subject to a maximum blending ratio of 5% based on volume. The blending ratio may be increasing from time to time as seen in the European Union (EU) diesel specifications (EN 590:2009+A1:2010) where the maximum limit of biodiesel of 7% has been allowed. Other issues such as sustainability of biodiesel production and potential GHG emissions saving of using biodiesel are being discussed globally.

DEVELOPMENT OF MALAYSIAN BIODIESEL INDUSTRY

The launching of National Biofuel Policy on 21 March 2006 by the Prime Minister of Malaysia has paved the way for the establishment of the biodiesel industry in Malaysia. The National Biofuel Policy envisions that the production and use of biofuel will enhance the prosperity and well-being of all stakeholders in the agriculture and commodities-based industries through stable and remunerative prices of palm oil.

The policy is primarily aimed at reducing the country's dependency on depleting fossil fuels, promoting the demand for palm oil and stabilizing its prices at a remunerative level. There are five strategic thrusts underpinned by the policy namely, (i) biofuel for transport, (ii) biofuel for industry, (iii) biofuel technologies, (iv) biofuel for export, and (v) biofuel for cleaner environment.

In June 2006, a significant milestone of the

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biodiesel industry was achieved by the successful commissioning of the first normal-and winter-grade commercial palm biodiesel plants by Carotino Sdn Bhd with capacities of 60 000 and 30 000 t per annum respectively based on MPOB technologies (Choo and Goh, 1987; Choo and Ong, 1989; Choo et a/., 1990; 2002). Since then, 91 biodiesel manufacturing licences have been issued by MIDA and to date, 61 licences have been re-issued (some with conditional approval) by the Ministry of Plantation Industries and Commodities which has since assumed the licensing function for biodiesel. The total approved biodiesel production capacity stands at 6.7 million tonnes per year.

In line with one of the strategic thrusts underlined in National Biofuel Policy, the Malaysian biodiesel industry has been exporting biodiesel since 2006 with gradual increase in total export volume from 2006 to 2009 as shown in Table 1. The major feedstocks used were crude palm oil and refined palm oil and the major export destinations were the EU and the US.

MPOB played a key role in getting published the Malaysian Biodiesel Standard on Automotive Fuels - Palm Methyl Esters (PME) for Diesel Engines - Requirements and Test Methods (MS 2008:2008) in October 2008 to facilitate the local implementation of biodiesel usage. The Standard is substantially similar to biodiesel specifications stipulated in EU Standard EN 14214 and US Standard ASTM D 6751.

TABLE 1
MALAYSIA PALM BIODIESEL EXPORT (2006-2009)

	Volume (t)
2006	47986
2007	95013
2008	182108
2009	227457

Source: MPOB (2009).

CURRENT STATUS OF B5 IMPLEMENTATION

The commercial use of 5% biodiesel with 95% diesel (B5) in Malaysia started in February 2009 in selected government departments, viz. Dewan Bandaraya Kuala Lumpur (DBKL), Armed Forces and Ja-batan Kerja Raya (JKR). A total of 4000 vehicles are involved in this initial phase of implementation. No engine problem have been reported as of October 2010.

The Minister of Plantation Industries and Commodities has announced the mandatory use of B5 in central region which covers Kuala Lumpur, Putrajaya, Selangor, Negeri Sembilan and Melaka in June 2011 (The Star Online, 2010). The implementation shall cover all sectors including transportation and industrial sectors.

The government through MPOB is actively facilitating the setting up of proper inline blending facilities for biodiesel by petroleum companies at

Figure 2. MPOB-Sime Darby winter-grade palm biodiesel plant.

Figure 1. MPOB-Sime Darby normal-grade palm biodiesel plant.

depots and terminals in the central region. Con currently, the licensing and regulatory framework a being finalised.

CONCLUSION

Biodiesel, as diesel substitute remains as the most readily available liquid renewable energy in the world today. Malaysia is committed to produce biodiesel in the most sustainable manner so as to achieve highest GHG emission reduction through the use of biodiesel. Whether the biodiesel will sustain itself in the face of uncertain demand will depend on developments in global market.

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Organic Farming Principles and Concepts

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ALTHOUGH, there is no single International organic production regulation, all generally accepted organic rules prohibit use of synthetic fertilizers, pesticides, growth regulators livestock feed additives and emphasis on long term soil management. The ethics of organic farming is to generate all the required plant nutrients within the farm and adopt crop protection using local resources, restricting external inputs to bare minimum, if not avoid. The organic farming is essentially a soil building mechanism, to make the soil living and sustainable. If takes 3-4 years before the soil to become living, if the principles of organic farming are applied faithfully. When once a satisfactory condition is reached it will take care of itself with minimum maintenance cost and requiring no eternal inputs.

The United States Federal Trade Commission (FTC) defines organic food as production of food grown on humus-rich soil, whose fertility has been maintained organically with no fertilizer, pesticides and synthetic additives.

USDA defines organic farming as " a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and live stock feed additives" (Gold, 1994). Organic farming relay upon rotations, crop residues, animal manures, legumes, green manures, off-farm organic waste, biological or mechanical control of pests, diseases and weeds.

IFOAM-Principles: The worldwide umbrella organization of organic agriculture (International

Federation of Organic Agriculture Movement) founded in 1972 in Versailles, near Paris, France, By Five organization from three continents, Flurope, USA and Africa, has now grown to over 600 members from more than 100 countries. The main principles of IFOAM organic agriculture include all agriculture systems that promote the environmentally, socially and economically sound production of food and fibres. It aims to optimize quality of all aspects of agriculture and environment keeping soil fertility as a key to successful agricultural production.

In India, organic agriculture is as old as Indian Agriculture and no set standards were existing except the traditions set by our ancestors and handed down from generations. Our traditional agriculture closely followed nature, in a way defined in recent times as 'nature farming', rooted on sound principles of sustainability. Sir Albert Howard, who came to India as an Imperial Fconomic Botanist in 1905 to work at the Imperial Agriculture Research Institute, Pusa, Bihar had all the admiration of Indian peasantry, who followed "good farming, faithfully copying nature in their agriculture. Live stock were not merely source of nutrition in the form of milk and meat or of energy in the form of draught animals, their urine and dung was crucial cog in the progress of growth. So were growing leguminous crops, ploughing back crop residues and the extensive use of green manure" (Howard A 1924). Howard also developed a scientific method of composting,now known as Indoor method of composting, which later spread to Europe, Latin America and Africa. His writings on Indian sustainable agriculture influenced several farmers in the west and began to be known as 'organic agriculture'.

However, the centuries old sustainable agriculture took a turn towards chemical agriculture in the early fifties of the last century, as several compelling factors emerged simultaneously including the acute shortage of food. It met the demand of food, but left many questions unanswered satisfactorily. A new thinking began in 1990's when agriculture production started declining in spite of all the modern, high tech inputs like high yielding varieties, fertilizers, pesticides, irrigation were available, backed up by good monsoon. A task force on farming was constituted by the Government of India in the year 2000 to find out the causes for the decline in yield and immediate steps to be taken to promote organic farming in the country on the line with worldwide trend.

The Indian National Programme for organic production (NPOP) recognizes that the fertility of the soil is to be maintained and increased with the biological activity of the soil held intact; the farmers must become self sufficient in producing organic manure to avoid fertilizers; the seed and plant material must be sourced from the existing organic farms or to be obtained from other organic farms, all species and varieties of plans that are cultivated should be adopted to the soil an climatic conditions that of they are introduced and an innate resistance to pest and disease must emerge in such varieties; the pest, disease and weed must be managed either, mechanically, biologically or by rotation of crops or companion planting, avoid contamination of pesticide, weedicides and other chemicals through irrigation and drainage. The organic produce must be stored, transported and conveyed to the final consumer in its pristine state.

A member of alternate agricultural methods similar to organic agriculture is being advocated in different countries under different names. Some of them are discussed here under.

- Biodynamic Agriculture: Biodynamic agriculture was developed by Dr.Rudolf Stenier (1861-1925), an Austrian philosopher and scientist. Its principles are based on the natural phenomenon that cosmic and terrestrial forces to enhance the growth, quality and nutritive value of plants and animals. Biodynamic preparations are derived from a varictv of herbs, silica and cow manure. The preparation are said to vitalize the living activity and fertility of soil in addition to proper breakdown of compost. The utility of this system depends on the relative position of the stars, planets, sun and moon on the growth and development of planets. A biodynamic calendar gives guidance to farmers for sowing vegetables and other seeds (Biodynamic Farming and Gardening Association: 3, Gold 1994).

- Low External Input and Sustainable Agriculture

(LEISA): LEISA is a Dutch concept to promote

ecological agriculture in many countries through local participation using local resources, local knowledge and experience. In this system external inputs are included, but advocates judicious use supported by scientific knowledge. In addition to soil and water harvesting, agro-forestry, integrated pest management, intercropping, crop-livestock integration, microclimate management and use of local species of animals and plants in food production are included in LEISA.

• Permaculture: It is also known as permanent agriculture. The concept of permaculture, developed by an Australian, Bill Mollison in 1970's, is to creat sustainable human environment (Mollison and Shay, 1991). Permaculture emphasizes on a design to include each element in landscape to produce an efficient low-maintenance integration of plants, animals people and structure. It can be applied to home gardens as well as large farm.

• Regenerative Agriculture: It is the concept of Robert Rodale of USA. It aims is to ecologically restore a farm or an agriculture system through the use of resource efficient and ecologically sound farming system.

• Sustainable agriculture: It is attributed to Brundtland (1987) who stated that "Sustainable development is the ability to ensure the needs of the present without compromising the ability of future generations to meet their own needs". Sustainable agriculture include all the practices advocated in organic agriculture such as crop rotation, intercropping, biological control of pest and weeds, no-till or reduce tillage, integration of livestock with crops, use of organic manure, leguminous crops, compost, etc., in place of chemical fertilizer.

• Nature farming: This is based on the teachings of the Japanese philosopher Mokichi Okada (1882-1955), featuring a belief in the productive powers of soil, fire and water elements and devised to contribute to an ideal civilization. The principle is nearer to our vedic principles, wherein the 'Pancha Bootas' the five elements, fire, earth, water, air and ether (Akasha) are known as the building blocks of every life, including plant, on earth and therefore they are worshiped or revered.

Nature farming is an integrated system of production, marketing and consumption that builds upon the inherent life giving principles of the soil, water and fire(sunlight), Mokictu Okada began experimenting with nature farming in 1936 in his own garden in Tokyo. Subsequently, people followed his methods in gardening and found to be highly productive and spiritually satisfying in building link between humans and nature. He moved his base of operation from Tokyo to Hakone, acquired land in Atomi, and established nature farming society in 1953. Mokichi Okada association (MOA) was established in 1980, 25 years after his death and started MOA, Ohito nature farming experimental farm. MOA has more than 36 branches world over and every year people come here for training where too had the privilege of undergoing training. MOA India branch started during 1990s at Bangalore created good awareness about nature farming and is importance on 'healthy soil, healthy food and healthy people" (Anonumous).

• Nature's agriculture: Albert Howard (1940) enumerates the principles underlying in 'Nature's agriculture'; operating in our woods and forests. In the forests, biodiversity exists in every form and there is never any attempt of monoculture whether plants or animals. Soil maintains strict economy, nothing is lost, the sun's energy is made use of both of canopy and of the undergrowth, the rain reaches surface gently, preserving the litter and soil. The pore space of the forest soil is at its maximum. The forest manures itself, makes its own humus and supply itself with minerals, there is no deficiency of any mineral. The humus provides the organic manure, the soil supply mineral matter. "There is no hand to mouth existence in nature's agriculture". Here and there all kinds of pest and disease are found but never assume large proportion. Nature's rule in these matter is to live and let live. Howard conclude that "Mother earth never attempts to farm without livestock. She always raises mixed crops, great pains are taken to preserve the soil and prevent erosion, the mixed vegetables and animal wastes are converted into humus, there is no waste the process of growth and the process of decay balance one another, ample provision is made to maintain large reserves of fertility, the greatest care is taken to store the rainfall, both plants and animals are left to protect themselves against disease.

Thus, true Nature Farming is to be in tune with

the above principles. All the above, Nature's principles may not have been followed in our present day 'nature farming'. It is a good towards which we aim at to be nearer to nature through the organic farming principles. In every form of present day farming we are going away from the Nature's principles, the trend needs to be reversed and organic,^ farming is a step in this direction.

"BE HEALTHY"

Role of Soyabean in Human Health

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SOYBEAN is an environment friendly grain legume and provides high quality protein, oil and health promoting phyto-chemicals at a low cost and help people, who eat it in their daily diet, feel better and live longer with an enhanced quality of life. One of the easiest ways of using soybean in daily diet is the fortification of whole wheat flour with full fat soyflour (10-15%) and making the use of the mix-flour in the normal way. It enhances the content and quality of protein and also provides micro-nutrients for better human health and longevity. Indian population is predominantly vegetarian and their diets lack in quantity and quality of protein. Moreover, the cost of one kg pulse protein is about Rs. 3007kg and that from livestock is Rs. 500-1200/kg. In such a situation, soybean is an alternative because soy protein quality is at par with livestock protein and cost is only Rs. 75-100/kg. Soyfoods and beverages are also free from cholesterol and lactose and suit the poorest of the poor on account of economic and health benefits and to the richest of the rich because of health benefits. Use of30-35 g of carefully processed soybean in daily diet helps people to have better health and live a happy life.

Soybean Cultivation also improves soil health because of its .atmospheric nitrogen fixing ability and deep root system. Soybean has now become an important world commodity because of its wide range of geographical adoption, unique chemical consumption, good nutritional value, functional health benefits and industrial applications. Soybean is, therefore, a human, animal and soil friendly crop and its production and utilization need to be encouraged and promoted for the betterment of the planet earth and its inhabitants. India has a great potential for production and domestic utilization of soybean and its derivatives for health and economic benefits of the people of the country. Soybean provides approximately 60% of vegetable protein and 30% of edible oil in the world and ranks 3rd in vegetable oil economy of India after groundnut and rapeseed mustard. Indian produces about 10 million tonnes of soybean annually (Table-l) and a substantial portion (85%) is produced in the states of Madhya Pradesh and Maharashtra.

Indian People and Their Diets

There are more than 1200 million people in India and majority of them (65-70%) are vegetarian and derive their proteins from pulses, cereals, milk and, to some extent, from oilseeds like groundnut, sesame and soybean. In general, the quality of protein eaten by such population is poor. Better quality proteins from egg, meat and aqua products are costly and only select groups of rich population have access to it. About 40% of Indian population are below poverty line (BPL) and do not have enough purchasing power for good quality dietary proteins. This calls for providing them an alternative source of dietary protein, which could financially be affordable. Soybeans meet such requirements. Hence for India, one of the options is to make use of soybean as protein source to augment its conventional protein supply at a cost / price affordable by one and all, especially the lower income group of population.

Soybean is one of the oldest food sources known to the human beings. On an average, it contains about 40% protein, 23% carbohydrates, 20% oil. 5% mineral, 4% fibre and 8% moisture (Table - 2). Soybean is recognized for its value in

Table 1: State wise Production of Soyabean in India (2008-09)

States	Production, million tonnes	% of Total Production	Remarks
• Madhya	• 5.5	• 52.4	• Madhya Pradesh and Maharashtra produce about 85% of total Soyabean in India
• Pradesh	• 3.5	• 33.3	
• Maharashtra	• 0.8	• 7.6	
• Rajasthan	• 0.7	• 6.7	
• Rest of India			• Soybean Productivity is about 1100 kg/ha
Total India	**10.5**	**100.0**	

enhancing and protecting health. Soy protein has all the eight essential amino acids. The recent discovery of the value of soy isoflavones and their role in disease prevention has created special interest of human being in soybean. It has boundless food potential.

Acceptance of soyfoods in India is increasing but at a slower pace because it is a new introduction to the food baskets of Indian people. In order to accelerate the process of promotion of soy foods, creation of awareness about the economic and health benefits of soy foods, transfer of presently available technology, development of specialty new and diversified products and human resource (HRD) are needed.

Nutritional and Economic Benefits

Soybean is an excellent source of nutrition and health promoting phytochemicals at .an affordable price. Regular use of soybean in daily diet enhances and protects human health and results in longevity - the goal every human wants to achieve. Hence, the food, feed and pharmaceutical use of soybean is in the interest of mankind and it, therefore, should be promoted globally and particularly in India where a majority of its population is vegetarian and suffer from protein energy malnutrition.

Processed soybeans in the form of full fat soyflour (FFSF) would cost about Rs. 40/kg in the retail market with about 40% protein and other nutrients whereas an average cost of one kg split pulse (dal) in the market is about Rs 75 and its protein content is about 25%. Quality wise, soy protein is better than pulse protein. In fact, soy protein is of the best quality among all plant proteins. Soy based food item, like FFSF containing all nutrients as well as phytochemicals is healthful and economically affordable by all sections of Indian population, especially those living below poverty line. Cost of one kg soy protein in the form of soyflour is Rs 75-100 whereas one kg protein in the form of dal (split pulses) is Rs 300 (Table - 3). Protein efficiency ratio (PER) of soy protein increases considerably when combined with cereal and other legume proteins. Health benefits that could be derived from regular use of soybean in daily diet is given in table 4.

Table 2: The approximate food value of 100 g of edible soyabean

Constituents	Value, g
• Protein	40
• Carbohydrates	23
• Fat	20
• Moisture	8
• Minerals	5
• Fibre	4
Dietary Energy	**430 k Cal**

Table 3: Approximate cost of one kg of protein from different sources

Source	Cost of one kg protein, Rs
• Defatted Soyaflour	75
• Fullfat Soyaflour	100
• Split pulses (dal)	300
• Egg	400
• Milk	500
• Chicken	600
• Fish	720
• Meat	1200

Table 4: Major Health Benefits from the Regular Use of Soyabean in Daily Diet

Nutrients	Health Benefits
Protein	Lowers blood cholesterol
Carbohydrates	Relaxes constipation. Good for diabetics
Fat	Prevents cardio,... vascular diseases
Mineral	Overall health promotion
Vitamin	Overall health promotion
Phytochemicals	Prevent cancer, helpful in menopause and osteoporosis

Table 5: Some of the Potential Food Uses of Soyabean and its Derivatives / ingredients

Soybean and Its Products/Ingredient	Some of the Potential Food Applications
Whole Soybean foods, sprouted bean, Tempeh, Miso, Natto and	Soybased dairy analogs, fullfat soyflour, snack Sauce
Soybean Oil Soyaproteins (Edible Soybean meal)	Cooking/ shortening oil, salad oil, margarine, bread spread and soylecithin Texturised soyaprotein, soyaprotein concentrate, soyaprotein isolates, defatted soyaflour, and dietary fibre
Soybean byproducts (hull & okara) Soybean crop residue (leaf, branches & stems)	Single cell protein (SCP) and dietary fibre Animal feed, fuel, and manure

Table 6: Traditional and non-traditional soya products being used in India and those having good potential in near future

Traditional products		Non-traditional products
Non-fermented	**Fermented**	
• Cooking oil	• Yogurt	• Texturised soy-protein
• Hydrogenated fat	• Tempeh	• Health foods
• Flours, flakes and grits	• Sauce	• Lecithin
• Roasted/fried nuts		
• Roasted/fried nuts		• Protein concentrate
• Sprouted beans		• Protein isolate
• Cooked beans		• Protein hydrolysate
• Milk		• Liquid protein
• Paneer (Tofu)		• Vadi
• Bakery products		• Splits (dal)

It is well known that protein is essential for every one and it is derived from plant and animal sources. Some of the potential food uses of soybean and its derivatives are given in Table 5.

Soyabased Food Products

Indian snack foods like cookies, sev, laddu, halwa, have been prepared by replacing 15-30 % of the traditional ingredients with soy products and found acceptable by the people. Soy-fortified wheat flour gave good preparation of chapattis, pun and paratha. Chickpea flour (Besan) mixed with soyflour resulted into a good quality fried snack food like sev and pakoda. Soyflour incorporated idlidosa batter gave good and acceptable products.

The consumers have found soycereal extruded snacks quite acceptable. Green soybean can also be used as vegetable. Soy products can fit very well into various Indian food recipes provided it is properly processed and blended. Technology and hardware are necessary to develop entrepreneurs in soyfood manufacturing and marketing. Some of the traditional and non-traditional soy products are listed in Table 6.

Soybased Food Entrepreneurs

Many small-scale entrepreneurs are interested in soyabased food manufacture. However, they wish to see the working of a complete plant to know the actual investment cost and the facts about plant capacity and product quality to judge the market potential and to be sure of training facilities available for their production staff, before deciding to go for the establishment of a soyafood plant. Project reports along with economic profile/ analysis based on actual commercial-scale plants are needed. Training in soyabased food production and machinery are also required for individuals, groups and entrepreneurs for domestic use and commercial manufacturing. Constraints in Soyfood Promotion.

In spite of a number of good features of soybean, there are a few constraints associated with soyabean for its food uses. If not properly processed, the constraints are beany flavour of soyafood products and oxidative instability of soybean oil. So far, two major approaches have been used to overcome these constraints. One is through innovative processing and the other one is through plant breeding. Now, other means, such as marketing efforts, medical discovery, consumer education and change in dietary habits are also needed. Acceptance of soyafoods in India has been rather slow. However, now more and more people are tilting towards soyafood because of its economic, nutritional and health benefits.

Soyaproducts and its Present Uses

The primary interest in soybean in India has been about its oil. However, increasing attention is now being paid to the protein potential that soybean offers. As of now, about 15 - 20% of total soybean production in India goes for direct food and feed uses, 10% for seed and 70 - 75 % is processed for oil and protein. Crop residues like leaves, fine straw are used as feed and the hard and woody stem for fuel in the rural areas.

The major food uses of soybean in India is for oil, protein, and lecithin.

The present soybean oil processing capacity is about 15 million tonnes of soybean and that for food is about three million tonne. The Indian soybean industry has capability to process soybean for food, feed, pharmaceutical and industrial application. The present soyafood industry has about 500 units.

The major food uses of soybean, as of now, in India are edible oils, texturised soyproteins (TSP), flours, bakery products, milk / paneer (tofu), soy protein concentrate / isolates / hydrolysates, lecithin and others. The need is to create awareness about soy products and their benefits and make available such products in the market through small scale decentralized soyafood processing enterprises. Domestic level processing and utilization of soybean for food and feed need to be given priority especially in the rural sector. The centre and state development agencies may come forward and make plans to promote soy based foods. The hardwares and technology for a number of soyafoods matching with the Indian food recipes and food habits are available.

(Courtesy : September - October 2011, SAARC Oils & Fats Today, Pg 16-19.)

ZOOM !

Biofuels in the air

Marguerite Torrey

European airlines in particular are ramping up efforts to use biofuels for their commercial flights.

Commercial airlines with European routes must participate in the European Union's cap-and-trade system for controlling C02 emissions as of 2012 (they have been exempt until now). If they exceed limits set by the European Commission, these airlines will have to buy additional permits, taking away from their bottom lines. Thomson Reuters Point Carbon indicated in March that the cost of these permits to airlines in 2012 alone could add up to $1.9 billion (http://tinyurl.com/PointCarbon).

As 2012 approaches, European airlines are ramping up their tests of biofuels, searching for the right fuel for the right plane that will limit their liability for greenhouse gas (GHG) emissions. They are also seeking to ensure that the fuels they choose require no adjustments to aircraft engines or infrastructure. The Paris Air Show was an excellent place to see how solutions to these issues are being developed.

The Paris Air Show

Le Bourget Airport, the general aviation airport for the city of Paris, France, hosted the 49th Paris Air Show in June. The show attracted about 145,000 professional visitors; 2,100 exhibitors showing off their latest technological innovations; and 200,000 members of the public. Transatlantic fly-ins. Two airplanes made first-ever transatlantic flights into the Air Show powered at least in part by biofuels. A corporate Gultstream G450 jet, carrying executives from Honeywell UOP, flew nonstop from company headquarters in Morristown, New Jersey, USA, to Paris, landing in about seven hours (Fig. 1). A 50:50 blend of Honeywell-UOP Green Jet Fuel and petroleum-based jet fuel powered one of the two Rolls-Royce engines in the plane. The biofuel was derived from camelina oil that had been grown and harvested by Sustainable Oils (Bozeman, Montana, USA). Based on lifecycle analyses, Honeywell calculated that using green jet fuel on the flight saved approximately 5.5 metric tons of net CO2 emissions compared with the same flight powered by petroleum-based fuel.

Boeing flew a new 747-8 freighter from Seattle, Washington, across the United States and then on to the Show. Each of its four General Electric GEnx-2B engines was powered by a blend of 15% camelina-based biofuel mixed with 85% traditional kerosene fuel (Jet A). Boeing says the 747-8 freighter is set to enter service with a double digit reduction in carbon emissions. Cargolux of Luxembourg is the freighter's first customer (www.Bloomburg.com, June 24,2011). Biofuels at the Show. An entire hall was devoted to "Alternative Aviation Fuels." Companies promoting biofuels at the Show included (http://tinyurl.com/BiofDig-Paris):

FIG. 1. The Gulfstream G450jet lands in Paris, France, after flying from New Jersey, USA, on a 50:50 blend of camelina oil-based and petroleum-based jet fuels. Courtesy of Honeywell Aerospace

- Altair Fuels, Seattle, Washington, USA
- Amyris, Emeryville, California, USA
- Axens, Rueil-Malmaison, France
- Gevo, Engelwood, Colorado, USA
- Heliae, Gilbert, Arizona, USA
- Lanzatech, Auckland, New Zealand
- Metron Aviation, Dulles, Virginia, USA
- Neste Oil, Espoo, Finland
- Sapphire Energy, San Diego, California, USA
- SkyNRG, Amsterdam, Netherlands
- Solazyme, South San Francisco, California, USA
- Solena, Fort Collins, Colorado, USA
- UOP Honeywell, Morristown, New Jersey, USA
- Verno Systems, Seattle, Washington, USA

Honeywell-UOP touted the reliability of its Green Jet Fuel at the Show. The company has already produced more than 700,000 gallons (2.6 million liters) of hydroprocessed fuel from sustainable, inedible sources such as camelina, jatropha, and algal oils. Camelina oil served as feedstock for 500,000 gallons of that biofuel. Sixteen flights testing the Honeywell fuel have been carried out so far on military and commercial platforms, and in aJl cases the fuel met specifications for flights without any modification to the aircraft or engines (http://tinyurl. com/HoneywellGreenJet).

Neste Oil showed off its NExBTL renewable aviation fuel, which is based on hydrotreating vegetable and waste oils. The company especially stressed the reduction in GHG emissions possible with its fuel, as well as other air pollutants such as sulfur oxide.

Heliae Development, LLC, an algae technology company, and Azmark Aero Systems (Gilbert, Arizona, USA), a designer and manufacturer of gas turbine engines, announced at the Air Show their agreement to develop and test algae-derived jet fuels. Azmark s small precision turbine engines are designed primarily for use in military unmanned aerial vehicles. In a company statement, Heliae Chief Executive Officer Dan Simon said, "These smaller engines are unforgiving when it comes to the quality of fuel that they require and we are excited and eager to engineer renewable fuels to meet... these rigorous standards." Heliae will begin producing testable quantities of algae-derived jet fuels at its pilot facility in Gilbert during the third quarter of 2011.

Who's already flying with biofuels?

Since 2009, a number of airlines have conducted a number of demonstration flights using biofuels, including Virgin Atlantic, Mexican Interjet, KLM, United Continental, Japan Airlines, Qatar Airways, and Qantas Airways. As 2012 approaches, more are carrying out long-term trials to ensure the fu-

TABLE 1. Biofuel-powered commercial airlines flying regularly scheduled flights[0]

Airline	Plane(s)	First flight	Fuel source	Fuel feedstock	Roundtrip route	One-way distance (km)
Aeromexico		2012	Honeywell-UOP	Jatropha	Mexico City to San Jose, Costa Rica	1,900
FinnAir	Airbus A319 Airbus A320	July 18, 2011	SkyNRG	Used cooking oil	Amsterdam to Helsinki	1,500
KLM	Boeing 737	September 2011	Dynamic Fuels, as supplied by SkyNRG	Used cooking oil	Amsterdam to Paris	400
Lufthansa	Airbus A321	July 15, 2011	Neste Oil	Jatropha, camelina oil, and/or animal fat	Hamburg to Frankfurt	520
Thomson Airways	Boeing 757	September 2011	Via Sky NRG	Used cooking oil	Birmingham, UK, to Raima de Mallorca, Spain (Summer); to Alicante, Spain (winter)	1,500

[0]All but Aeromexico are using a 50:50 blend of biofuel/commercial jet fuel. Aeromexico plans to use a 30:70 blend.

els they have chosen are good, safe, and sustainable. As shown in Table 1, both Finnair and Lufthansa initiated regularly scheduled commercial flights in July 2011. Tests will be carried out for six-12 months before results are evaluated to determine reliability of the fuel and effects on airplane engines.

KLM and Thomson Airways, a British charter airline, plan to start flying with biofuels on a regular basis in September. Aeromexico will follow in 2012.

Who's making plans to fly with biofuels?

Ten airlines—including American Airlines, United Airlines, Air Canada, Alaska Airlines, FedEx, Frontier Airlines, JetBlue Airways, Lufthansa, Southwest Airlines, and US Airways—announced at the Paris Air Show that they had signed letters of intent with Solena (Washington, DC, USA) for future purchase of jet fuel from 2015. The fuel will come from Solena's GreenSky California biomass-to-liquids facility (http://tinyurl.com/FlightGlobal-Paris), which is scheduled to be constructed in Santa Clara County, California, in 2013. The facility will supply the airlines in the San Francisco Bay area with 1,000 barrels a day of jet fuel made from urban and agricultural waste. According to the FlightGlobal article, United Airlines' Managing Director Strategic Sourcing-Fuel Robert Sturtz said the fuel will be divided among the airlines as a "proportional split based on the size of the carrier" and will be burned as a 50:50 blend with traditional kerosene.

The fuel will be trucked from the Solena production plant to airports in San Francisco, Oakland, and San Jose, where the aircraft will be fueled. The plant is being designed to produce annually up to 16 million gallons of neat jet fuel from 550,000 metric tons of waste through the Fischer-Tropsch process. Solena is already working on similar projects with airlines in the United Kingdom and Australia.

For example, British Airways (BA) is developing plans to use : London's municipal waste to produce biofuels for use in its aircraft at London City Airport (see inform 22:118, 2011). The aim is for this plant to enter production in 2014; if successful, it could provide 2% of BA's entire fuel needs (http://tinyurl.com/BritishAir-biofuel).

Why are airlines only now introducing biofuels commercially?

The brief answer to this question is, the airlines finally have a standard, agreed-upon fuel to use. In mid-June the ASTM International Committee on Petroleum Products and Lubricants, composed of industry, air force, and regulatory stakeholders, unanimously approved the addition of a new bio-derived jet fuel annex to the alternative jet fuel specification D7566-11, Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons. The vote to approve concluded the technical review process, and was expected to lead to the final issuance of the revised specification by August 2011. This action could clear the way for "commercial aviation [to use] biofuels without changing aircraft systems or airport fueling infrastructure," said US Federal Aviation Administration Administrator Randy Babbitt.

Once finalized, the new specification will enable use of biofuel blends—composed of up to 50% biofuel generated from feedstocks such as camelina, jatropha, or algae—to power commercial or military flights. Properties and criteria necessary to control the manufacture and quality of "hydroprocessed esters and fatty acids" fuel—formerly referred to as hydrotreated renewable jet or bioderived synthetic par-affinic kerosene—are detailed in the new annex.

Fischer-Tropsch processing was the first pathway to be covered by ASTM's alternative jet fuel specification, in 2009.

How will airlines get enough biofuel?

Adoption of biofuels in aviation has been hampered in part by the lack of reliable supplies in adequate quantities and at competitive prices. Biojet International Ltd. On July 6, Biojet International Ltd. (Barbados; Santa Barbara, California, USA) announced it was releasing one billion gallons of renewable jet fuel to long-term contracts (http://tinyurl.com/BiojetBillion). This one-time introductory offer was made to the commercial aviation industry on special pricing and terms. Pricing is fixed at $2.97/gallon ($0.78/liter). Alternatively the buyer may elect to index at par with petroleum jet fuel with a $3.50 gallon cap and $2.50/gallon floor.

The company is an international supply-chain integrator for renewable (bio) jet fuel and related products for the aviation and transportation industries.

Biofuel Flightpath. At the Paris Air Show, the European Commission, Airbus, leading European airlines, and European biofuel producers announced a cooperative effort, called Biofuel Flightpath, to produce two million metric tons of sustainably produced biofuel for aviation by 2020.

Specific goals include the following:

- Facilitate the development of standards for drop-in biofuels and for their certification;
- Work together with the full supply chain to further develop worldwide accepted sustainability certification;
- Facilitate dedicated aviation biofuel production at a reasonable cost by agreeing to tangible biofuel supply and purchase commitments;
- Promote appropriate legislative measures to ensure the market uptake of paraffinic biofuels by the aviation sector;
- Accelerate research and innovation into advanced biofuel technologies, including algae;
- Establish financing structures to facilitate sustainable biofuel projects; and
- Publicly promote the benefits of replacing kerosene by sustainable biofuels.

A document drafted by an editorial team from the European Commission, the paraffinic biofuel producers, and the aviation sector that summarizes the Biofuel Flightpath is available at http:// tinyurl. com/BiofuelFlightpath.

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Courtesy : inform September 2011, Vol. 22 (8) | 499

Solvent Fractionation 101: frequently asked questions

John Harris

The following article originally appeared in The AOCS Lipid Library.

We all generally like the snap of chocolate, the creaminess of a biscuit (cookie) filling, the pourable nature of cooking oil, and the texture of pastries. All these products depend on the melting or solid and liquid characteristics at various temperatures of the oil or fat used in the particular product.

IN naturally occurring edible oils and fats, a range of fatty acids are combined with the glycerol backbone in the triglycerides. These fatty acids can be saturated, unsaturated, long chain, or short chain, and in themselves have different melting points. When these fatty acids are combined on the glycerol backbone they introduce a range of melting points into the triglyceride molecules of the oil or fat. A good example of this is in palm oil where the major fatty acids are the saturated palmitic acid, C16:0 (P), and the monounsaturated oleic acid, CIS: 1 (O), followed by lesser amounts of linoleic acid, C18:2, and stearic acid, C18:0. As a simple example, these can be combined in the triglyceride to create a tri-saturated triglyceride (PPP), a di-saturated triglyceride (PPO or POP), a monosaturated triglyceride (POO or OPO), and an unsaturated triglyceride (OOO). The melting points of these triglycerides are very different, with:

- PPPat~65°C
- PPO/POP at ~34°C
- POO/OPOat~18°C
- OOOat~5°C

Reality will be slightly different from the above simplification with different crystal modifications and also the presence of other minor fatty acids.

It is also possible using hydrogenation and

interesterification (either chemical or enzymatic) to introduce higher melting-point fatty acids (trans or saturated) into a more liquid oil such as soybean or canola.

In an oil or fat composed of triglycerides having a range of melting points, it is possible to separate them by fractional crystallization. The resultant products will then have more specific solid/ liquid characteristics, better functionality, and therefore higher value. The processing "trick" is to crystallize and separate these various triglycerides. The quality of separation of crystals from any remaining liquid oil is called the Separation Efficiency (SE), where 100% SE means perfect removal of all liquid oil from the crystals.

Solvent fractionation allows one to achieve SE of greater than 90% relatively easily compared to the 60-70% typical for dry (or nonsolvent) fractionation. A higher SE means a purer crystal product, which then gives a much sharper melting point. For example, its sharp melting point at about 30°C is one thing that people love about chocolate!

TABLE 1. Solvents for lipid fractionation

	Boiling point (°C)	Heat of vaporization (kJ/kg)
Acetone	56.3	518
Hexane	69	365
Isopropyl alcohol	82.5	770
Methanol	64.6	1099
2-Nitropropane	120.3	410

What solvents are used?

Solvents that have been used for solvent fractionation of "lipids" are listed in Table 1. The choice of solvent depends on:

- Polarity, which affects solubility of both major and minor components
- Energy required for solvent recovery (heat of vaporization)
- Explosion/ignition risk
- Toxicology (e.g., probable carcinogenicity of 2-nitropropane)

What are the benefits of crystallization in solvent?

Oils and fats are fairly viscous with a viscosity usually higher than 30 mPa at typical fractionation temperatures and potentially > 100 mPa for colder fractionation, for example, below 10°C. Acetone, a frequently used solvent, has a viscosity of 0.3 mPa. Adding solvent to edible oil for fractionation dramatically lowers the viscosity and as a result speeds up molecular diffusion to give much quicker crystallization (see Perry, ref. 1). What might take 10 hours or more in dry fractionation can happen in less than 30 minutes in a solvent fractionation. This means that the crystallizer volume required for a given plant capacity can be much smaller, and it also makes continuous crystallization a practical solution. A typical continuous crystallizer used for solvent fractionation usually has a wiped or scraped surface for good heat transfer.

Solvent fractionation at a glance

Solvent fractionation can:

- Achieve high separation efficiencies in a single step to give sharp-melting stearin products.
- Fractionate feedstocks, where the product would be a high yield of stearin or where one needs to just remove a small liquid portion from the feedstock.
- Actually be more efficient than one might think because of benefits from single-step processing, quick crystallizing (plant capacities), and energy recovery.

A further benefit of solvent crystallization is the percentage of crystals that need to be grown for the desired product. In dry frac-tionation the limitation for percentage of crystals that can still be managed in a pumpable slurry is 20-35% (by volume), depending on the oil. However, the higher percentage is often associated with quiescent crystallization where a reasonably solid cake is formed. By adding solvent to the oil the amount of crystals, or solid, will now be calculated as a percentage related to the total volume present, that is, the solvent plus oil. For example, crystallizing 60% of the oil with five volumes of solvent to one volume of oil will be 10% crystals, or solid, present for this solvent fractionation and the mixture will still be a liquid slurry. Therefore, solvent fractionation enables a far higher yield of crystals to be separated from

the oil in a single step and also the removal of small amounts of liquid oil (e.g., 10-20%) from a starting feedstock to increase the solids content or "harden it up."

What are the benefits of solvent fractionation for filtration, filter cake washing and improvements in SE?

As already stated, the addition of solvent dramatically reduces the viscosity of the oil. In the basic case, filtration rate is proportional to the inverse of viscosity (see Perry, ref. 2). Thus, a crystal slurry in solvent fractionation will filter more easily. This enables the use of continuous niters. Originally, rotary drum filters were used, but these have been superseded by various forms of flat band vacuum filters. The use of a solvent means the filter has to be enclosed. Filters available on the market today are usually of an indexing type rather than a continuous moving belt. There are two forms of indexing: In one, the filter belt and filter cake are indexed forward after a period of filtration above a stationary filtration deck, in the other the filtration deck moves forward with the belt during filtration and then the filtration deck indexes back to restart the moving filtration step.

Addition of solvent to the oil means that any liquid left around the crystals is already diluted. However, a negative effect of crystallizing in solvent is that the crystals tend to grow to "fill the space" so that the actual liquid volume (oil and solvent) entrained with the crystals can be more than with dry fractionation. Although the actual mass of liquid oil entrained will be less than in dry fractionation, high SE have not really been achieved with just filtration! However, using a flat band filter of sufficient length enables the filter cake of crystals formed after filtration to be washed with clean solvent that contains no liquid oil. The basis of filter cake washing is well described by Wakeman (ref.).

3). The most efficient form of filter cake washing is with "plug flc displacement of the dirty liquid (liquid oil and solvent) with a cl one (pure solvent). Dispersion effects, both practical and diffusio move the process away from perfect plug flow displacement. Howe the concept of a "void volume wash ratio" is important to understa ing the effectiveness of filter cake washing. The void volume is volume of liquid held up with a unit quantity of crystals. In per! plug flow, by allowing one void volume of clean solvent to displ that void volume of dirty liquid, one would end up with pure ci tals in clean solvent (100% removal and thus 100% SE). Dispers effects cause one to need more than one void volume of clean w solvent to approach 100% SE. The fractionation of the contamin removed against the void volume wash ratio for different amount dispersion is defined by an effective Peclet number (see Waken ref. 3). In practice, one will need 1.2-1.5 void volumes of wasl achieve >90% SE.

What are the cost factors?

Solvent recovery. The use of solvent for fractionation requires the rec ery of that solvent from the products, both crystals (stearin) and liq (olein). Obviously, a solvent with a higher heat of evaporation require more energy for that evaporation; therefore, hexane woulc the first choice and methanol the last! Choice of solvent is, howe not just based on energy consumption! It is also necessary to rem solvent from the product down to safe levels before discharge fr the plant. This would be typically about 100-200 ppm and require just evaporation but also some solvent stripping. For energy efficie one would choose multiple-effect evaporators. How many effects chosen will depend on energy cost and payback on the extra inv ment required for more effects. Use of steam for the last stripp stage will also require some form of recovery of the solvent from I stripping steam. Use of solvent in fractionation will therefore ha' higher energy cost per ton of oil feedstock fractionated.

information

• Perry's Chemical Engineers' Handbook, 8th edn,, edited by D. Green and R. Perry, Section 18: Crystal Growth and Nucle-ation, McGraw-Hill Professional, New York, 2007, p. 44.

• Perry's Chemical Engineers' Handbook, 8th edn., edited by D. Green and R. Perry, Section 18: Filtration, McGraw-Hill Professional, New York, 2007, p. 83 .

• Wakeman, R.J., The performance of filtration post-treatment processes: 2. The estimation of cake washing characteristics. Filtration and Separation 77(4):67-72 (1980).

Refrigeration. In crystallization, there is more liquid to be coc because of added solvent. Therefore, it can be expected that m energy will be consumed in any refrigeration system per ton of fe stock compared with dry fractionation.

With solvent recovery (heating) and refrigeration (coolii the addition of solvent has reduced the viscosity, which gives m opportunities for both "hot" and "cold" energy recovery in a solv fractionation plant.

Hazardous plant. The solvents used are volatile and potenti, explosive. Therefore, the plant must be a closed system and proba critical points in the process must be covered with a nitrogen blan to remove oxygen to a safe level to prevent explosion. All equipm has to conform to relevant safety standards for hazardous envin ments such as the National Fire Protection Association and AT (from the French: ATmospheres EXplosibles). These requireme also add to the investment and space requirements for a solvent ft tionation plant.

(Courtesy : inform, July / August 2011, Vol. 22 (7).

A NOVEL WAY

Continuous enzymatic biodiesel production

RESEARCHERS in France at the CNRS's Centre de Recherches Paul Pascal and the Institut des Sciences Moleculaires in Bordeaux as well as the Laboratoire de Chimie de la Matiere Condensee in Paris have developed a novel catalyst that could lead to the continuous production of biodiesel.

Although lipases are particularly efficient and selective in transesterification processes leading to fatty acid methyl esters, their high cost and low conformational stability restrict their industrial use. Renal Backov and co-workers have developed a way to confine the enzymes irreversibly in porous matrices, allowing good accessibility and enhanced mass transport.

The group had already developed modified silica-based cellular matrices that make it possible to confine lipases. Furthermore, the scientists found they could use unpuri-fied enzymes, a first step in reducing the cost of the biocatalysts. However, the process did not allow continuous biodiesel production.

In Energy & Environmental Science (4:2840-2844, 2011), Backov and co-workers present their new method, which generates a cellular hybrid biocatalyst in situ inside a chromatography column, making it possible to carry out continuous, unidirectional flow synthesis over long periods. They have shown high, practically steady levels of synthesis over^ a two-month period of time.

(Courtesy : inform, September 2011, Vol.22 (8)/495)

DEBUNK

Myth or Truth ?

SO this news item has nothing to do with fats and oils. But it does involve debunking a myth most of us in developed countries accept as fact. Namely, that adults need to drink eight glasses of water a day for optimal health.

Not so, writes Margaret McCartney, a medical doctor from Glasgow, Scotland, in a commentary in the British Medical Journal (doi: 10.1136/bmj.d4280).

McCartney notes that a handful of studies have found no evidence of benefit for recommending such levels of hydration.

"There are many organizations with vested interests [such as purveyors of bottled water] who would like to tell doctors and patients what to do," McCartney says. "We should just say no.

(Courtesy : inform, September 2011, Vol.22 (8)/503)

LEADERSHIP

Indian Central Railways to use Jatropha

Central Railways in India has planted ove 750,000 jatropha plants in their Mumbi Pune, and Nagpur

divisions with the idea th; these plants will produce biofuel for runnir; the trains in the future.

The Pune Mirror newspaper quoted Y.li Singh, public relations officer, as saying, "Us Central Railways has begun planting in PUK where railway land was available. We hat plans to plant [700,000] more this year."
According to the Mirror, the Pune dm sion has planted some jatropha trees aloe; the side of the railway tracks. Others havi been planted on land at the Railways washin; center in Ghorpadi, and thousands morehan been planted alongside the railway tract running from Saswad Road to Jejuri. The Mirror did not comment wheths Central Railways would make its own tue! or hire another company to make biodiese for them.

(Courtesy : inform, October 2011, Vol.22 (9) / 563).

ONE MORE FEATHER

Add another to list of aircraft flying on biofuel

A US Marine Corps MV-22 Osprey tilt rotor aircraft flew on biofuels for the first time on August 10 at the Naval Air Station, Patuxent River, Maryland. The craft was flown at altitudes of up to 25,000 feet (7,600 meters) on a 50:50 blend of camelina-based and standard petroleum-basedJP-5 aviation fuel.

The MV-22 is a multi-mission aircraft, combining the functionality of a helicopter with the long range and high speed of a turboprop aircraft.

Secretary of the Navy Ray Mabus said, "[T]hese types of fuels will... increase our energy efficiency and help lead the nation toward a clean energy economy."

The MV-22 is the fourth Navy aircraft to test this biofuel blend successfully. The fifth test, also successful, was carried out on August 24 with a T-45 aircraft, which is used to train pilots on carrier and tactical mission operations.

(Courtesy : inform, October 2011, Vol.22 (9) / 557).

JATROPHA - CLAP ! CLAP

Bharat, SG Biofuels to work together

BHARAT Renewable Energy Ltd. (BREL), a unit of Bharat Petroleum, India's second-largest petroleum company, and SG Biofuels (SGB; San Diego, California, USA) announced in August their program to work together to develop and cultivate elite hybrids of Jatro-pha curcas for production of biodiesel in India. About 86,000 acres (35,000 hectares) will be involved in this phase of the project.

M.V. Radhakrishnan, chief executive officer (CEO) of BREL, said in a company statement, "With the genetic diversity of their jatropha hybrid material, combined with ability to produce large volumes of hybrid seed, SG Biofuels is an ideal partner to work with to successfully develop, validate, and scale jatropha as the primary source for biodiesel in India."

The first task is to produce high-performing hybrid varieties of jatropha that are adapted to growing conditions in different areas of India. The SGB germplasm library of jatropha currently totals more than 12,000 genotypes. The company will work with BREL to select, test, and scale the highest-yielding, most commercially viable hybrid varieties for growing in regions in India.

Kirk Haney, CEO of SGB, said in an interview with BiofuelsDigest.com (http:// tinyurl.com/ Bharat-SGBiofuels), "The days of selling seed with a service program that consists of'Good luck' are over."

In a company statement, Haney said, "Our partnership with BREL is a great example how collaborations across the entire value chain—from crop science and agronomics to downstream refining and logistics — are the key to the successful scaling of jatropha."

According to the Asian Development Bank, the current cultivation of jatropha and other nonedible oilseeds will need to increase by nearly 80 million acres to meet India's biodiesel targets of blending 20% biodiesel with 80% petrodiesel for the diesel market.

(Courtesy : inform, October 2011, Vol.22 (9) / 563).

"CHALK & CHEESE"

Scientists find rice 'chalk' gene, eye yield rise

MANILA — Scientists expect to soon be able to remove a chalk-like part of rice, dramatically raising global harvests amid rising demand for the staple, an international research outfit said Tuesday.

The International Rice Research Institute announced the breakthrough after a 15-year study on what makes rice chalky, which causes the loss of up to a fourth of grain content in milling, said spokeswoman Sophie Clayton.

The discovery follows a 2008 global crisis that saw the price of rice, the staple of half of the world, rise three-fold and pushing an estimated 100 million people into poverty.

"Within a few years, it might be possible to breed a chalk-free grain," Clayton told AFP in a telephone interview, citing the research team's assessment.

The chalky part of rice raises the chances of breakage during milling, cutting the amount that can be recovered and downgrading its quality, said the institute's nutrition research chief Melissa Fitzgerald.

"Until now, rice scientists did not know where in the rice genome the genes for chalkiness resided," Fitzgerald said in a statement issued by the Philippine-based institute.

She said field tests in eight countries isolated rice varieties with extremely low chalk, regardless of the growing environment, out of which major regions in the rice genome responsible for chalkiness were studied. (Source : The Business Line dated 20th July 2011).

(Courtesy : SEA NEWS CIRCULAR, Vol.XIV, ISSUE 4, July, 2011).

"HAIL SAHA"

Saha recognized as ICAC researcher of the year

DR. SUKUMAR SAHA of the United States was recognized as the ICAC Researcher of the Year during the Inaugural Session of the 70th Plenary Meeting of the ICAC in Buenos Aires, Argentina.

Dr. Sukumar Saha has a total of thirty-five years of professional research experience. He is recognized as an international authority for the development of genetic and cytogenetic resources that are being used by the scientists around the world.

He has developed, evaluated and released backcrossed interspecific chromosome substitution lines from other tetraploid cotton species. This research opens new paradigms in cotton breeding and genetics studies providing a tool to overcome the problems of interspecific introgression and in the discovery of some novel genes or traits.

He also made a major contribution in developing PCR-based SSR markers, a critical first step for the use of PCR-based marker technologies in the cotton breeding.

Dr. Saha has mentored many Ph.D. students, post-docs and visiting scientists in his lab. His research productivity is well documented in about 130 publications including about 80 peer reviewed journal articles in many prominent journals, one germplasm release notice, a co-edited book, additional multiple papers and abstracts in presentations as an invited speakers. (Tecoya Trend, 8th September, 2011).

(Courtesy : AICOSCA Newsletter, September, 2011)

NEW !

New Use For Crude Glycerin

POLYURETHANES, which are some of the most versatile polymers in the world, are heavily petroleum dependent because two major raw materials (polyols and isocyanates) are derived mostly

from petroleum. Use ofbio-based polyols may alleviate concerns regard-ing petroleum depletion and rising oil prices.

Crude glycerin resulting from the manu-facture ofbiodiesel is inexpensive and could be a feedstock for making biopolyol products at a competitive cost with petroleum-based polyol products.

However, crude glycerin contains only 30-40% glycerin, according to Yebo Li of the Department of Food, Agricultural, and Bio-logical Engineering, The Ohio State University OARDC in Wooster, Ohio, USA. The remainder is impurities, such as methanol, soap, fatty acid methyl esters, and salts. In addition, the composition of crude glycerin varies with the biodiesel process, feedstock, and post-treatment.

Li and his co-workers have devised a patent-pending one-pot catalytic process to make biopolyol from crude glycerin and lignocellu-losic biomass. Crude glycerin, biomass, and a catalyst are heated under atmospheric pressure. During the heating, methanol is recovered by distillation at about 100°C. The methanol then can be reused in making biodiesel At the designated temperature, the glycerin plus the impurities react with the biomass to form biopolyol. The crude biopolyol is then pumped through a filter to remove remaining impurities and is ready for shipment to end users for polyure-thane production.

The process is being developed for commercialization. A major hindrance is the inconsistent composition of crude glycerin, leading to inconsistent biopolyol quality. (Source : INFORM Jul/ Aug 2011 issue).

(Courtesy : SEA NEWS CIRCULAR, Vol. XIV, Issue : 5, Aug. 2011).

"GOOD NEWS"

Antioxidants may reduce trans fat

THE addition of antioxidants to edible oils may control the formation of trans fats during processing and heating, according to new research reported by FoodNavigator.com.

The study appeared in Food Chemistry (doi: 10.10 16/j.foodchem.20 11.04.036). It found that the addition of antioxidants (delta-toco-pherol, rosemary extract, a mixture of rosemary extract and mixed tocopherol, and sesamol) led to suppression in trans isomer-ization. The researchers said that such inhibitory effects were associated with some of the types and concentrations of the antioxidants.

"Our results suggested that the appro-priate addition of antioxidants to edible oils during processing and cooking would facilitate the control of heat-induced trans isomerization of unsaturated lipids," lead author Wakako Tsuzuki of the National Food Research Institute in Japan told FoodNavigator.com.

He added that the antioxidants investigated may also serve as anti-isomerizing agents during the heat-induced isomerization of unsaturated lipids. (Source: Inform July -Aug . 2011 Issue)

(Courtesy : SEA NEWS CIRCULAR, Vol. XIV, Issue : 5, Aug. 2011).

"NO FRIG"

Now, keep food fresh for years

SCIENTISTS claim to have discovered a natural preservative that could spell the end of rotting food.Researchers at the University of Minnesota identified the substance,called bisin,which destroys the bacteria that make meat,fish,eggs and dairy products decompose.

The preservative could extend the foods life for several years and even work for opened bottles of wine and salad dressing,the researchers said.The discovery,they said,is set to revolutionize the way people shop and can also reduce the tonnes of food waste thrown out every year.the Daily Mail reported.

According to the researchers,bisin occurs naturally in some types of harmless bacteria.It prevents the growth of lethal bacteria including E-coli,salmonella and listeria.The substance could extend the life of a variety of everyday foods which

have strict use-by dates including seafood,cheese and canned goods.they said.

In some cases these foods could last for years and may not even need to be kept in the fridge.they claimed.

Dan OSullivan,a microbiologist at the university who accidentally found bisin while examining a culture of bacteria found in human intestine,said: It seems to be much better than anything which has gone before. It doesnt compromise nutrient quality we are not adding a chemical, we are adding a natural ingredient. Its aimed at protecting foods from a broad range of bugs that cause disease, he said.PTI (Sourrce : Times of India dated 16th Aug. "11).

(Courtesy : SEA NEWS CIRCULAR, Vol. XIV, Issue : 5, Aug. 2011).

Bio-technology the only way to combat world hunger: Experts

BIO-TECHNOLOGY needs to be adopted more widely to combat the spectre of global hunger, said agriculturists from all over the world, policy experts, senior US officials and Fortune 500 companies who came together at a global farmers' conference in Des Moines, Iowa. One of the keynote speakers at the event, Jose Fernandez, assistant secretary in the US Bureau of Economic, Energy and Business Affairs set the tone of the discussions at conference, "The next generation: confronting the hunger challenge of tomorrow". Fernandez said agriculture production systems are under pressure as never before. "The United Nations' Food and Agriculture Organization estimates that a doubling of agricultural output will be needed by 2050 to feed a population of more than nine billion people. That doubling of production will need to occur despite challenges caused by climate change, including water shortages and increased salinity of soil," he said.

Other speakers noted that innovative science and collaboration are essential to addressing global food security. "At the end of the day, no one country, company, government or foundation can meet the global food security challenge alone," said DuPont CEO Ellen Kullman. "We have to work together through public-private collaborations and through a harmonised, science-based regulatory system to ensure farmers and consumers can benefit from new technologies." In a ceremony later at the State Capitol, John Kufuor, former president of Ghana and Luiz Inacio Lula Silva, former president of Brazil were honoured with the World Food Prize for creating and implementing government policies that alleviated hunger and transformed the lives of the poor.

The award was instituted by Nobel Peace Prize winner and father of the Green Revolution Norman Borlaug. Past recipients have included India's M.S. Swaminathan and Muhammad Yunus of the Grameen Bank, Bangladesh. Vijay Kapoor, a farmer from Karnal in India's Haryana state, was the sole farmer from Asia invited to attend the conference. Kapoor told IANS that his participation in the conference helped reaffirm his belief that biotechnology would help increase productivity, as well curb crop diseases in countries like India, faced with a rapid population growth and shrinking arable land. It also gave him an opportunity to compare notes with farmers from the West. "Attending the global farmers conference gave me an opportunity to see where we (in India) are compared to farmers the world over," said Kapoor, adding that BT (bio-technology) crops was the only option of increasing production in countries like India. He said he found the opposition in India to BT crops misplaced.

"The United States has had BT crops for the last 16 years. Food regulatory authorities are far more stringent there than in India and yet they have not found adverse effects on humans," he said. Giving the example of BT cotton, which has been allowed in India since 2002, Kapoor said: "In Haryana, Punjab and Gujarat, pests affecting cotton had, over the years, grown resistant to pesticides. Moreover, there was a rise in incidences of cancer among cotton farmers as a result of a heavy use of the pesticides. With the planting of BT cotton, the use of pesticides has been reduced. Less pesticide residue is found in irrigation water and consequently even the groundwater samples show lower pesticide contamination." Indian farmers can adopt BT rice to fight pests like the brown plant hopper which now causes significant damage to rice crops, Kapoor said.

While the US was way ahead of India in agricultural reforms, Kapoor said that a panel of experts at the conference acknowledged that India had surpassed the US in agricultural research reaching the farmer. "In Haryana, for instance, we have an agricultural development officer who is responsible for five villages. We also have Krishi Vigyan Kendras where farmers can call a toll free number for advice. Farmers can also get text messages on their mobile phones on issues like the best time for sowing and the best variety of seeds. All this is available at no cost to the fanner, while in the US, the farmer has to pay for such advice. A discussion at the Iowa State University concluded that India is ahead of the US in this area," he said.

According to Kapoor, besides dramatically raising productivity, BT crops could reduce the contamination of groundwater, a rapidly depleting resource in India. He echoed experts at the conference who said that water conservation could be a critical issue worldwide. "The next global war could well be over water resources and we need to do whatever we can to conserve it," he said. Besides updating him on the latest in agricultural technology, the farmers' conference also brought Kapoor a humbling realisation. Kapoor's farm extends over 120 acres making him the biggest farmer in Karnal, Haryana. Interacting with American farmers, he puzzled over why they indulgently referred to him as a small farmer, till he discovered that their average farm size was over 3,000 acres. "For me, it ^ was a global reality check," he said.

(Courtesy : Business Empire, November, 2011)

Innovation: Changing the Indian MSME Landscape

INNOVATION is the key factor, given the current global scenario, the only way that Indian MSMEs can remain competitive is by adopting innovation as a key business strategy.The Ministry of Micro, Small and Medium Enterprises has taken several initiatives to encourage MSMEs to continuously innovate in terms of creation of new products, new processes and new services. The 'National Innovation Council' was constituted by the Prime Minister to encourage and promote innovation in every sector of the economy. MSME sector got special emphasis under this Innovation Council and a Sectoral Council was constituted under the Chairmanship of Secretary (MSME) to evolve an enabling framework that would help transform novel innovative ideas to successful business ventures.

National Manufacturing Competitiveness Programme

The MSME Ministry is implementing the National Manufacturing Competitiveness Programme (NMCP), the nodal programme of the Government to develop global competitiveness among Indian MSMEs. There are ten components under NMCP targeted at enhancing the entire value chain of MSME sector. It includes programmes like establishment of new Tool Rooms, enhancing of product and process quality, cost reduction through lean manufacturing techniques, design clinic, etc. Out of these 10 components, one component i.e. incubator scheme, especially caters to the need of supporting innovative ideas. So far the Ministry has already identified 76 institutions and has helped them financially for incubating innovative ideas. This is an on-going scheme and more and more innovative ideas would be incubated to become successful commercial ventures.

Prime Minister Employment Generation Programme

To encourage innovation and entrepreneurship at the grass root level, a flagship programme i.e. Prime Minister Employment Generation Programme (PMEGP) is being implemented by the Ministry. Under this programme, margin money assistance, upto 35% of the project cost, is provided to entrepreneurs desirous of setting up an enterprise. The Ministry also implements the Rajiv Gandhi Udhyami Mitra Yojana (RGUMY) whereby handholding support and assistance is provided to potential first generation entrepreneurs.

Entrepreneurship Development Institutes

The National Knowledge Commission had identified that the most important external barrier to innovation, as perceived by the MSMEs, is skill shortage. The three national level Entrepreneurship Development Institutes under the Ministry, NIESBUD,

Noida, NIMSME, Hyderabad and HE Guwahati alongwith the MSME Development Institutes and Training Centres spread across the country organize comprehensive training programmes to upgrade existing skills and to create new skills in workers and technicians of existing units as well as unemployed youth. Specific tailor made programmes are also being organized for the skill development of socially disadvantaged groups like OBC, SC, ST, minorities and women.

Web Portal on 'International SME Development'

In this globalised era, proper understanding of the international markets is essential for MSMEs to remain competitive globally as well as domestically. The Ministry, through various schemes, facilitates the participation of Indian MSMEs in international exhibitions & fairs for getting the much required exposure to the world markets. This helps not only in increasing the exports from this sector but also helps the MSMEs to acquire latest technologies and understand international best management practices. National Small Industries Corporation Ltd. (NSIC), a public sector undertaking under the Ministry, is maintaining a dedicated web portal on 'International SME Development' which facilitates information and sustainable collaborations amongst SMEs of 28 countries.

Adoption of innovative practices may entail additional investment by the entrepreneurs. In order to facilitate technology upgradation of Small Enterprises to meet international competition, the ministry provides capital subsidy on investment for technology upgradation through Credit Guarantee Fund Trust for Micro & Small Enterprise (CGFTMSE). Under the scheme, credit facilities extended to micro and small enterprises are guaranteed upto 75% of the amount in the event of a default. The Performance & Credit Rating Scheme of the Ministry is a very unique way of empowering the small enterprises to face internal and global competition. Under this Scheme, financial assistance to the extent of 75% is provided for rating of MSMEs by a third party national or international rating agency. This rating benefits the units in many ways like establishing their creditworthiness which helps them in accessing quicker and cheaper credit. It also certifies their performance ability which would help procuring orders from foreign and other bulk buyers and. It also helps the entrepreneur in analyzing the strengths and weaknesses of unit and may prompt him in bringing changes to improve upon their operating performance.

The Ministry has also taken several other initiatives to promote innovation in the MSME sector. With a view of recognizing the efforts and achievements of MSMEs, National Awards are given annually to selected entrepreneurs and enterprises. The awards are given for various categories in Research & Development Efforts, Entrepreneurship & Quality Products. The MSMEs are also encouraged and financially assisted through various schemes to adopt ISO certification, Bar Coding, Patents, better designs etc.

*Based on the Speech of the Minister of MSME,Shri Virbhadra Singh at the Global Summit on MSMEs 2011.

(Courtesy : Business Empire, November 2011).

"IRON MAN"

IRRI begins triais on GM iron-rich rice that helps combat nutrition deficiency

SCIENTISTS have made a breakthrough in developing a rice variety rich in iron and zinc, brightening the prospect of combating nutrition deficiency among millions of people in poor countries across Asia. Iron and zinc are the most common mineral nutrients needed for a balanced human diet. It would take 10 years before the new rice variety could be released for human consumption, because of the need for evaluation in the field over several seasons, and the need for bioavailability studies to discover whether animals actually absorb the iron. In view of this, field trials have begun at the Philippines-based International Rice Research Institute (IRRI). "The genetically-modified (GM) rice has up to four times more iron than conventional rice and twice as much zinc," said Alex Johnson from the Australian Centre for Plant Functional Genomics (ACPFG). "The rice has some of the highest iron concentrations that have been

described for white rice (up to 19 parts per million).

We have also demonstrated that the iron is in the endosperm tissue that makes up white rice," Johnson said. This is important because of the widespread consumption of white rice. HarvestPlus, which promotes biofortification research, usually focusses on conventional plant-breeding methods. But increasing the level of iron in rice is hard to achieve through conventional breeding because there are few naturally occurring varieties of rice with higher concentrations of iron to kick off the breeding process. Johnson and his team focussed on nicotianamine, a substance that occurs naturally in rice and helps it to take up iron from the soil. Normally, it is the low levels of iron in the soil that signal the rice to switch on the genes that control the production of nicotianamine. The scientists have succeeded in keeping these genes switched on all the time. The method also boosted zinc levels. Since nicotianamine naturally occurs in rice, consumption was unlikely to have any adverse health effects.

(Courtesy : Business Empire, October 2011).