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News Letter

OIL TECHNOLOGISTS' ASSOCIATION OF INDIA
WESTERN ZONE

Inside This Issue

To put our shoulder to the Juggernaut Food and Energy has become a crucial issue for all of us. Further, it is necessary to get together, identify pathways to success.

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

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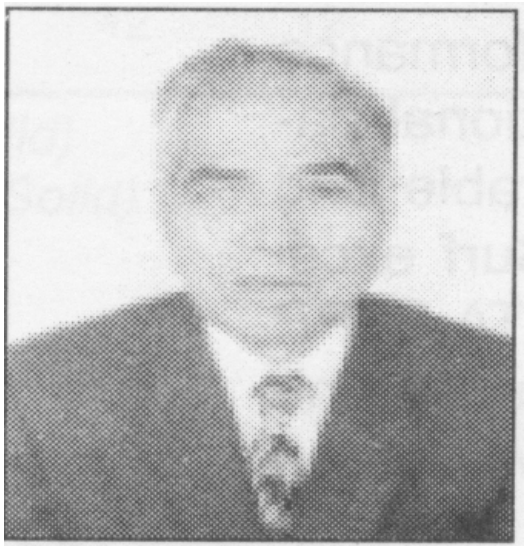
OIL TECHNOLOGISTS' ASSOCIATION OF INDIA WESTERN ZONE

From the Editors's Desk

ARISE ! AWAKE!
STOP NOT TILL THE GOAL IS REACHED

Amidst all the din and turmoil what role will the OTAI play? Time we played a substantive role in furthering Food and Energy causes. It is indeed essential to hold dialogues with the so-called powers (read Pawar!) be. There is no escape. We can't be playing "Holier than Thou" game all the time. We need to cultivate those who matter with honest and technologically sound presentations. Not just in Seminars. As a pro-active role. Calling all the OTAITES to ponder over the ways and means to make our presence felt. For Food, For Energy we have two powerful weapons.

OBITUARY



PROF. D. REBELLO IS NO MORE!

With profound regret and heavy heart we announce that our most respected and valued colleague Prof. D. Rebello has left for his heavenly abode.

He was very actively associated with Oil Technologists' Association of India Exhibitions & Seminars.

We will miss him a lot. May his noble soul rest in peace!!

GOOD ADVICE

Ways and Means to Reduce the Supply - Demand Gap of Vegetable Oils in India

Key -Note Address
By
Dr. M.V. Rao
Former Special Director General, ICAR & former Vice-Chancellor, ANGRAU, Hyderabad

National symposium on
Vegetable Oils Scenario :
Approaches to Meet the Growing Demands
January 29-31, 2009- Hyderabad,
Organised by
Indian Society of Oilseeds Research, Directorate of Oilseeds Research Rajendranagar, Hyderabad-500 030.

Distinguished Participants, Ladies and Gentlemen,

At the outset I warmly congratulate the member of the Indian Society of Oilseeds Research (ISORE) and its office bearers for organizing this symposium to bring together all the oilseeds worker to discuss the important and contemporary issue of how the meet the growing demand for vegetable oils in India and reduce the import burden. Ever since it's inception 25 years ago the ISOR has been active in trying to sensities policy makers, scientist, technologists, industry and the farmers to discuss, review and work in unision for achieving self reliance in the vegetable oil sector. Between 1988 till today it organized five National Symposia covering all aspects of oil economy. I sincerely hope that in this sixth symposium, the talent, expertise and wisdom of all the oilseeds workers assembled here will result in the preparation of an imp0lementable road map for India to bridge the ever widening supply-demand gap of vegetable oils.

Today we are honoured to have with us shri N. Radhuveera Reddy Garu, Hon'ble Ministry for Agriculture, Horticulture, Food and Civil Supplies, Legal Metrology and consumer Affairs, Govt. of Andhra Pradesh as the Chief Guest to inaugurate this National Symposium. Shri Raghuveera Reddy Gaur, beside being Minster of an important portfolio is also a keen practicing agriculturist and an oilseed crop grower. I am sure his practical wisdom and suggestions will benefit us. I am also happy to have with us Dr. S. P. Tiwari, Deputy Director General (Edn. & Crops) ICAR who is associated with oilseed Research and Development, as a Director of the National Center for soybean at Indore and later in several capacities at the ICAR headquarters. I see a galaxy of scientist, administrators, technologists and farmers in this gathering. As the President of the ISOR, I welcome all of you and look for your valuable presentations, views, strategies and guidance. I thank the representatives of the electronic and print media for their presence her to cover the symposium events.

Background

Like foodgrains, pulses, fruits, vegetables, fibres and other commodities, the growing Indian population and it's growing diversified needs, require more vegetables oils to meet it's edible oil and industrial needs. Edible oil consumption being income-elastic, as the Indian economy is growing and the income of all classes, particularly of the middle class is growing, the demand for more oil is also increasing.

Although India is one of the largest oil crop growing countries of the world it is also the largest importer of oil. It has the fifth largest vegetable oil economy in the world, next to U. S. A., China, Brazil and Argentina. In terms of area under cultivation it occupies the first position in the world for castor, groundnut, safflower sesame, niger and rapeseed-mustard, second in linseed, and third position for sunflower and fifth for soybean, Oilseed occupy 14% of the gross cropped area and

they form the second largest agriculture commodity after cereals. Oils contribute to 12-14% of dietary energy of our people and accounts for 15% of the agricultural exports of the country. More than 14 million more are involved in processing. In states like Gujarat, Madhya Pradesh, Rajasthan oilseeds contribute 17-12% in the state agricultural GDPs. India is a country where nine oilseeds

Table 1 . Production of oilseeds/oils and Net Domestic availability of edible oils (2002-07)

(in lakhs metric tonnes)

	Oilseeds	Oil
Groundnut	48.6	11.3
Rapeseed - Mustard	74.4	22.0
Soybean	99.9	14.2
Sunflower	14.4	3.9
Sesame	5.8	1.8
Niger Seed	0.7	0.2
Safflower	2.2	0.7
Castor	7.9	3.2
Linseed	1.8	0.5
Coconut	-	4.5
Cottonseed	-	6.3
Rice Bran	-	7.0
Solvent extracted oil	-	3.5
Tree & Forest origin	-	1.2
Less: Export of Industrial	-	7.8
Net domestic availability of edible oils	-	72.4
Import		42.2
Actual Consumption		**114.6**

Table 2. Changes in oilseed cultivation.

Year	Groundnut			R & M			Soybean			Sunflower			Total Oilseeds		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
1970-71	7.3	6.1	834	3.3	2.0	594	0.03	0.01	426	0.01	0.08	653	16.6	9.6	579
1985-86	7.1	5.1	719	3.9	2.7	674	1.3	1.0	764	0.75	0.3	374	19.0	10.8	570
1990-91	8.3	7.5	904	5.8	5.2	904	2.6	2.6	1015	1.6	0.9	565	24.1	18.6	771
2000-01	6.6	6.4	977	4.5	4.1	935	6.4	5.3	822	1.3	0.6	602	22.8	18.4	810
2006-07	5.6	4.9	866	6.8	7.4	1095	8.3	9.9	1124	2.2	104	567	26.5	24.3	916

A = Mill. Ha; P = Mill. Tons; Y = kgs/ha

crops viz., ground-nut, rapeseed-mustard soybean, sunflower, safflower, sesame, niger, castor and linseed are grown in it's different agroclimatic zones. As of 2008 oilseeds are grown on 26.54 million hectares producing 28.82 million ton with an average productivity of 1086 kgs/ha. The net domestic availability of edible oils is only 7.2 million tonnes as against the actual consumption of 11.5 million tonnes and the gap of 4.3 million tonnes has to be imported (Table 1) which is a great drain on our foreign exchange. It is projected that by 2020 A. D. we may have to produce 66 million tons of oilseeds to meet the oil demand of 21.8 million tones. If we cannot produce this amount of oil we may have to helplessly depend on imports. This is a challenge before us. In this context, it is pertinent to take stock of our past and present situations and, the efforts were made o increase oil seed production.

India in 1950-51 was growing oilseeds on 10.7 million hectares of producing 5.16 million tonnes with an average productivity of 481 Kegs/ha to meet the demand of 360 million people. Since we are short of foodgrains, all our attention was how to need four people to avert wide spread starvation and famines and we were importing large quantities of food grains, particularly wheat. The food scenario changes by 60's with the ushering of the Green Revolution. By 1970-71, area under oilseeds has increased to 16.6 million hectares producing 9.6 million tonnes with a productivity of 579 kg/ha. The shift that took place from 1971 to 2007 in the area, production and yield of four major crops viz., groundnut, rapeseed mustard, soybean and sunflower witch together account to 92 per cent of the total oilseed production of India is shown in Table 2.

The demand for oils has been increasing with the growing population needs and India had to resort to large scale import of this commodity which touched 1.6 million tonnes costing Rs. 1319 crores in 1983-84 and 1.4 million tonnes costing Rs. 1319 crores in 1983-84 and 1.4 million tonnes costing Rs. 1122 crores in 1984-85. Realising the gravity of this situation our late Prime Minister Shri Rajiv Gandhi initiated in May 1986 "The Technology Mission on Oilseeds" with a clear mandate, that this Mission should show the results within a certain time frame. The goal was to make India Self-

Table 3. Production,import, per capita consumption and level of self sufficiency.

Year	Indigenous Production of oils (lakh tons)	Import of oil (lakh tons)	Per capital consumption (kgs)	Percentage selfsufficiency
1979-80	24.08	11.40		
1983-84	33.0	16.34		
1984-85	34.87	13.68		
19986-87	38.7	14.7	6.2	72
1990-91	63.7	5.3	6.5	92
1994-95	71.9	3.5	7.3	95
1999-2000	67.1	42.0	10.4	62
2005-2006	91.0	54.3	11.6	63
2006-07	80.0	62.0	11.2	56
2007-08*	91.4	51.8	12.2	64

* Provisional

reliant for vegetable oils at the shortest possible time. The mission mode approach with the active involvement of four mini-missio0n of crop operations involving procurement, handling and disposal and lastly price support to farmers and financial support to processing industry, achieved in a short period of ten year laudatory progress in more than doubling oilseed production and in significantly reducing the import bill leading to near self-sufficiency (Table 3). This was acclaimed by everybody as the Yellow Revolution synonymous to Green Revolution in food grains. The growth in oilseed production is both due to area expansion and increase in productivity. The success of the mission is due to it's focus on non-traditional crops like soybean, sunflower and non-traditional areas for rapeseed-mustard, rabi groundnut and exploiting cotton seed, rice bran, coconut, oilpalm and oil processing and extension.

Table - 4 Import of oil in India

Year	Import	
	Quantity (000 t)	Value (Rs. Crores)
1997-98	1265	2764
1998-99	2621	7588
2001-02	4321	6465
2003-04	5290	11683
2004-05	4751	11077
2007-08	4902	10295

The Self-reliance that has been achieved could not be sustained subsequently due to a variety of reasons the more important being the increased

demand due to increased consumption, cheap availability of vegetable oils in the inter national markets and government import policies on tariff and bound duties (Table 4) Although India is earning through exports more than what is spending on imports in the oilseed sector this should not lead us to complacency. In the next 10 years India has to produce 6.6 million tonnes of oilseeds and 22 million tonnes of vegetable oil. Since many of the exporting countries are diverting sizeable quantities of palmoil, com oil, soybean oil, mustard oil, sunflower oil etc for biofuel production there will be less oil for India to import from the international markets and even if it is available it will be very costly. So India has to realize this reality and work for self reliance without losing time.

SWOT analysis

If we make a SWOT analysis of the Indian oil seed scenario we realize that India has strengths of (a) diversified oilseed crop options (b) there is a strong National Agricultural Research System and (c) hard working farming community. The weaknesses are (a) most of the oilseeds crops, except to some extend rapeseed-mustard, sunflower, hybrid castor and rabi groundnut, while all other oilseed crops are grown under rainfed, resource poor conditions, (b) poor oil extraction technologies, (c) hazards of weather (e. g. 80% of the area of groundnut, 97% of soybean 99% of safflower, 96% of seasmum, 97% of linseed, 96% of castor, 76% of sunflower, and 36% of rapeseed-mustard is under uncertain rainfed conditions). Because of uncertainties of rainfall weather dependent oilseed cultivation, farmers do not apply needed quantities of fertilizers to the energy rich oilseed crops are also do not invest much on plant protection although many of the oilseed crops are subject to a variety of pest and disease problems.

Table 5 : Potential yield in Field level Demonstrations (average yield in kgs/ha during 1996-97 to 2006-07)

Crop	FLD average yield over 10 years	National average yield	Yield gap (%)
Ground nut	2249	866	160
Rapeseed-Mustard	1405	1095	28
Sunflower	1492	567	163
Safflower	1272	637	100
Soybean	1819	1063	71
Sesame	644	363	77
Niger	489	258	90
Castor	1840	1213	52
Linseed	949	385	147

The extraction of oil in village ghanis leaves considerable amounts of oil in the cake (government

policies are aimed at protecting the village based small scale industry inspite of poor oil extraction) and so also in several of our oil mills which have very outdated inefficient machinery. In terms of opportunities we have technology to increase yield as shown in Field Level Demonstrations (Table 5). We have enormous opportunities to extract oil from cotton seed, rice brain, maize, coconut, oil palm and also to some extent from tree borne oilseed bearing crops (Table 6). The vegetable oil economy face the threat of import of cheap oils particularly palm oil, canola oil and soybean oil which discourages the domestic oilseed crop growers and secondly the aberrant rainfall, natural calamities, pest and disease outbreaks always pose a threat.

Table 6. Supplementary sources of oils

Source	Potential (lakh tons)	Current producton (lakh tones)
Rice bran	15.2	7.7
Cotton seed	11.0	9.9
Oil cake	6.0	5.2
Tree borne oilseed	6.0	0.8
Palm Oil	To be exploited	0.7
Corn Oil	-	-

The road ahead

The Country has to make choice between (a) whether we should plan for self-sufficient or (b) resort to partial imports to supplement domestic production (c) balance between exports and imports. India needs more vegetable oil now and in future. To meet the future demands let us explore the opportunities of ways and means to increase oilseed crop production and reduce the supply-demand gap of vegetable oils. These ways and means could be summarized :

1. Since most of the crops are raised under rainfed conditions popularize rainfed oilseed production technologies already developed in several programmes of the NARS. The moisture conservation, watershed development and saving every drop of water through moisture conservation technologies should be popularized.

2. Provide life saving one or two irrigations wherever it is possible. This will increase production by 20-30%

3. Popularise the existing well proven production technologies as demonstrated in the field level demonstrations to increase yield/ha.

4. Popularise intercropping to bring stability in income to the oilseed crop grower. A number of models on intercopping for different agroclimatic conditions of the country are worked out by scientists in the NARS.

5. Exploit rice, wheat or other crop fallows for raising oil seed crops in sequence.

6. Seed replacement, except in the case of hybrid seed crops like sunflower and castor is rather poor in most of the oilseed crops. Seed production and seed replacement and seed health are critical for increasing oilseed crops production. The seed sector needs great strengthening. Seed villages, seed godowns need to be developed particularly in crops like groundnut.

7. Improve the oilseed varieties/hybrids for resistance to different biotic and abiotic stresses and also for quality characters. Biotech-

nological approaches offer enormous opportunities.

8. Improve the oil extraction efficiency. At present oil extraction in India is very low as compared to that of USA, china, Brazil and other countries.

9. Give high priority to bring more area under oilpalm (Potential is estimated to be 8 lakh hectares). This crop can give under good management 5 to 6 tonnes of oil per hectare which no other oilseed crop can give. Both the kernel and the pulp could be exploited for extraction of vitamin A and other useful products.

10. Relook at the strategies followed in the early stages of the Technology Mission on Oilseeds in exploiting the non-conventional crops, non-conventional areas and non-co nventional oil seed sources.

11. Exploit to the maximum possible extent supplementary sources of oil such as rice bran, cottonseed, corn, tree borne oilseed crops, extraction of more oil from the oil cake from the mills and village ghains.

12. Strengthen the transfer of technology and timely supply of quality inputs to the farmer.

13. Price of the produce is the greatest incen tive to the farmer. Remunerative prices should be given to the oilseed farmer and the price should be announced before the commencement of the sowing season.

14. Reduce the imports of the vegetable oils to the maximum extent possible to encourage indigenous production.

15. Coordinated Mission Mode approach is the right course to follow. Technology with the prodsupport of development and other associated department will be the driving force for the success of the oilseed production programme.

16. Institute awards to the best oilseed farmers and best oil extracting plants to encourage efficiency and enterprise.

17. Large section of Indian population is suffering from malnutrition, protein and fat deficient diets (Every four out of ten Indians are estimated to be suffering from one or the other deficiencies). The Government of India should see that the protein rich oil meals, defatted soyflour is utilized in Indian diet, rather that exporting this valuable materials to earn foreign exchange.

18. Encourage production of value added products from oilseeds as is done in USA and other countries to improve not only nutrition of our people but also generate more employment and income to the rural people and the industry.

19. Many of our solvent extraction plants and oil mills are underutilized and are working at lower capacity because of non-availability of raw materials. With proper phyto-sanitation check ups we may explore the possibility of import of oilseeds and process them here to produce oil and oil cakes and improve the utilization of our oil mills and solvent extraction plants. The cake will be available for recycling in to products.

20. Government of India should encourage export of certain categories of oilseeds, oil and other products wherever we have competitive advantage. In this context, we, may consider to encourage products of oilseeds rather than the raw oilseeds themselves, because they earn more foreign exchange.

21. Oilseeds section is reasonably competitive. What makes oil sector noncompetitive is the inefficient processing sector and the policy of reservation for village and small scale industries. Both oil and oil meals suffer on this score and also the producer and consumer. This issue requires relook.

22. Our average yields are one of the lowest in the world except in case of castor where our yields are higher than the world average.

There is a need for some teams from India to visit countries like Israel, China, Italy, Tunisia, Equador, Lebabon, Belgium and Switzerland where very high yields (almost 4 to 5 times more than that of India) are reported in groundnut, rapseed-mustard, sunflower, sesame, safflower, castor, linseed and soybean). This will help to reorient our production programmes.

23. Farmer need machinery in the cultivation, harvesting, processing of oilseed crops. Providing appropriate machinery to the oilseed growers with appropriate subsidies may receive government attention.

24. Biotechnology which is now an upcoming subject should be exploited judiciously with all the regulatory precautions.

25. Public-private partnership should be strengthened which will yield rich dividends in the vegetable oil sector. Private sector cooperation in the areas of seed production, input supply, transfer of technology, processing and product development and marketing etc. can play a very vital role.

26. For meeting xtra demands of oil both for edible or industrial or energy purposes we may exploit crops like simarouba glauca, jatropha or even olive plantations.

Conclusion

Oilseed economy is complex. From seed production to processing and marketing several stages are involved and several agencies are involved. Oilseeds crop cultivation is also risky because of dependence on weather, natural hazards, market prices and manipulations, import and export policies, pricing and several such other factors. It requires careful analysis and appropriate action at every level. I am sure the oilseed workers who are assembled her will look at the oilseed sector in its totality and suggest, advise and guide so that we march ahead to produce enough oil to meet the demands of the edible oil and industrial oil sectors, reduce the gap between the supply-demand, reduce the import and encourage export of oil-seeds, oilseed production and oil wherever they are competitive. I personally feel that to bridge the supply-demand gap we should concentrate on oil palm, rabi-groundnut, soybean, sunflower, rape-seed-mustard and castor, cotton seed, rice bran and in improving the processing and oil extraction technologies and modernizing our mills. We should exploit white seasamum seed, niger seed, extractions of castor, bold table type groundnut kernels, safflower petals etc, for export purposes. Since we cannot show spectacular gains in yield in the oilseed crops, we should concentrate on exploiting the present existing yield potential of our varieties and hybrids with appropriate transfer of technologies.

I would like to conclude, by quoting what three of our illustrious Prime Minster said :

"NO country can raise it's head among the comity of nations if it can not feed its people"

Indira Gandhi

"In the face of complex problem facing the society, the need of the hour is not how excellent a scientist works, but the extent to which a scientist can work with others-other scientists and other departments personnel in the persuit of alleviation of our problems.

Pt. Jawaharlal Nehru

'Our biggest problem today in the agriculture sector is oilseeds. We are setting up a thrust Mission for Oilseeds production... The only limits will be certain achievements, which must come within a certain time frame."

Rajiv Gandhi

Whenever there is a challenge facing the country we have risen to the occasion in the past-whether it is in food grain production or oilseed production, or production of any other commodity. Let us raise again to produce more vegetable oil to bridge the supply-demand gap as is exists today by our coordinated approach.

I wish the National Symposium all success.

[source : AICOSCA News Letter, February,2009]

BT for BREAKTHRU!

Bt cotton has contributed $4.2 bn to national farm economy : Dr. Mayee

Bt cotton has contributed US $ 2 billion to national farm economy in 2007 alone, totaling to US $ 3.2 billion between 2002-2008, revealed Dr. Charudatta Diagambarrao Mayee, Chairman Agricultural Scientists Recruitment Board (ASRB), The Bt cotton, he said, has been well accepted by the Indian farmers. Not only farmers, who have been bailed out from the major problem of pest spraying, but even textile industry has been happy with the results of Bt cotton on account of higher yield and abundant supply of cotton in the country, Dr. Mayee said. The Bt cotton management has assumed greater importance today as 274 Bt hybrids have entered the market supplied by over 30 seeds companies, Dr. Mayee said while informing that only 3 Bt seeds were available in 2002 which increased to 131 in 2007 and now 274 Bt specific cotton are available for sowings in the country. Addressing a press meet Dr. Mayee informed that independent public sector studies have reported that Bt cotton has decreased insecticides spray by 39% and increased yield by 31% resulting in increased profit of 88% equivalent to US $ 250 or more per hectare.

He said that Bt cotton area within India had increased to 7.6 million hectares which accounts to 82% of the total area under cotton cultivation in 2008 up from 6.2 million hectares equivalent to 66% in 2007.

The average Indian cotton yield, Dr. Mayee said, has increased from 208 kg/ha in 2002 to 591 kg/ha in 2008 with 50% of the increase attributed to Bt technology.

Stating that there has been a steep reduction in insecticides usage at national level, Dr. Mayee informed that the market share for cotton insecticides as percentage of total insecticides declined from 42% in 1998-99 to 28% in 2006-2007.

Earlier, Dr. James Clive, Founder and Chairman of International Service for the Acquisition of Agri-biotech Application (ISAAA) said that GM. Biotech crops were not a panacea but important to double global food, feed and fibre production by 2050. The future of Biotech, Dr. Clive said would depend on continued flow of new and improved biotech crops and equally important was political will and support.

[source : Tecoya Trend, February 20, 2009]

Availability of Cottonseed for processing industry

Availability of cottonseed for processing durig the current year based on the revised production the currently year based on the revised production estimates of cotton is estimated as follow.

Availability of Cottonseed for processing in india

	2008-09	2007-08	2006-07
1. Cotton Production (Lakh bales)	290	315	280
2. Cottonseed Production (@ 333kg / bale) (lakh tonnes)	96.59	104.90	93.24
3. Retained for sowing & Direct Consumption (lakh tonnes)	13	13	12
4. Marketable Surplus (lakh tonnes)	83.59	91.90	81.24
5. Production of Washed Cottonseed Oil. (Lakh tonnes)	10.03	11.03	9.75

Revised production estimates of cottonseed

Based on the revision of cotton production by CAB, the revised production estimate of cotton seed is given below.

Production of Cottonseed & Cottonseed oil in India **(Production : in lakh tonne.)**

State	Cottonseed			Cottonseed Oil		
	08-09	**07-08**	**06-07**	**08-09**	**07-08**	**06-07**
Punjab	5.83	7.32	7.98	0.73	0.88	0.96
Haryana	4.66	5.32	5.00	0.58	0.64	0.60
Rajasthan	2.50	3.00	3.00	0.31	0.36	0.36
North Zone	12.99	15.64	15.98	1.62	1.88	1.92
Gujarat	29.97	37.30	34.30	3.75	4.48	4.12
Maharashtra	21.65	20.65	1 6.65	2.71	2.48	2.00
Madhya Pradesh	5.99	6.99	6.33	0.75	0.84	0.76
Central Zone	57.61	64.94	57.28	7.21	7.80	6.88
Andhra Pradesh	16.65	15.32	11.99	2.08	1.84	1.44
Karnataka	3.00	2.66	2.00	0.37	0.32	0.24
Tamil Nadu	1.67	1.67	1.67	0.21	0.20	0.20
South Zone	21.32	19.65	15.6	2.66	2.36	1.88
Others	0.67	0.67	0.33	0.08	0.08	0.04
Total	92.59	100.90	89.25	11.57	12.12	10.72
Loose Production	4.00	4.00	0.4	0.50	0.48	0.48
All India	**96.59**	**104.90**	**93.25**	**12.07**	**12.60**	**11.20**

(Estimates of Cottonseed oil based on total production of cotton-seed inclusive of cottonseed used for sowing/direct feeding to cattle)

EUREKA

Bt cotton increase yields at lower cost

Cotton farmers who adopt Bt cotton are able to cut cost of production, increase yields and raise net income, says a study.

The study, a follow-up on work undertaken by researchers at the Centre for Economic and Social Sciences (CESS) has said the cost of production a quintal, which went down by 1 per cent in 2005, was lower by 31 per cent in 2006-07.

The study done by Mr. N. Chandrasekhara Rao and Prof S. Mahendra Dev (former CESS Director who heads the Commission for Agricultural Costs and prices), covered four cotton growing districts of Warangal, Guntur, Kurnool and Nalgonda.

The survey found that the cost of production had come down by 31 per cent in 2006-07 from Rs. 2,012 (non-Bt) to Rs 1,563 in Bt cotton, resulting in significant savings. One of the major contributors for this reduction was decreases in the number of cocktail pesticide sprays.

The cotton yield has gone up by 32 per cent in 2004-05 in Bt cotton vis-A- vis non-Bt cotton. This increases was 42 per cent after adoption of Bt-cotton in 2006-07," the survey said.

It may be recalled that the survey done in 2005 had concluded that the net income, though still negative, had gone up in Bt cotton farmers when compared to their non-Bt peers.

"We have found that the farmers are far more relieved now and are sure of harvesting some cotton."

Impact on profitability

"Though Bt improved net income by 83 per cent, the farmers, both Bt and non-Bt farmers, could not cover all costs in 2004-05. Adverse weather causing 33 per cent lower rainfall in 2004-05 and a 21 per cent reduction in the farm harvest price are largely responsible for this situation then." the survey said.

In 2006-07, the farmers, after adoption, could cover all costs, On an average, the farmer adopting the new technology got Rs. 9.596 per acre of farm business income. This is three times more than before adoption, Mr Chandrasekhara Rao told Business Line.

The area under Bt cotton has increased from just 45,000 hectares in 2002-03 to an estimated 8 million hectares in 2008.

The researchers, however, pointed out that doubts raised on biosafety should be addressed by establishing and standardising the testing procedures. Research on the environmental impact has to be stepped up.

(source : The Hindu Business Line , 24th February 2009)

HOW?

Surging prices may boost demand for GM crops

Biotech or genetically modified (GM) crops have got a booster shot after world commodity prices soared in 2008, in the form of increased

Political will to meet food demands, according to the International Service for the Acquisition of Agri-Biotech Applications (ISAAA). In India also, there has been a significant increase in the area under Bt cotton, the only biotech crop to be in 2008, India became the fourth-largest adopter of GM crops in the world replacing Canada. India planted Bt cotton to cover 7.6 million hectares, which is 82% of the total area under cotton in 2008.

Addressing a press conference in the city on Thursday, ISAAA's chairman Clive James said: "Biotech crops bring down the food prices because an increase in supply brings down the cost of production."
Mr. James said no single approach will allow food,

fed and fibre production to be doubled sustainable by 2050, for over 9 billion people globally. "No one approach can double the production," said Mr. James, adding that a successful strategy must have multiple approaches that also include biotech crops," he said.

Drought is the single largest constraint to increased productivity. But biotechnology is beginning to identify solutions to the growing challenges of drought seen in sub-Saharan Africa and Latin America. Drought-tolerant crops, especially maize, are an emerging reality with seeds expected to be commercialised in the US by 2012 or sooner, and by 2017 for Africa.

In India, after Bt cotton, Bt brinjal is in an advanced stage of field testing, and is under consideration for commercial approval. By the end of the second decade of commercialization in 2015, ISAAA predicts that four billion accumulated acres would have been planted. And going further, 200 million hectares of biotech crops annually will be planted in a total of 40 countries.

In additions to aiding in issues of food security, biotech crops have an important role to play in decreasing environmental impact and improving sustainability of food production. Insect-resistant rice, for example, has the potential to benefit about one billion people.

(source : The Economic time, 20th February, 2009)

BEWARE!

Boom and bust

Governments across Asia have seen biofuels as the answer to many problems, but volatile oil prices and environmental concerns have given the industry a bumpy start

John Richardson, Singapore

THE ASIAN biofuels industry is confronting a cycle reminiscent of the early days of the railroads in the US.

Other challenges include the food-versus fuel controversy, arguments over the net environmental impact of palm oil-base diesel and the difficulty in aligning the agriculture and refining industries.

Palm oil prices went through the roof in 2007, driving many news biodiesel players out of business. Prices have since declined, but too late for those that have gone bust.

Cheaper feedstock costs might end up being only an academic benefit for those still operating. The reason is that governments are looking at rolling back blending mandates for food-crop-derived biofuels.

Palm oil planting has been blamed for the loss of biodiversity and wildlife. Tigers, clouded leopards and orangutans are all threatened with extinction, say environmentalists.

Since 1996, 9.6 m acres (3.9m ha) of forest have been planted with palm oil, according to Indonesian government figures. Indonesia releases 2.6hn tonnes/year of carbon dioxide (CO2) a year as a result of forest clearing, according to a World Bank report. This puts the Southeast Asian country behind only the US and Europe as the world's largest emitter of $CO_{2.}$.

"There are brand-new biodiesel plants is Indonesia and Malaysia that have never been run because of the rise in palm oil prices," says a Singapore-based biofuels entrepreneur.

"Private equity firms have recently bought some of these facilities for half of what they cost of build. The plan is to run them on jatropha rather than palm oil."

Jatropha can be grown on land not suitable for food crops and so, potentially, might be a solution to the food-versus-fuel row.

"But commercialization is several years away because of yield and toxic waste problems. We

are thinking about setting up a jatropha futures exchange so farmers and biofuel producers can hedge against likely prices if and when commercial production takes place," he adds.

One means of solving jatropha's yield problem is to grow it on land that can be used for food crops-but this would defeat the purpose.

It's all about trial and error

The problem with the Asian industry in general is that a great deal of trial and error seems to be involved, Policies are constantly being adapted to tackle unexpected consequences such as rising food crop prices and resistance from auto manufacturers and refiners.

"To be fair, the refiners and the oil industry are doing their best to support biofuels initiatives. However, it's important to ensure that a sustainable, stable and long-term supply of biofuels and relatively stable raw material prices are always available," says Clarence woo, executive director of the Asian Clean Fuels, Association (AFCA).

The AFCA, also based in Signapore, is a non-profit organization established to promote the use of oxygenates that cut crude-oil dependence, and lead to cleaner air.

tanks was also something we didn't take fully into account. We are learning."

Thailand is increasing the use of E85 gasohol (gasoline containing 85% bioethanol) through subsides that keep prices lower than conventional gasoline.

Elsewhere in Asia, biofuels remain a key government priority, even if private investment is being deterred by a collapse in oil prices and the global economic crisis.

In the case of China, both the above challenges-and that of switching from food-based feedstocks-will be overcome by as early as late 2010, according to Frank Xie, a consultant with global consultancy Frost & Sullivan.

New feedstocks

New bioethanol raw material being researched and developed include sweet researched and developed include sweet potatoes and nonfood celluloses, he adds.

Jatropha, too, is being looked at by China as most of its current biodiesel production is based on waste cooking oil, which, says, Xie, suffers from unstable supply.

"Governments jumped into bofuels, thinking they were the main solutions to problems such as energy security"

Clarence Woo, executive director, Asian Clean Fuels Association

Other hurdles include engine performance, quality and consistency issues, says Woo.

"In addition, RVP (Reid Vapor Pressure) levels have to be adjusted, which adds costs to refiners and reduces flexibility in their blending stock."

Bioethanol has to be handled property in order to avoid contamination with water.

A senior Thai industry source admits. "We made the error of introducing bioethanol without always providing proper training.
The capital cost of installing separate storage

Biofuels demand growth was at a compound annual average of 15.5% in 2007-2008 by volume, says Frost & Sullivan. Even this ear, growth is forecase to be close to 9%.

This rapid expansion led to China Becoming the world's third-largest biofuels market in 20008, after the US and Brazil, says the consultancy. Biofuels production was estimated at 260,000 tonnes, with biodiesel at 1,620 tonnes.

Growth is being supported by mandates that permit blending of ethanol up to 7-10% by volume, with no reported limits for biodiesel. Strong gov-

ernment support for R & D is also expected to encourage more private investment over the next few years.

Troubles in india

In India, though, the picture isn't quite as rosy. Its government has deferred introducing a mandatory 10% blending of ethanol, which was due to take place last October, This is the third delay in five years.

Reasons for the latest delay were reservations by auto manufactures and rising alcohol prices. India requires 12.9 m liters/year to achieve its current 5% blending norm.

The latest proposal is for a pilot project study to be undertaken by Indian Oil involving E10 blending in the states of Maharashtra and Utter Pradesh.

And despite the Thai government commitment to biofuels, companies are rescinding licenses to produce because of falling crude and the credit crunch. The same is happening in the Philippines.

Energy security concerns

But energy security issues persist despite the downturn, leading to a commitment to get policy right, says Woo, Current accounts could easily swing back into big deficits if crude easily swing back into big deficits if crude prices once again surge on the back of lack of investment.

Biofuels are also a good way to support agricultural industries that are vitally important-politically and socially- in countries such as India, the philippines and Thailand.

But coming up with an effective policy takes time, requires good data and a through evaluation of economic, environmental and social issues, adds Woo.

"It is important to utilise science and facts to establish the right road map. You need to also look at the total picture for energy usage and fuel efficiency, as biofuels may only ever provide 5% of a country's fuel needs.

"In Japan, the government actively looks into sustainability and has set up a committee to ensure that it's preparing its biofuels road map in the right way."

Good science means making use of fossil fuel-based octane booksters such as methy1 tertiary buty1 ether (MTBE), which, according to Woo, has a critical role to play in Asia and the Middle East in improving air quality.

The same applies to bio-ethy1 tertairy buty1 ether (bio-ETBE) – another ether that can help reduce the benzene, aromatic, olefuels, and sulfur content of gasoline.

"Most governments jumped into biofuels, thinking they were the main solutions to problems such as energy security and current account. It is not easy to get your approach right," says Woo, who adds that the ACFA provides free technical information for governments and companies.

Biofuels will perhaps only ever be one of a broad set of solutions for dealing with Asia's heavy dependence on imported oil and gas.

(source :ICIS Chemical Business, March 2-8, 2009)

EAT & DRINK!

Indian food industry to grow to USD 300 billion by 2015

The Indian food industry is set to grow by USD 100 billion to USD 300 billion by 2015, a study said. "The Indian food industry estimated at USD 200 billion (Rs 8,80,000 crore) in the year 2006-07 is slated to reach USD 300 billion (Rs 13,20,000 crore) by 2015 with the share of processed food in value terms increasing from 43 per cent to 50 per cent," a report by FICCCI-Technopak said.

Food processing being the major sector in the Indian food industry stands at USD 85 billion (Rs 3,74,000 crore) and gives direct employment to about two million workers, the report said.

The food processing industry is highly fragmented

and dominated by the unorgaised sector with 75 per cent units falling under it.

"The increasing contribution of food processing sector would largely come from the organised sector," the report said.

The key growth drivers for the Indian food industry would be higher disposable incomes, shifts in spending orientation, increasing organised food retailing, increasing export opportunities, favourable regulatory environment and Government support and investment inflows amongst others, the report said.

Although the industry is growing at a fast pace, the level of food processing is still lower as compared to other countries, the FICCI-Technopak report said.

"The major challenges faced by the sector are low level of research and development, industry academia gap, skill and technology gaps and meeting global quality standards," the report said.

(source : Economic Times , Mumbai)

THE WARNING

India needs a Renewable Energy Revolution to Command Global Leadership

By
Dr. Madhav Mehra

With governments all over the world bending backward to resuscitate the economy and generate employment there was never a better time to invest in renewable energy. Amidst worldwide slowdown, both Barack Obama and Gordon Brown recognize the growing need to boost employment. Environment offers the greatest opportunity to do this, and revive the economy in the process. There is a huge potential for generating wealth and employment by greening the economy. The pursuit of green energy is going to unleash the biggest innovation in the history of business.

The future of humanity lies in harnessing solar energy; 1% of sunlight received by the earth can meet humanity's demand for pore for another 20 years. Biofuels, such as agricultural waste, is another area of importance. 600 million tonnes of agricultural waste in India can produce celluosic ethanol equivalent to 80,000 mega watts of power, which is 60% of India's installed capacity and create 30 million new jobs.

The impact of energy crisis is going to be far more pronounced than credit crisis. Can a portion of the hundreds of billion dollars of government bailout of banks be used to plough into clean and renewable energy? Recognition by markets and policymakers that the only way to achieve sustainability is to speed up innovations and investments in R & D for cleaner fuels and especially solar technology. This will fuel the capital markets and pay itself many times over by creating a world which is not only by creating a world which is not only prosperous but much more equitable, greener, cleaner and sustainable.
Rather than giving huge bailouts to banks and platinum parachutes to those who wrecked the economy, let us spend tax payer's hard earned

The future of humanity lies in harnessing solar energy; 1% of sunlight received by the earth can meet humanity's demand for power for another 20 years.

money on regenerating the planet and creating jobs for our people. The New Apollo Program is a comprehensive economic investment strategy developed by the Apollo Alliance to build America's 21st century clean energy economy and dramatically cut energy bills for families and businesses. It estimates that the investment of $500 billion over the next 3 years can create more than 5 million high quality green-collar jobs in US.

Let us scale that up for the world. A massive green economic stimulus package like this could even pay for itself in more ways than can be imagined. Human race would need huge amount of energy in decades to come. Oil is incapable of meeting that demand. It can cut down our dependence on

fossil fuel. 1% of solar radiation can meet world's entire energy needs right up to 2020. As Thomas Friedman says, "We don't just need a bailout. We need a buildup."

A report released by the U. S. conference of Mayors says that we can create over 4 million green jobs if we aggressively shirt away from traditional fossil fuels toward alternative energy and a significant improvement in energy effort. Another report just released by the Political Economy Research Institute and the Center fro American progress shows that the U. S. can create two million jobs over two years by investing $100 billion in a green economics recovery plan. The report also shows that this investment would create four times more jobs than spending the same amount of money within the oil industry.

Green For All, an environmental outfit in US together with its partners are proposing a Clean Energy Corps that includes a revolving loan fund to finance the ambitions retrofitting of the nation's building stock. An investment of less than $3 billion per year would provide financing and can be expected to create close to 120,000 green jobs a year and 600,000 over five years, while also lowering home heating and electricity bills for homeowners and small businesses.

According to a Greenpeace International Report published recently, India's 35 percent electricity demand can be met from renewable energy by 2030 and 50 percent of the projected energy requirements can be met simply from smart and efficient generation, distribution and use of energy. The report calls for political will to back solutions for India's energy that is secure, technically feasible and sustainable in a climate challenged world.

The report shows how ambitions of economic growth and development can be met while curbing India's carbon emissions.

"Unlike other energy scenarios that promote energy futures at the cost of the climate, our energy revolution scenario shows how to save money and maintain global economic development without fuelling catastrophic climate change. All we need to kick start this plan is bold energy policy from India's leaders" said Sven Teske, Greenpeace International's Renewable Energy Expert and lead-author of the report. "There is a huge opportunity in going green now given the fact that India is still developing its energy infrastructure and has the human and intellectual capital to be world leaders on this front," he added.

Providing a global perspective, Oliver Schafer, Policy Director-EREC (European Renewable Energy Council) said: "The global market for renewable energy can grow at double digit rates until 2050, and overtake the size of today's fossil fuel industry. Currently, the renewable energy market is worth 70 billion dollars and doubling in size every three years. Because of economy of scales, renewable energies such as wind power at good sites are already competitive with conventional power. From around 2015 onwards, Schafer said that renewable energies across all sectors will be the most cost effective energy capacities.

"The renewable industry is ready and able to deliver the needed capacity to make the energy revolution a reality. There is no technical impediment but a polititcal barrier to rebuild the global energy sector" he added.

Srinivas Krishnaswamy, Political and Business Advisor, Greenpeace India said: "In the context of today's economic instability, investing in renewable energy technologies is a 'win-win' scenario: A win for energy security, a win for the economy and a win for the climate."
Renewable energy sources have the potential to produce electricity without any further fuel costs beyond 2030, creating an enormous number of jobs and helping lift the whole world out of recession, he said. it can also provide immediate and reliable energy for the 600 million plus Indians who have no access to electricity today, he added.

The renewable industry is ready and able to deliver the needed capacity to make the energy revolution a reality.

U. S. Sen. Bernie Sanders (I-VT), Greenpeace

Renewable Energy Council (EREC), and Dr. Joseph Romm of the Center for American Progress today released a report commissioned from the German Aerospace Center (the German Aerospace Center (the German equivalent of NASA) that shows how the United States can meet the energy needs of a growing economy and achieve science-based cuts in global warming pollution-without nuclear power or coal. The report, entitled "Energy [R]evoltion," is co-authored by Greenpeace and EREC and includes a foreword by Dr. R. L. Pachauri, chairman of the Nobel Prize-winning Intergovernmental Panel on Climate Change (IPCC).

The report finds that off-the-shelf clean energy technology can cut U. S. carbon dioxide emissions from fossil fuels by at least 23 percent from current levels by 2020 and 85 percent cut by 2020 (equal to a 12 percent cut by 2020 and an 83 percent cut by 2050 from 1990 levels) at half the cost and double the job creation of what it would take to meet U. S. energy needs with dirty energy sources.

Throughout, the study makes conservative assumptions to ensure the real-world viability of the scenario. The report assumes that only currently available technologies will be used and no appliances or power plants will be retired prematurely, and adopts the same projections for population and economic growth included in the International Energy Agency's World Energy Outlook.

"Every day that we don't deal with the crisis of global warming, it's only going to get worse, it's only going to get more costly, there's only going to be more damage to our environment," Sanders said. "This report shows that we can address climate change while improving our economy. The time is now to move forward aggressively on energy efficiency and creating new sustainable energy and millions of good-paying jobs in the process."

Based on the IPCC's findings, developed countries as a group must reduce emissions by at least 25-40 percent below 1990 levels by 2020 to minimize the risk of the worst impacts of global warming. In addition to the domestic emissions reductions in the energy sector, the Energy [R]evolution provide guidance on how the United States can achieve the IPCC"s targets by financing clean technology in the developing world.

The domestic reduction goals set by the United States will have profound impacts on the commitments other countries are willing to undertake and on the prospects for a strong agreement at the Copenhagen Climate Summit in December. President Obama's goals for near-term emission reductions fall short of what the science shows is needed and what the Energy [R]evolution scenario demonstrates is achievable, putting U. S. promises of international leadership on climate at risk.

"What this report shows is that doing what science says is necessary won't just provide the planet a living future, it actually will create far more jobs and save far more money than business as usual," said Greenpeace Global Warming Campaign Director Steven Biel. "And it will do it without exposing us tot eh unnecessary risk and pointless boondoggles that would come with any further investments in nuclear or coal."

The blueprint details the specific technologies and timetables necessary to achieve these goals such as:

- By using the most energy efficient technologies, total primary energy demand will decline by 24 percent by 2050, while under the reference scenario demand will increase by 40 percent.
- Renewable energy will grow from just 8.9 percent of U. S. electricity generation in 2005 to 95.2 percent in 2050.
- Electricity from nuclear, coal, and oil will be completely phased out by 2050.
- The savings in fuel costs under the clean energy scenario is nearly double the additional up front investment needed to end our reliance on fossil fuels.

The blueprint also details a mechanism for

achieving the deep emission reductions called for by the IPCC by supporting rapid renewable energy uptake in developing countries.

"Not only is the Energy [R]evolution blueprint essential, it's also realistic," said Romm, the Editor-in-chief of the Climate Progress blog and a former Assistant Secretary of Energy in the Clinton administration.
"In the best of worlds, we could go even further, but this report provides an invaluable baseline."

To implement the Energy [R]evolution scenario, Greenpeace supports a strong cap on global warming pollution, an end to all fossil fuel and nuclear subsidies, mandatory efficiency standards for vehicles, buildings and appliances, binding targets for renewable energy generation and strong financial support for clean energy in developing countries.

"Unlike other energy scenarios that sacrifice the climate, our Energy [R]evolution scenario shows how to save money and maintain global economic development without fueling catastrophic climate change," said Sven Teske, Greenpeace International's senior energy expert and co-author of the report. "All we need to kick start this plan is bold energy policy from world leaders."

Because renewable energy has no fuel costs, the total fuel cost savings in the Energy [R]evolution Scenario reach a total of $18.7 trillion, or $ 750 billion per year. A comparison between the extra fuel costs associated with the Reference Scenario and extra investment costs of the Energy [R]evolution version shows that the average annual additional fuel costs are about five times higher than the additional investment requirements of the alternative scenario. In fact, the additional costs for coal fuel from today until the year 2030 are as high as $ 15.9 trillion; this would cover the entire investment in renewable and cogeneration capacity required to implement the Energy [R]evolution Scenario. These renewable energy sources will produce electricity without any further fuel costs beyond 2030, while the costs for coal and gas will continue to be a burden on national economies.

Greenpeace's Energy Revolution' scenarios show how making additional investments in renewable energy would pay back handsomely. A global annual investment of US $ 22 billion in clean power plants could produce fuel cost savings of up to $22 billion per year, paying back the investment 10 times over. The value of the renewable industry. worth $50 billion in 2006- could increase to $288 billion annually by 2030. Meanwhile, converting the massive subsidies of $250 billion a year that coal and gas receive to clean, safe renewable energy would more than cover the costs of achieving the energy revolution.

Energy scenario for India shows that large-scale investments in energy efficiency measures could limit the increase in energy demand to just one-third above the current level by 2050, rather than see it triple, according to conventional wisdom. By mid-century, 60 per cent of India's electricity could be produced from renewable sources keeping India's CO2 emissions at the level of 2010 levels, instead of trebling as they do under the IEA projections.

Instead o simply countering the protectionist lobbies in the west, India should adopt an aggressive posture and adopt a leadership role in demanding technology and finance from developed world by fully harness its green energy capacity and reduce its carbon emissions well below the requirement of Kyoto protocol. India should use Doha round to seek commitments for financial and technological assistance because that will not only help in fighting climate change but help in alleviating rural poverty, creating an inclusive society and bridge regional disparities. Effective governance of climate security not only will make India achieve its social, economic and environment goals it also hold the key to India's leadership of the world polity.

(source : Quality Times, Vol. XIV No. 4/2009)

WAR

Biodiesel War

By
Ben Lefebvre, Houston

THERE'S A big fight brewing in biodiesel. Last month, the EU slapped temporary antidumping duties on US biodiesel for six months, and could extend them further.

Subsidized US biodiesel suppliers hurt their European competitors by undercutting EU material by up to 33%, the European Commission said, following its months-long trade investigation.

"The pressure exercised by the surge of low-priced subsidized imports-did not allow the (EU) industry to set its sales prices in line with market conditions and cost increases. The (EU) industry was only able to pass to its customers a price increase limited to 4%, while its full costs increased by 20% over the same period," the Commission stated in its findings.

The investigation's findings led the EU to impose temporary antidumping and countervailing duties on all US biodiesel.

Antidumping duties ran from 211/tonnes ($280/tonner) for US distributors Peter Cremer, Vinmar and World Energy Alternatives to 237/tonnes for producer ADM. The duties are in place for six months, after which the EU is scheduled to vote whether to extend them for five years.

Only blends higher than B20 (80% mineral diesel, 0% biodiesel) were included in the investigations, leaving some traders with ideas for ways to avoid the new fees.

The duties come after the Commission investigated complaints nonprofit trade body the European Biodiesel Board (EBB) filed in June 2008. EBB Secretary General Reffaello Garofalo celebrated the decision, saying "it will reestablish the level playing field that our producers have long hoped for."

The commission avoided the issue of "Splash-and-dash," saying US export statistics did not differentiate between domestic suppliers and those from outside countries who brought material to the US to claim the $1.00/gal blending credit before reexporting it to Europe.

But the investigation found that subsidized US suppliers undercut their European producer's prices by 19-33% during the investigation period. US suppliers grew their market share in Europe to 17% from 0.4% in 2005, according to commission statistics.

Although EU suppliers saw their sales volumes increase to 2m tonnes during the investigation from 1.2 m tonnes in 2006 and their average sales price grow by 23%, discounted US imports kept them from passing increased feedstock costs through to customers, the commission said.

US Makers claim protectionism

US producers, who expected the temporary duties, still called the decision "protectionist." The lack of US biodiesel will make it more difficult for the EU to meet its renewal able fuel mandates, they said.

The new imports duties will not be good for European biodiesel buyers, said Gene Gebolys, president and CEO of world Energy Alternatives, one of the US firms investigated.

"As prices rise in Europe, Europeans will be paying more for less biodiesel, putting even more pressure on their already dwindling diesel stocks," said Gebolys. "I am confident that the Europeans will soon have all the evidence they need to conclude that their protectionist impulse must give way to more enlightened policies."

US suppliers are contemplating ways to get around the duties and continue selling in a key market.

Facing up to · 260-420/tonnes in antidumping and countervailing duties on blended product sent across the Atlantic, some US biodiesel sellers are considering options such as routing Europe-

RUNNING ON EMPTY
FINANCING SHORTFALL TRIPS US BIODIESEL INDUSTRY

CASH FLOW issues are hammering US-based biodiesel producers, causing them in turn to have problems financing their operations.

US renwable fuel producer Athens Biodiesel says a financing shortfall caused it to miss payroll for its employees.

Melvin Kilgore, who owns the Huntsville, Alabama-based company with his sister Beverly, says investors failed to deliver on $1.5 m (· 1.2m) in financing, leading the company to suspend payment for 13 of its employees as it looks for new capital.

“They got nervous about the economic times and current oil prices. It was a surprise move, and now we’re scrambling,” says Kilgore.

The business started production at its 40 m gal/year Athens refinery in Alabama in July 2008, using animal fats and soy methyl ester as feedstocks. The company is currently not producing.

While a scarcity of capital has starved many companies throughout the business world, it is proving especially fatal to many in the biodiesel industry. Life for the market’s roughly 170 refiners was already difficult as crude oil prices below $60/bbl reduce demand for alternative fuels, and trade arguments have cut access to key customers in Europe. US biodiesel refining rates are down by more than half compared with last year, sources say.

In February, investors fled Nova Biosource, forcing the Butte, Montana based producer to idle its 30m gal/year refining capabilities. The company filed for Chapter 11 bankruptcy protection on March 30.

Jonathon Wolfson, president and CEO of Solazyme, a California-based company researching the use of algae as a raw material for biodiesel, told the audience at the National Biodiesel Conference in February that lack of financing “may be a bigger hurdle than anything else” in developing second-generation feedstocks. “A lot of those folks have turtled, and they are hiding in their shells.”

bound-shipments through third-party countries or selling lower blends of renewable fuels.

“That can be doable,” says one broker of the possibility of sending material to Latin America or Asia and then reexporting it to Europe. “Let’s see if the freight costs won’t penalize them too much. And it depends on where they would export it to – taxes could be smaller than duties on US material, but there would still be taxes.”

Other traders say any exploiting regulatory loopholes would be short-lived, lasting only as long as it took the EU to sort them out. US exports to Europe are still expected to fall, with many traders saying they are moving their focus to the domestic market.

Another broker is exploring selling B20 directly to Europe, as the lower blend was not covered in the EU’s investigation.

“That would make it more of a diesel export,” the broker said. “I could definitely see people looking into that.”

While European producers hailed the commission’s decision, Manning Feraci, vice

president of federal affairs for US trade body the National Biodiesel Board (NBB), calls it "flawed." He says: "The imposition of provisional duties is nothing more than a politically expedient effort to appease the protectionist whims of the European biodiesel industry and is inconsistent with the European Union's World Trade Organization obligations. This sets a dangerous precedent for global commerce."

US biodiesel major Imperium Renewable cut 24 workers from its payroll in March and suspended refining operations earlier in the year, laying much of the blame on the EU tariffs.

Imperium announced the layoffs at its 100m gal/ year Grays Harbor refinery, in Washington state, after the EU said it would impose the temporary duties.

Imperium founder and CEO John Plaza said while lagging domestic demand, tight credit markets and volatile petroleum prices, also plagued the company, the tariffs played a major role in the layoffs.
"Until recently, the soft US biofuels market had been offset by demand in the European market. This advantages ended when the European Union enacted tariffs on imported US-produced biodiesel,: the company said in the statement.

Company spokesman John Williams said the layoffs represent "over half" of its staff.

Imperium is the second-largest biodiesel refiner in the US. It started commercial operation in Seattle in 2005 and opened the Grays Harbor plant in 2007.

(source : ICIS Chemical Business, April 27-May 3, 2009)

MORE OF IT

India amends rice bran oil regulations

The Indian Ministry of Health and Family Welfare has amended its prevention of food adulteration specifications for refined rice bran oil after a six-year negotiation with the Solvent Extractor's Association of India (SEA) and other parties.

Specifically, the new rules allow higher amounts of unsaponified matter (% by weight) of up to 3.5% in chemically refined rice brain oil and up to 4.5% in physically refined rice brain oil, and they also fix the oryzanol content at not less than 1% or 10,000 parts per million. (Oryzanol is an antioxidant found in rice brain oil that is used to treat symptoms of menopause and reduce serum cholesterol levels.)

"In view of this amendment, the industry now would be in a position to offer better quality rice bran oil with more nutraceuticals (oryzanol, tocopherols, and totcotrienols)," commented B. V. Mehta, SEA executive director. In addition, he expects the change will "boost the overall processing, production, and demand for rice bran oil in the country," which currently produces 8.0 lakh tonnes (8 MMT) of rice bran oil and hopes to produce 10.0 lakh tonnes "in the next three years."

(source : Inform, AOCS, December 2008, Vol. 19 (12))

THE KEY

Jatropha

Examine the future promise of this oil

PLANTING HOPE,
HARVESTING FUEL

A humble desert plant named jatropha has been receiving much attention lately, raising high hopes for the future. Offering a wide range of applications, the hardy shrub's potential sounds more than promising: Jatropha can revive barren grounds, create jobs from virtually nothing, help small farmers in emerging countries to escape poverty and it can even provide renewable energies.

This particular oil well holds a lot of future promise. Jatropha nuts provide up to 2,270 liters of high-quality biodiesel per hectare. Boasting 60 octane, it is one of the most effective bio-oils in the world. Refined jatropha oil can be used for diesel motors with just minor medications to the engine.

What is more, the fuel is clean and environmentally friendly: it contains no sulfur, offers an outstanding CO_2 balance, and can thus contribute to protecting the climate.

ARCHER DANIELS MIDLAND CO., BAYER CROPSCIENCE, AND DAIMLER TO COOPERATE IN JATROPHA BIODIESEL PROJECT

Archer Daniels Midland Co. (ADM), Bayer CropScience AG, and Daimler AG plan to jointly explore the potential for a bio-diesel industry based on jatropha (Jatropha curcas L).

A respective Memorandum of Understanding was singed by the companies. Jatropha, a tropical plant from the Euphorbiaceous family, is seen by the tree cooperating partners as a promising alternative energy feedstock for the production of biodiesel. Bayer CropScience plans to develop and register herbicides, soil insecticides, and fungicides for disease and pest control of Jatropha plants.

Fig. I.Fruits of the jatropha shrub. Images copying Bayer CropScience.

The jatropha plant itself is undemanding and tough. While other potential fuel plants require precious farmland, thus competing with feed and food plants, jatropha thrives where nothing else will survive: on poor or degraded soils that are unsuitable for growing maize or other food crops. This type of barren wasteland is available in abundance in tropical areas. India or example, has 200 million hectares of wasteland, where hardly anything but jatropha will prosper.

Food production takes priority

Cultivation on poor or degraded soils is in the focus also for the chairman of the board of Bayer CropScience, Friedrich Berschauer: “Biofuels certainly make a contribution to covering the increasing global demand for energy while simultaneously lowering greenhouse gas emissions. However,” he continued “we would be well advised to also promote research into approaches that do not lead to competition in food growing.” He believes that the second generation of biofuels based on biomass and biomass residue will play an increasingly important role her in future. Berschauer summarized Bayer CropScience’s guiding principle as follows: “Food production takes priority.”

How it all started

The pioneer country of the jatropha campaign is India. This is where, in 2003, an enterprising project woke the hardy shrub from centuries of inconspicuous slumber. Agricultural researcher Professor Dr. Klaus Becker of Hohenheim University in Stuttgart, Germany, initiated the project together with Daimler Chrysler. Jatropha was cultivated in trial plantations in the Indian state of Gujarat, refined locally, and used in test vehicles in early 2004. In April/May 2004, a modified Mercedes Benz C 220 CDI went on a 5,900 –km tour through India, receiving worldwide publicity.

The Indian government has also come to realize the economic advantages of the succulent shrub bearing the scientific name of Jatropha curcas. So far, India imports 70% of its oil-an increasingly costly item in the country’s budget. Reducing the country’s dependence on fossil energy

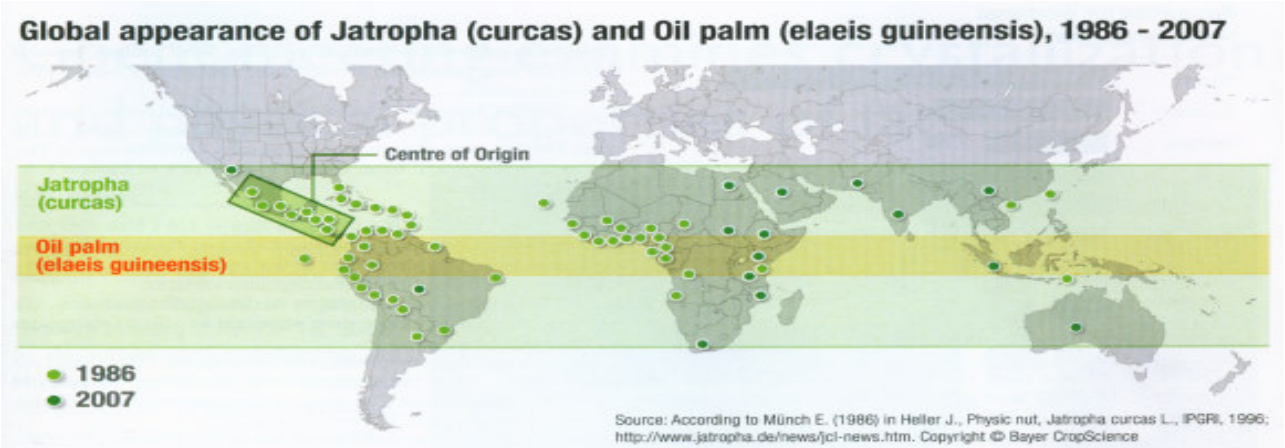


Fig. 2. While China and India have already started planting extensive areas. Africa is planning huge jatropha farms as well. Nonedible Jatropha curcas is a succulent shrub from the Euphobiaceae family. Native to South America, it was brought to Africa and Asia by Portuguese sailors. In contrast to the oil palm, jatropha can be grown in a much wider geographic area along the equator.

sources is therefore high up on the political agenda. By 2011, the government plans to substitute 20% of country's diesel consumption and jatropha is officially rated as the most important alternative fuel source.

New Jobs

The Indian population will benefit from further advantages of the crop-Farming and processing Jatropha will create jobs where they are needed most: in the rural areas. The modest shrub requires little care and even less water. As it is inedible to animals, it does not need fences for protection. its nuts cannot be harvested automatically, resulting in the creation of long-term jobs and income for the rural population. Becker reckons that is takes 1.5 workers per hectare to grow and harvest jatropha nuts. What is more, farmers need not worry about the demand side: The world's energy hunger is insatiable.

While China and India have already started planting extensive areas, Africa is planning huge jatropha farms as well. A BP and D1 Oils joint venture plans to process 2 million metric tons of nuts in four year's time, enough to meet 18% if Europe's demand for biodiesel.

Stopping erosion

Inexhaustible oil source, environmentally friendly energy supplier, job generator – the plant offers

all that the even more. According to Becker it is even able to heal degraded surfaces:

"We are planting jaropha on wasteland to stop erosion. We hope that in 10-15 years' time we might be able to recuperate these areas.

Information
Jatropha - Profile
Nonedible Hatropha curcas is a succulent shrub from the Euphorbiaceae family. Native to South America, it was brought to Africa and Asia by Protuguese sailors. The plant with its ivy-like leaves can reach a size of 3 meters and will only grow in tropical and sub-tropical climates. The fruit of the jatropha is called physic nut or purging nut. it contains toxalbumin curcin, a toxic substance that healers used to prescribed as a strong purgative. A close relative, Jatropha macrantha, is know in South America as a particularly strong aphrodisiac. As the shrub is inedible to animals. jatropha plants were traditionally used as living fences to prevent animals from grazing the fields.

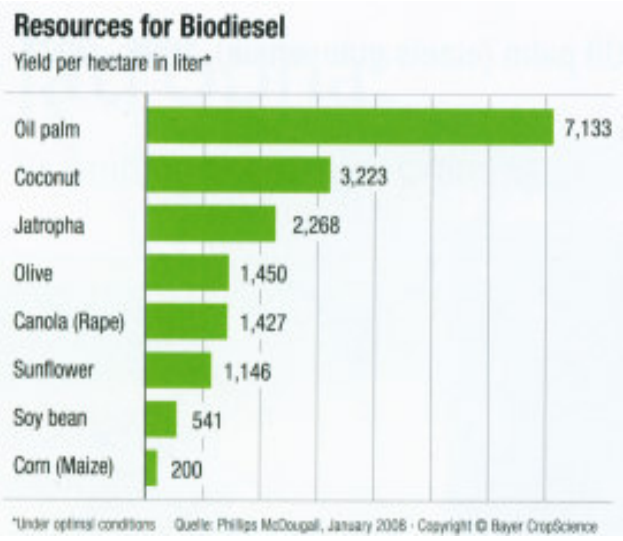


Fig. 4. Based on a study of Phillips McDougall, Jatropha nuts provide up to 2,270 liters of high-quality biodiesel per hectare o optimal conditions. Boasting 60 octane, it is one of the most effective bio-oils in the wolrd. Redifined Jatropha oil can be used for diesel motors with just minor modifications to the engine.

Even the crop's by-products might be useful. Once the oil has been extracted from the jatropha nut, the remaining press cake can be used as animal feed. The quality of the jatropha flour is significantly better than soy, Becker explains.

"The only problem we haven't solved yet is how to extract the poison. But I'm sure we will work something out."

The poison itself could also be marketed. Becker wants to use it is a biological pesticide. "It is a natural product, so biological farmers could use it for pest control."

So far, jatropha is still a wild plant that needs to be domesticated for cultivation. But researchers, industrialists, and politicians worldwide are increasingly interested in the energy plant with its promising potential.

Used as lubricant, hydraulic oil, fuel, or heating oil, the jatropha nut has what it takes to become a serious competitor to the petrochemical industry in just a couple of years.

(source : Inform (AOCS), December 2008, Vol, 19 (12)

KNOW THE FACTS

Economic News

COOIT'S Trade estimate for Oilseed crop-2009-10

30th All India Seminar on Rabi oilseeds was held at New Delhi on 22nd March, 2009. The trade estimate of oilseed crop finalised in this seminar is summerised below.

Oilseed output grows 18% as weather plays along

The weather has finally looked up in India for raising oilseed production. A conducive weather and better irrigation coverage helped the country to

Oilseed	2008- 09			2007- 08	Change
	Kharif	Rabi	Total		
1. Groundnut (In Shell)	42.2	17.0	59.2	68.9	(-)9.7
2. Soya	89.0	--	89.0	94.6	(-)5.6
3. Rape / Mustard/ Toria	1.5	65.5	67.0	47.9	(+)19.1
4. Sunflower	4.0	7.5	11.5	14.6	(-)3.1
5. Seasame	3.0	2.8	5.8	6.6	(-)0.8
6. Castor	10.2	--	10.2	9.1	(+)1.1
7. Niger	0.8	--	0.8	0.7	(-)0.1
8. Safflower	--	1.7	1.7	1.7	No change
9. Linseed	--	1.3	1.3	1.8	(-)0.5
Sub Total	**150.7**	**95.8**	**246.5**	**245.9**	**(+)0.6**
10. Cottonseed	86.8	--	86.08	99.2	(-)12.4
11. Copra	65		6.5	6.5	No change
Grand Total	**244.0**	**95.8**	**339.8**	**351.6**	**(-)11.8**

harvest 95.8 lakh tonnes of oilseeds in the 2008-09 Rabi season – 18% higher than 81 lakh tonnes in the previous season.

The hike in production comes on the back of bringing more areas under oilseeds in the current Rabi season, According to the latest estimate by the Central Organisation of Oil Industry and Trade (COOIT), area under summer oilseeds crop increased by 2.67 lakh hectares to 98.24 lakh hectares from 95.57 lakh hectares in the previous year.

Part of the rise in oilseeds acreage may be attributed to efforts taken by various state governments, which now give importance to raising oilseeds output for reducing the yawning deficit in edible oils from domestic oilseed production. This is to allow meeting internal demand.

The 18% rise in Rabi oilseeds output would help avoid a dent in total oilseeds production in the 2008-09 season (November-October), despite a drop in production during the Kharif season. According to the Solvent Extractors' Association of India (SEA), the COOIT's data which surfaced in the recently held conference on the edible oil industry make it clear that the kharif and Rabi seasons put together would see total oilseeds production in the current year increasing to 246.5 lakh tonnes from 245.9 lakh tonnes a year ago.

Rapeseed-mustard crop, with a 43% growth in production, contributed largely to the hike in Rabi oil seeds output in the current year. According to trade estimates, about 65.5 lakh tonnes of rapeseed-mustard have have been harvested this Rabi season, which was just 45.9 lakh tonnes in the previous season. This has helped to offset fall in groundnut production, which dropped by 3.2 lakh tonnes to 17 lakh tonnes in the current Rabi season from last year's level of 20.2 lakh tonnes. Cottonseed output, to, reduced to 86.8 lakh tonnes from 99.2 lakh tonnes. The total vegetable oil availability from Kharif and Rabi oilseed crops from 2008-09 is estimated at 82 lakh tonnes.

(source : The Economic Times, 27th March, 2009)

THE SLIP?

Edible oils slip as govt cuts import duty on soya oil

Edible oil and oilseeds closed lower on the commodity exchanges following the announcement by the government to scrap 20% import duty on crude soyabean oil.

The near month (April) refined soya oil contract on NCDEX nearly hit the lower circuit of 4% before closing a tad higher at Rs 440 per 10 kg.

The decision will further boost the import of soya oil and increase supplies in the domestic market.

Even crude palm oil, soyabean and rape mustard seed ended lower on Thursday.

Country's vegetable oil imports registered a year on year increase of 48% in February to 7.6 lakh tonnes. In the oil year from November 2008 – February 2009, imports were up by 68% at 29.5 lakh tonne according to the Solvent Extractors Association of India (SEA).

Reacting to the government's decision to reduce the import duty, SEA president Ashok Sethia said that the duty cut was unjustified as local prices of all edible oils were currently down by 30-50% and that compared with March 2008.

"The reduction of duty on crude soya oil will have serious impact on prices of domestic rape- mustard seed and sunflower seed which had just been harvested," Mr Sethia said.

In line with soya oil, soyabeen closed lower 1% to Rs 2,310 per quintal. Rape mustardseed May contract closed down at Rs 452 per 20 kg from Rs 455.8 previously. Even crude palm oil April contract on MCX ended down 2% at Rs 304 from its previous close.

The volumes of oil and oilseeds more than doubled on NCDEX on Thursday, Soya oil contracts clocked a cumulative volume of Rs. 575 crore against a daily average of Rs. 200 crore since the past on month, soyabean contracts a cumulative volume of Rs 505 crore and rape mustardseed Rs 420 crore.

(source : The Economic Time, 20th March,2009)

POPULATION TOO!

India's edible oil deficit expected to grow

India's edible oil deficit is expected to grow by 73.5% by 2020 to more than 8.1 million metric tons (MMT) from the current 4.71 MMT, according to the Associated Chambers of Commerce and Industry of India (Assocham).

During the last two decades, the consumption of edible oils in the country has increased at a compounded annual growth rate of 4,25%, from 4,9 MMT in 1986/87 to 11,4 MMT in 2006/07, Assocham noted.

The report also pointed out that the yield of non-native oilseeds such as soybean and sunflower is just half of the global average. The yield of traditional oilseeds is also well behind global average. In addition, expansion of groundnut (peanut) cultivation has been hindered by limited export demand for groundnut meal due to the prevalence of afatoxin in the meal. Further, repetitive sowing of the groundnut crop in southern India has resulted in a deterioration of the soil and an increase in pest infestation, which has resulted in low yields and erratic production of groundnuts.

The Assocham report pointed to oil palm as having the greatest potential to raise the amount of edible oil produced per unit of land. It also noted that there is a need to boost the irrigation coverage of oilseed crops in the country to increase acreage and yield.

In related news from India, the Solvent Extractors' Association of India (SEA) expects oilseed

production to remain stagnant during the 2008/ 09 marketing year at 26-27 MMT, which may lead to a rise in imports of more than 200,000 metric tons.

(source : Inform, March 2009, Vol. 20 (3))

MARK IT!

Growing jatropha in California

Chevron is sponsoring a project with the University of California – Davis (USA) to develop Jatropha curcas as a crop for biodiesel in the state. Working with engineers, plant scientists, and geneticists, the three year program will focus on plant domestication, yield improvements, and harvest optimization.

The first year of the study is nearly complete. Points considered so far include:

(i) how to dispose of the plants' remnants after oil is extracted from the seed: fuel to power electricity generation and fertilizer manufacture are being considered;

(ii) how to develop mechanical harvesting methods;

(iii) how to determine the effect of growing environment and genetic diversity on seed yield;

(iv) how to deal with seed toxicity;

(v) how to identify whether jatropha will be invasive in California; and

(vi) how to modify the plant genetically so that fruits mature simultaneously : this would make mechanical harvesting easier.

(source : Inform, March 2009, Vol. 20 (3))

WHO?

The Development of sustainable biofuel options is progressing well. who will emerge as the winners?

By
Simon Robinson , London

ONCE SEEN as a promising alternative to gasoline, corn-based ethanol is being supplanted by a second generation of biofuels promising greater sustainability. Cellulosic materials, algae, pyrolysis and directed evolution are all contributing to these developments.

Pyrolysis

A combined pyrolysis/Fischer- Tropsch (FT) route to biofuels from cellulose is being demonstrated by French gas producer Air Liquide's subsidiary, Lurgi, at the science and engineering research institution For schungszentrum Karlsruhe, in Germany. Lurgi will be building a gasification plant in a joint project with the Karlsruhe Institute for Technology by 2011.

The Lurgi process takes three steps to turn straw to automotive fuel. The first state uses fast pyrolysis at around 500 C (932F) to convert thin-walled plants, such as straw, into energy-rich slurry.

This slurry is then transported to a central refinery, where it is heated with steam to produce synthesis gas (syngas). In the final step, the syngas is converted into fuels by the FT process.

Edmund Henrich, of the Forschungsezentrum Karlsruhe outlined the process in a presentation at the second European summer school on Renewable Motor Fuels in 2007.

Henrich says that, on average, the cereal harvest for rural Europe yields around 50 tonnes/km of straw that is not needed to maintain soil fertility. Square bales of this straw that is not needed to maintain soil fertility. Square bales of this straw could be transported economically for 20-30 km (13-19 miles) to a pyrolysis plant.

"Taking the larger radius, the plant would convert around 200,000 tonnes/year," he says. "With a dry ligno-cellulose feed, the output is around 134,000 tonnes/year of a pyrolysis oil.char paste, a sludge or slurry with a density of 1,300kg/m and a higher heating value of 6+/- 1k Wh.kg."

Henrich says the output of the pyrolysis paste is about eight times greater than the straw bales and this can make it economical to transport for long distances. He adds that the slurry can contain around 90% of initial bioenergy and is easily stored in tanks and silos. Because the energy density is much greater than straw, it is economical to transport this by rail to a central refining facility, which can be up to 500km away.

Henrich says about half of the initial biomass energy can be converted into raw FT products, about 80% of the FT raw product energy may be converted into super-clean diesel and gasoline, and he suggests that a synfuel energy yield of 42% is a realistic upper value. Available present-day technology is near 30% Synthesis pathways via methanol may be more efficient.

How sweet it is

Cellulosic to ethanol via enzymes and fermentation is an area where Swiss based agricultural chemicals firm Syngenta has been active. The company has partnered with other industrial biotech firms, notably France-based Proteus and US-based Verenium (formerly Diversa), to develop technology.

Proteus and Syngenta announced in January at

they will work together to develop novel, high-performing enzymes for next-generation biofuel production.

Both diversity screening and directed evolution methods are to be used for the discovery and the optiomization of enzymes for the conversion of biomass into biofuels.

Proteus has a range of technologies and a source of new genes. It also has tools to generate new proteins that enable it to produce tailored enzymes, as well as a protein manufacturing platform to generate them.

Just over two years ago, Syngenta signed up Verenium to develop a range of novel enzymes to economically convert pretreated cellulosic biomass to mixed sugars.

This route to producing ethanol from cellulose is likely to be a long haul. Syngenta says that converting biomass to biofuels requires breakthrough developments in three areas: chemical preparation of the cellulosic biomass (pretreatment), conversion of pretreated cellulosic biomass to fermentable sugars by combinations of enzymes (saccharifiction), and the development of novel microoganisms to ferment the sugars to ethanol or other fuels (fermentation).

"People have to be broadminded about what's out and what's in"
John Monks. *business director, bioproducs, DSM*

Dutch chemical giant DSM is using its long-standing expertise in industrial processes that use yeast and enzyme technologies to help develop routes to ethanol from cellulose.

"Our focus is on how to bring conversion technology into play, into second-generation, second-wave technology," say John Mons, business director, bioproducts. He is not interested in making biofuels as such, but rather in the process that make them.

DSM has partnered with Spain-based biofuels firm Abengoa, and the combination has won a grant from the US Department of Energy to look at ways of turning agricultural residues into biofuels. The firm's focus is wheat straw and corn stover. "Will it be the best feedstock? Who knows?" says Monks, "Whatever is chosen, there are many hurdles to be overcome in getting the fuel from the field. The challenge is in delivering technology, which enables cost-effective production. People have to be broad-minded about what's out and what's in."

Cost effective means biofuel from cellulose that can compete with oil at around $65/bbl. DSM's routes are currently "several orders of magnitude" above that price level, so there is plenty of room for development.

Monks's bioproducts business has pulled in yeast technology following its purchase of compatriot pharmaceuticals and foodstuffs company Gistbrocades, in 1998, as well as a number of processes and ideas to develop yeasts that deliver enzymes capable of handing not only C6 sugars like glucose and fructose but also C5 saccharides produced by the decomposition of cellulose and lignin.

"Yeast classically consumes C6 sugars," says Monks. "Some of the work we're doing in the lab is to change the diet of yeast,

Typically it turns its nose up at C5 sugars, and we're trying to persuade it to be more broad-minded." This can be done through natural selection, protein engineering, or a combination of the two.

One concern about using field waste as a source of biomass is the effect of removing cellulose on soil structure and fertility. Monks says that research needs to be done to ensure that the right level of cellulose is left on fields to protect the soil below. This is especially important in areas like the US Midwest, where wind erosion can be a problem if soils become too dry and lack organic matter.

Aqueous Solution

Algae, grown in freshwater lagoons or the sea,

may be one answer. Algae can yield over half its biomass in oil, which can be converted to biodiesel. It also produce sugars that can be fermented to ethanol.

However, there is still some way to go before biofuels produced from algae can become a reality, says Dominique Duvauchelle, chairman and CEO of France-based industrial biotech company Eco-Solution. Duvauchelle puts the current best yield at around 25g/m for algae from open ponds. His company, like DSM, sees its niche as providing technology and tools to make biofuels.

Eco-Solution started with a platform that enables it to stress a range of microbes from bacteria to yeast to algae, encouraging them to respond through accelerated evolution to the environments to which they are subjected.

According to a rule of thumb, bacteria will divide once an hour and algae once every day, says Duvauchelle. Eco-Solutions has a patented method for increasing this rate, so that algae placed in the reactor will mutate faster than naturally. After a short time a natural mutation in the algae will likely have developed to become the dominant form in the reactor, being the fittest for that particular environment.

Duvauchelle says process can be repeated as necessary and combined with high-throughput screening to rapidly develop algae that will have high yield and high growth rates. Eco-Solution has been working for three years to understand algal metabolism in an attempt to tackle algae's problems as a biofuel source.

"It is slow-growing and must be faster," says Duvauchelle. "There are some problems with contamination at the start of growth after the algae has been seeded in open ponds, and the amount of biomass required."

These problems go some way to explaining why the economics are still unclear. "We will need a lha (2.5 acre) pond to better define that," he says. The firm is in discussion with two companies that are interested in carbon dioxide mitigation, he says, and a trial may be possible by the end of 2010.

Duvauchelle believes that a combination of open ponds and glass ware might offer the best economics. His current strategy sees algae started in glass and then added to the ponds. But it is important that the biofuel algae grow quickly to minimize the amount of contamination from competitive algae.

"[Of] about 30,000 species of algae... between 15-20 are used for production"

Dominique Duvauchelle, chairman and CEO, Eco-Solution

"There are about 30 000 species of algae," he says, "100 are well known and between 15 and 20 are used for production." So there is plenty of scope for competition.

But the diversity of algae also means that there is scope to produce niche varieties for different conditions. He says it is unlikely that there will be single variety of algae that works well in the cold climates, the tropics, salt and fresh water.

All of these technologies could offer a considerable range for producing biofuel from nonfood sources. The pyrolysis route looks to be the closet to commercialization, but is some way off. For companies looking to bet for the longer-term enzyme fermentation and algal routes could sill pay off, though.

(source : ICIS Chemical Business, March 2-8,2009)

THE TURMOIL?

Bio Fuels Development as Mitigation Strategy

By
Pradeep Chaturvedi

The global economic, turmoil and the consequent

recession have lowered the crude oil demand and also the crude oil price to US $ 35 per barrel in mid February 2009. Whereas in the earlier scenario the global leaders thought that the crude oil price will only go higher than US $ 140 and may touch US $ 200 per barrel any day, they now feel that the crude oil price may remain in the region of US $ 35 per barrel only in the near future.

Bio Fuels in India

India has looked at bio fuels development as important element of energy security and climate security, and bringing about several positive impacts on India's rural economy and livelihood of farmers. Realising the need of back up of industry support the government is promoting bio fuels industry. As a result large investments are being attracted to this sector recently. The development of bio fuels in India is confronted with new issues like: policy development, commercial sustainability feedstock availability, appropriate technology availability, appropriate financing and market linkage.

Ethanol

Ethanol is currently produced in India mainly from molasses, a by-product of sugar industry. In view of the glut in the sugar industry. In view of the glut in the sugar industry in the early years of this century conversion of sugarcane directly in to ethanol was considered.

An operational programme was taken up by the Ministry of Petroleum and Natural Gas (MoP&NG) making 5% blending of ethanol mandatory in about one fourth of the country with effect from 1st January 2003. Subsequently 5% ethanol blending was extended to almost all the regions of the country from 1st November 2006.

Projected Demand for Ethanol: Planning Commission's Report of the Committee on Development of Bio-Fuel (2003) projected demand for gasoline by 2011-2012 at 12.85 MMT and 16.40 MMT by 2016-17. The ethanol requirement for 5% blending with gasoline has been estimated at 560 million liters at the 2006-07 consumption levels of gasoline.

Sugarcane Production and Utilisation : Sugarcane production in India, during the years from 2001-02 to 2006-07, ranged from a low of 233.86 million tonnes in 2003-04 to high of 315-53 million tonnes in 2006-07.

Ethanol Production Capacity and Utilisation in India: The oil marketing companies have a perception that the sugar companies are not in a position to supply ethanol as per the E 10 programme. However, as per industry sources, ethanol production capacities installed in distilleries are well in excess of meeting all alcohol requirements including E10.

Land Use for Sugarcane Production : Area under sugarcane cultivation has varied between 3.67 million hectares and 4.79 million hectares. No effort is being made to increase this area as the main focus in India is on sugar production, and ethanol is only a by product. Moreover irrigation requirements is another deciding factor. Government doe not promote higher production at the cost of food crops, and the farmer is not considering sugarcane production foe ethanol production as a reliable route. The sugar industry is still looking forward to a bio fuel policy to define the future growth pattern.

The land use pattern is not likely to be affected in the near future. Most of the sugarcane production will continue to be carried out on private farm lands and under the cooperatives.

Bio Diesel

Bio diesel the other route was considered to be produced from non edible oils and crops for the same were recommended to be grown on wastelands, degraded forest lands, unutilized public lands and agricultural field boundaries. This approach avoids competition with food production. Bio diesel programme was launched in India after the Report of the Bio Fuel Committee submitted in 2003.

Key recommendations of the Report of the Bio Fuel Committee included the following :

- Launching a National Mission on Bio Diesel production and consumption.

- Development of Jatropha curcas as a bio diesel crop.
- Policy changes for promoting bio diesel consumption.

In the light of the recommendations of the Committee, a National Mission of Bio Diesel was launched, with focus on plantation of jatropha curcas. The National Mission is to be implemented in two stage i.e. Phase I as Demonstration Project and Phase II a Self Sustaining Expansion of Bio-Diesel Programme. For launching of the Demonstration Project of the National Mission on Bio-Diesel, the Ministry of Rural Development has been identified as the Nodal Ministry.

One of the primary objectives of the National Mission is to make it an effective means of brining unutilized wasteland into productive use and make it a major pro-poor initiative for generating rural employment and income. Beside, Mission would lend itself as an effective instrument for meeting national energy/ecological needs. The ultimate output of the Mission would be to reduce the country's dependence on imported petroleum diesel by supplementation of bio-diesel tot eh extent of 20% by the end of Phase II of the progamme. Plantation so Far : Many States in India have taken up cultivation of jatropha and Pongamia on wastelands. More than 6,00,000 hectares of wastelands have been planted with Jatropha and Pongamia for production of non-edible oils for use as bio-diesel feedstock. Research and Development work has been initiated by several institutions to improve productivity of primary material and processing techniques. Blending of bio-diesel with diesel has not yet been commercially started.

The State governments have pledged an area of 1.72 million hectares for Jatropha cultivation in the initial Phase (2005-06). Total available land is 153 million acres (including both non-forest cultivable wastelands and degraded forestlands.)

Projected Bio Diesel Demand : "Planning Commission's Report on Development of Bio Fuel (2003) has estimated that to meet the 20% blending requirement of bio-diesel with diesel will mean 13.4 million tonnes of bio diesel, in 2011-12. For require to be planned with Jatropha. Blending of bio-diesel with diesel has not yet been commercially started.

Land Use for Jatropha Plantation: The government of India has taken stand that jatropha and other crops for bio diesel production shall be grown only on non productive lands or lands not used for production of cereal crops. With proper extension, research, availability of planting material and funds it will be possible to plant 13.4 million hectares in near future.

Conclusion

Whereas the debate on bio fuels vs food is intense in the country, the spread of bio fuels indicates acceptability by the farmers. India has the need and potential to grow bio fuels, but will have to move cautiously on land use issues and fuel vs food debate. It is realised that interventions by the industry will be a catalyst as bio diesel needs a three to four years of gestation period for the first crop. Funding the farmers for their subsistence during the gestation period will be an important component of industry-farmer partnership.

Bio Fuels in Cambodia

Cambodia has a total landmass of about 18 million hectares of which fifty percent is still under the forest cover. Biomass remains as a stable energy source for the rural poor. Rice cultivation and fisheries are two main income generation sources for the poor farmers. About 90 percent of cultivable land is under rice.

FAO Study on Feasibility

The Royal Government of Cambodia took the initiative to study the feasibility of biofuel energy in Cambodia by actually conducting the primary level survey to check the ground reality. FAO's technical experience and EC fund support has made possible this study.

Objective of the study was to conduct the feasibility study on the potential of production of bio fuels through the community based projects that can contribute to food security and income generation at household and community levels, in a

financially socially and environmentally viable manner.

FAO Farmer Centric Bio Fuel Business Model

The proposed Business Model brings the farmer centre-stage in decision making and thereby the ownership of the project. Different components of the Model are as follows :

- Model focuses on hands-on decentralized production system that is farmer-led.
- Model has two operative levels Plantations (on-farm activity) and Oil Extraction and Marketing (Community Enterprise)
- Plantation of jatropha is undertaken by farmers on their own fields so that they get maximum benefits and retain ownership. They dry the seeds and deliver at the collection point at a fixed price– which ensures secured livelihood and therefore household based food security.
- Farmers growing jatropha plantations to also include those farmers who grow jatropha only as fencing. Since their production is very small for them to go out and sell seeds therefore jatropha farmers association may arrange rural entrepreneur to collect seeds from such farmers.
- Each tree can give at least two kg of jatropha seeds per year. If a fence has 50 jatropha plants that will give 100 kg seeds every year or a minimum additional income of 50,000 Riel per family per year
- Oil extraction and Marketing (value addition and market premium) done by Community Enterprise (Commune based) where each farmer producer is a member and shares equally in profits-which is market driven
- Community Enterprise will also ensure quality seeds and saplings for the farmers-may be by setting up its own nursery
- Each producer farmer may get bio diesel at a preferred price to be decided
- This model keeps ownership with the farmers: ensures household food security; produces and markets bio diesel at the commune level under management controlled by the farmers and give assured inputs cost plus returns to the farmers and further share in profits.
- This model promotes enterprise at the rural level.
- It does not stop or prevent private entrepreneurs to enter, but prepare local capacities of farmers to be partners in any enterprise that may evolve from the community level and the ownership is with the farmers / growers.

The FAO Bio Fuel Production Model had evolved on the findings of the survey and elaborated in terms of land availability, quality inputs supply training for advance agronomic, practices, funding marketing of seeds, jatropha oil extraction and its marketing.

Land availability

Following lands were observed to be available in the country that can be put to productive use by growing jatropha.

- Availability of non-productive and deforested land
- Land concession to private
- Land concession to commune
- Social land concession
- Farmer's own land

Land availability is not an issue at this stage. However, land right is a major issue. Also, Cambodia's economy is not strong. The fear is expressed of foreign and national private com-

panies taking over the fertile land. This needs to be considered more seriously once the production starts.

However, it is understood that actions are being initiated at different levels to promote jatropha cultivation for bio diesel.

Conclusion

It is reported that during the recent general elections in Cambodia, in the middle of the year 2008, the leaders did speak about the potential of jatropha and bio diesel to Cambodia's economic and social development, especially in the rural areas.

These two case studies from developing countries present a comparison between a large and densely populated country; and another less populated country. one can see the similarity in issues and actions.

(source : Quality Times, Vol. XIV No. 3/2009))

YOUNGSTERS?

Two Indian Scientists from CSMCRI developed new free-flowing table salt with major food company

Parthasarathi Dastidar and Pushpito K. Ghosh, part of a research group from the Central Salt & Marine Chemicals Research Institute in Bhavnagar, India, developed the new free-flowing table salt in collaboration with a major food company in India. The breakthrough could impact numerous food makers. Dr. Pushpito Ghosh was the speaker for K. K. G. Menon memorial lecture organized by UICT and AFST (I) Mumbai Chapter in October 2008.

Standard common salt tends to cake easily, especially under humid summer conditions," according to Dr Pushpito Ghosh. Moreover, even if there is no caking, the flow of granular substances can be retarded by high contact areas between the granules. A sphere is the best geometry to reduce the latte." Ghosh pointed out that any crystalline material such as salt has well defined faces. For example, a standard salt crystal is cubic in morphology and has six square faces. "Any deviation from this morphology would be thermodynamically less favourable and therefore would not form without some kind of intervention," he said. The focus of others has been on mechanical intervention that cubes can be transformed into dodecahedron is not new but no one had thought perhaps from the angle that we did," said Ghosh. The challenge for the team was to carry out such modification under ambient conditions so that crystallization in solar pans was viable. They found that glycine was successful for this purpose.

"Thereafter, the main challenge was to find a way out of the problem of high requirement of glycine for the desired habit modification," said Ghosh. "This was solved by introducing the concept of recycling excess glycine in a fresh lot of saturated brine. However, this would not have worked but for the fact that the recycling led to dissolution of coprecipitated glycine leaving the condition of the salt intact." The end result, says Ghosh, is that the food industry has a potentially more convenient and aesthetically appealing product to offer. The fact that the modified salt contains a trace amount of glycine (0.5-1.0 per cent w/w) may also be a boon to the food industry since glycine, although non-essential amino acid, is known to impart a certain amount of refreshing and sweetish flavour.

"The salt tastes fine, but we have so far not carried out any studies on differentiated taste. Another advantage is that a solution of the salt would be completely clear unlike salts, which contain insoluble inorganic anti-caking agents. "We also expect that FDA clearance would be simple since glycine should be a perfectly acceptable additive in salt." Ghosh also said that the team was looking for enquiries from interested industries. "We may need to work in partnership with them to make the invention truly commercially viable," he said.

"We will also have to work with them to catalogue the advantages and drawbacks, if any, of the products" The team has already filed patent applica-

tions and the PCT application has now entered the National phase of fillings. Ghosh, Dastidar and colleagues plan to publish their findings in the 5 July issue of Crystal Growth & Design.

(source : Food India News)

MORE ON NANO!

Nanotechnology in food

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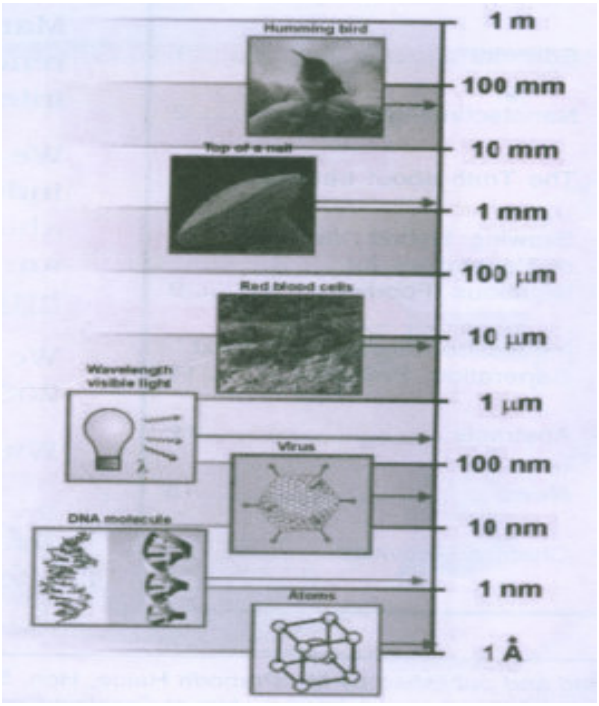
Nanotechnology is a rapidly growing science for producing and utilizing nano sized particles that measure in nanometers. The technology has been widely used by the electronics industry for many years. Examples for newer products using nanotechnology include automobile paints, transparent sunscreens, stain-and water-repellent clothing, improved sports shoes and odor-free socks, bouncier tennis balls, superior quality tennis rackets and golf clubs, the displays on digital cameras and watches and self-cleaning glass, and concrete. Even agricultural production and food industries have witnesses the use of nanotechnology so that can be integrated into number of food systems and food packaging products. The fact in nanotechnology is that at ultra small scale level, the materials exhibit new properties.

Nanotechnology

Nanotechnology is the study of manipulation or self assembly of individual atoms, molecules or molecular clusters to create materials and devices with vastly different properties. Nanotechnology involves the design, production and application of structures, devices and systems by controlling the shape and size at the nanometer scale. The first mention of some of the distinguishing concepts in nanotechnology was given by physicist Richard Feynman on 1959. He noted the changing magnitude of various physical phenomena: gravity would become less important, surface tension, etc. This basic idea appears feasible and exponential assembly enhances it with parallelism to produce a useful quantity of end products.

Consumers demand food to be fresh for long time, and the packaging materials should be easy for handling, safe and healthy to human and also to the environment. A major problem in food science is determining and developing an effective packaging material. Using nanoparticle technology, Bayer has developed an even more airtight plastic packaging that will keep food fresher and longer than their previous plastics and the plastics of their competitors.



Nanometer

The term “nano” is derived from the Greek word

for “dwarf”. A nanometer (nm) is one-billionth of a meter, of approximately one hundred thousandth of the width of a human hair. Nanotechnology is generally concerned with materials that are 10 – 100 nm in size or less. Anything that is smaller than 100nm is called as nanoscale. At this size range, the behavior of materials begins to change. Making materials smaller does not just lead to an increase in compactness, preciseness, or refinement of the structure and properties of the materials; it leads to significant changes in properties. The nanoparticles can be observed by human eye only through **Transmission Electron Microscopy (TEM).**

Examples

- A water molecule < 1nm
- A DNA - 2.5nm wide
- Proteins 5 - 50 nm
- A typical germ - 1,000nm
- A RBC - 5000nm diameter
- A WBC - 10,000NM diameter
- Bacteria 1,000 - 10, 000nm
- A hair - 100, 000nm

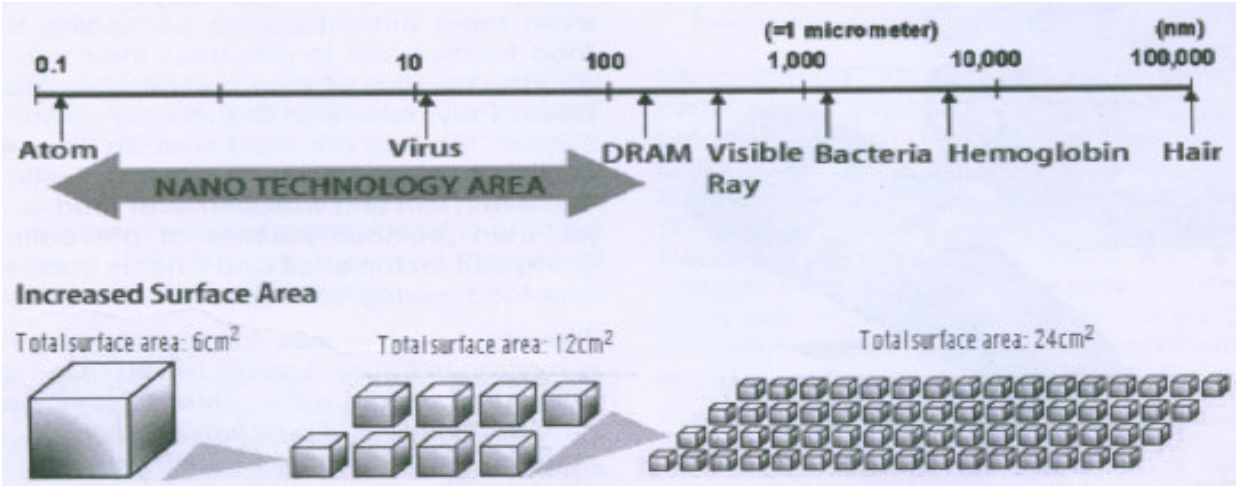
Materials at Nanoscale level

At nanoscale level the material properties changes and these unexpected changes are called quantum effects. With only reduction in size and no change in substance they exhibit different properties. for example.

Size does matter

The finer and tinier a matter gets, the original surface area of the matter gets amplified nano times over, emitting its packed force in their equal folds. Here lies the nano’s mystery unknown till recently but all of a sudden has hit us so powerfully. The surface area per unit weight increases exponentially as the size decreases, and it starts showing new or stronger characteristics or properties which have not been observed or found before when they become nano level particles.

BEFORE NANO LEVEL	AFTER NANO LEVEL	EXAMPLE
Opaque sustance	trasparent	Zinc Oxide
Stable materials	combustible	Aluminum
Soft materials	Stronger	Carbon
Inert materials	catalyst	Plantinum



Approaches to attain nano materials

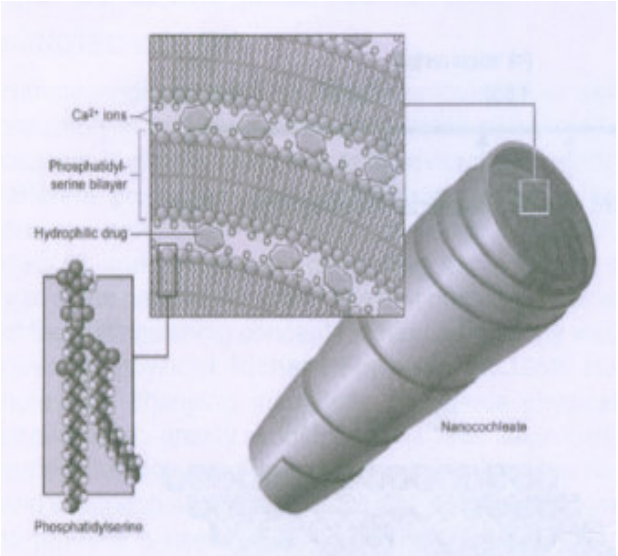
The two approaches to attain nanomaterials are top-down approach and bottom-up-approach. Lithography is a top-down fabrication technique where a bulk material is reduced in size to nanoscale pattern. In contrast, bottom-up techniques build or grow larger structures atom by atom or molecule by molecule. These techniques include chemical synthesis, self-assembly and positional assembly.

Nano- nutraceuticals and nano-functional foods

Agri-food Canada defines nutraceuticals and functional foods as "food components that provide demonstrated physiological benefits or reduce the risk of chronic disease, above and beyond their basic nutritional functions. A functional food is similar to a conventional food, while a nutraceutical is isolated from a food and sold in dosage form, in both cases the active components occur naturally in the food

Nanocapsules

nanocapsules containing tuna fish oil (a source of omega 3 fatty acids) in "Tip-Top" Up bread.



Nanocochleates

In food and beverage industry, attempts have been made to add micronutrients and antioxidants to food substances. But these antioxidants degrade during manufacturing and food storage. Nano cocohleates delivery system protects these substances from degradation. Ex. Polyphenols and Resveratrol are the substances present in most foods and wine, respectively. They gets degraded and oxidized when exposed to air. Nanocochleates solve early oxidation by individually capturing and wrapping them in a phospholipid wrap, and maintaining the internal nutrients secure from water and oxygen.

BioDelivery Sciences International have developed nanococochleates which are 50nm coiled nanoparticles and can be used to deliver nutrients such as vitamins, lycopene and omega 3 fatty acids more efficiently to cells, without affecting the colour or taste of food.

The delivery vehicle is made of soyphophatidyserine which is 100% safe. It provides a protective coat for range of nutrient additives.

Bioral nanocochleates is a licensed and patented delivery technology, where bioral omega 3 nanocochleates is introduces. The common source of omega 3 fatty acid is coldwater fish which have an unpleasant fishy odor and taste. But the bioral omega 3 formulation has some advantages like:

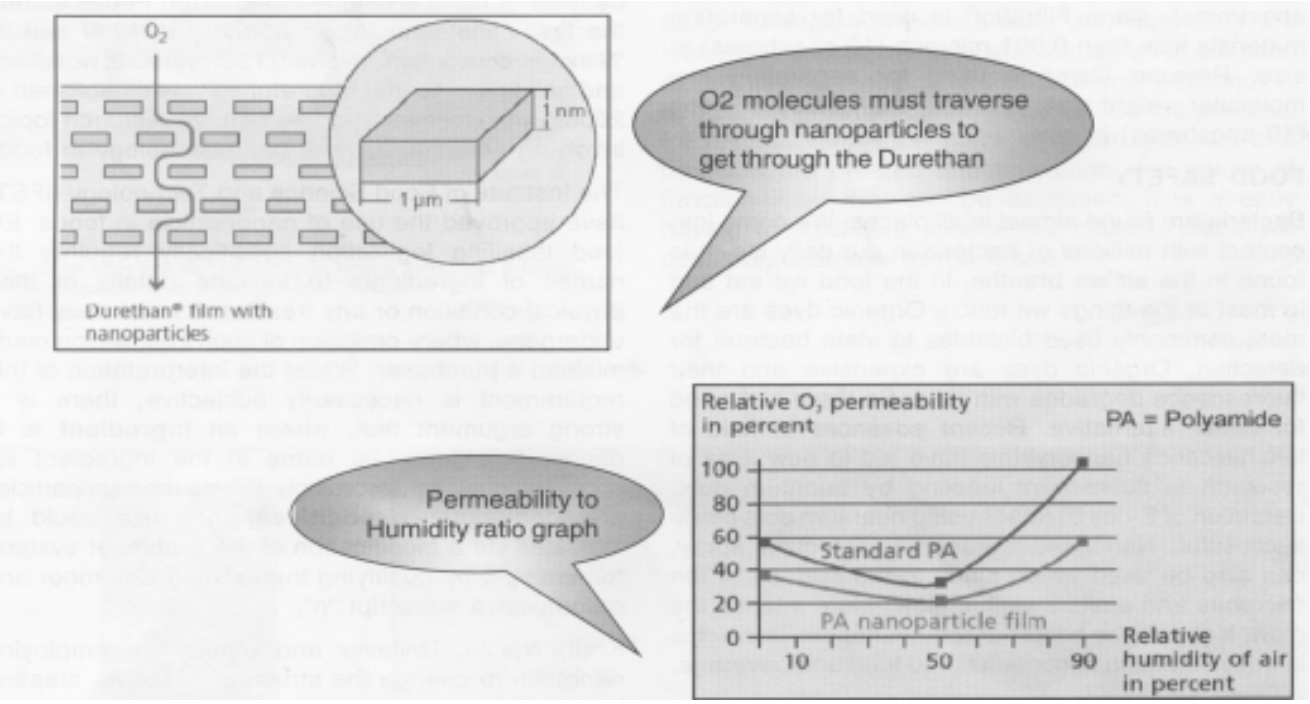
- It feels like flour
- No fish odor or taste
- Tested in food products
- Can be subjected to baking and heating
- Ability to protect omega 3 fatty acid from degradation

Nanoclusters

R&D Scientists at Royal Body Care developed NanoClusters, a nanosize powder that combines with nutritional supplements. When consumed, it reduces the surface tension of foods and supplements to increase wetness and absorption of nutrients. It replaces our previous micro clusters ingredient.

Food Packaging

Consumers demand food to be fresh for long time, and the packaging materials should be easy for handling, safe and healthy to human and also to the environment. A major problem in food science is determining and developing an effective packaging material. Using nanoparticle technology, Bayer has developed an even more airtight plastic packaging that will keep food fresher and longer than their previous plastics and the plastics of their competitors. Researchers at Bayer Polymers refer to this new plastic as a "hybrid system" as it is enriched with an enormous number of silicate nanoparticles. When this plastic is processed into a thin film and wrapped over food, it does a better job than previous plastics of preventing food from one food mixing with another. The most problematic for food packaging engineers is oxygen because it spoils the fat in meat and cheese and turns them pale. Due to the nature of the nanoparticles in Durethan, Bayer's new plastic material, air cannot penetrate it like other conventional plastics. The embedded particles have a maze like arrangement in the plastic, acting like barriers, which makes it difficult for gases, like oxygen, to pass through the packaging. They actually increase the distance the gas molecules have to travel by causing those molecules to zigzag around the silicate plates in effect increasing the amount of time it will take for the molecules to completely penetrate. Triton system and the US Army are conducting further work on barrier performance in a joint investigation. The requirement here is for a non- refrigerated packaging system capable of maintaining food freshness for three years. Nanoclay polymer composites are currently showing considerable promise for this application. USFDA has approved the use of nanocomposite in contact with foods.



Filteration

Nanofiltration water treatment is a liquid separation membrane technology. Nanofiltration can perform separation applications such as demineralization, color removal, and desalination. Nanofiltration systems offer cost-effective alternative to commercial reverse osmosis units, as Nanofiltration systems can be operated at low 02 molecules must traverse through nanoparticles to get through the Durethan Permeability to Humidity ratio graph pressures. The level of dissolved solids to be removed is less than what is typically encountered in brackish water or sea-

water. Sometimes referred to as membrane softening or membrane water softeners, nanofiltration is an alternative to salt bases water softening.

Nanofiltration membrane allows the diffusion of certain ionic solutes (such as sodium and chloride), predominantly monovalent ions, as well as water. Larger ionic species, including divalent and multivalent ions and more complex molecules are highly retained. Since monovalent ions are diffusing through the Nanofiltration membrane along with the water, the osmotic pressure difference between the solutions on each side of the membrane is not as great and this typically results in somewhat lower operating pressure with Nanofiltration compared with Reverse Osmosis. Some typical applications for Nanofiltration are:

- Desalination of food, dairy and beverage products or byproducts
- Partial Desalination of whey
- Desalination of dyes and optical brighteners Purification of spent clean-in-place (CIP) chemicals
- Color reduction or manipulation of food products
- Concentration of food, dairy and beverage products or byproducts
- Fermentation byproduct concentration.

Micro Filtration removes particulate ranging in size from 0.1 to 1.0 microns (1,000 to 10,000angstroms) and larger. Ultra Filtration separates materials in the 0.001 to 0.1 micron range (10 to 1,000 angstroms). Nano Filtration is used for separating materials less than 0.001 microns (10 angstroms) in size. Reverse Osmosis used for separating low molecular weight materials, less than 0.001 microns (10 angstroms) in size.

Food Safety

Bacteria are found almost in all places. We come into contact with millions of bacteria in our daily life. It is found in the air we breathe, in the food we eat and in most of the things we touch. Organic dyes are the most commonly used biolables to stain bacteria for detection. Organic dyes are expensive and their fluorescence degrades with time. So there is a need for better alternative. Recent advances in field of luminescence nanocrystals have led to new area of research in fluorescent labeling by quantum dots. Detection of E-coli 0157:H7 using quantum dots made successful. Nanobiominescence detection spray, can also be used which binds to the surface of the microbes and emits a visible glow. More intense the glow, higher is the bacterial contamination. This helps in easy detection of contaminated food and beverage.

Improved biosensor technology may be used to detect gases present in packaged foods as a measure of integrity of the packaging material, compounds released during food spoilage or deterioration, and the presence of pathogens or toxins in foods. Such sensors could be incorporated into packaging to alert consumers, producers, and distributors as to the safety status of foods or could be used to detect pathogens in processing plants.

Food Design

Understanding the nature of nanostructures in foods allows a better selection of raw materials and control of processing and packaging in order to optimize product quality and shelf life.

Nano food refers to the use of nanobiotechnology and nonotools, applied during the cultivation, production, processing, or packaging of foods. nanotechnology is attractive to the food industry as it promises to yield new solutions to key challenges. Food engineering is one of the areas receiving the highest attention, according to a separate EU report earlier this year. Research and development underway includes the development of functional food, nutrient delivery systems and methods for optimizing food appearance, such as colour, flavour and consistency.

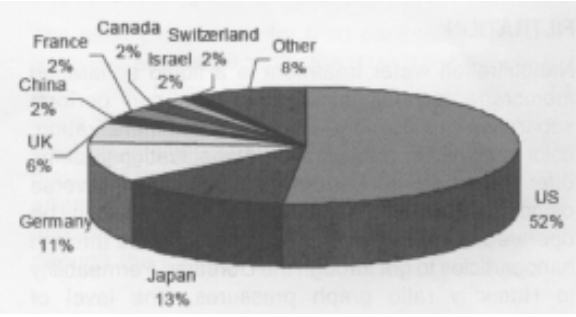
It seems almost certain that most major food companies are monitoring or researching the potential benefits of nano science in food. Kraft Foods started the first nanotechnology laboratory in 1999

and its 'Nanotek' consortium, involving 15 universities worldwide and national research laboratories was established in 2000. Both Unilever and Nestle have research topics involving potential used of nanotechnology in food.

The Institute of Food Science and Technology (IFST) have approved the used of nanoparticle in foods. EU food labeling legislation specifically requires the names of ingredients to indicate details of their physical condition or any treatment, which they have undergone, where omission of such information could mislead a purchaser. Whilst the interpretation of this strong argument that, where an **ingredient** is in nanoparticle form, its name in the ingredient is in nanopraticle from, its name in the ingredient list should be qualified accordingly. Where the nanoparticles are food approved **additives**, their use could be indicated via a modification of the E-number system, for example by qualifying the existing E-number and name with a subscript "n".

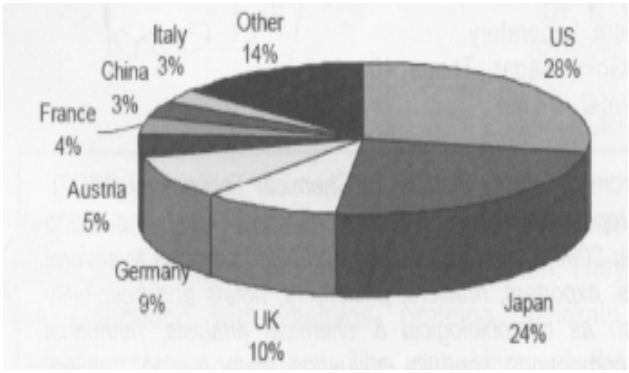
Kraft, Nestle Unilever and others are employing nanotech to change the structure of food-creating "interactive" drinks containing nanocapsules that can change colour and falvour (Kraft) and spreads and ice creams colour and flavour (Kraft) and spreads and ice creams with nanoparticle emulsions (Unilever, Nestle) to improve texture. Others are inventing small nanocapsules that will smuggle nutrients and flavours into the body ("nanoceuticals").

PERCENTAGE OF COMPANIES PRODUCING NANOMATERIALS BY COUNTRY



Note: Other includes Australia, Netherlands, Taiwan, Austria, Sweden, Finland,Korea, Russia, Italy, and Spain.

PERCENTAGE OF UNIVERSITIES & INSTITUTION INVOLVED IN NANO-RESEARCH BY COUNTRY



Conclusion : The use of Nanotechnology in food processing make product cheaper, more efficient and safer. The impact for the food industry will be a change of 40-50% by 2015. Change will be dramatic and potentials are immense. Source of increasing the speed of adaption of this new technology is linked to cost efficiency & population growth. Nanotechnolgy has the potential for revolutionzing the ways in which materials and products are created and the range and nature of functionalities that can be accessed. It is already having a significant commercial impact, which will assuredly increase in the future.

(source : News Letter, January 2009)

The Truth about trans fat

By
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There has been a lot of discussion in recent times regarding trans fats, its presence in our food and its ill effects on our health. New findings, media reports and regulatory action have added a surge in our curiosity towards this previously not-so-well-known fiend in our daily food.

But how much does the common Indian consumer know about what trans fats really are? How should be identify which of the foods he consumes contains more of it? And what are the health choices he should make when choosing alternative fats in his diet? This article is aimed and providing and answer to all of these questions and hopefully de-mystifying the term trans fat for one and all.

What is trans fat?

Without getting into the chemical complexities of this compound, it can be simply stated that trans fats (or trans fatty acids) are produced when manufacturers add hydrogen to vegetable oils- a term called as hydrogenation. Production of trans fats is a side-effect of the unavoidable partial hydrogenation that occurs during this process. Hydrogenation itself is popular because it increase shelf life, is helpful in baking and retains flavour stability of foods containing these fats.

A majority of trans fat is formed when food manufacturers turn liquid oils into solid fats like shortening and hard margarine.

Is trans fat bad for health?

Scientific evidence has clearly shown that consumption of saturated fat, trans fat, and dietary cholesterol raises low-density lipoprotein (LDL) (or 'bad cholesterol') , which increases the risk of coronary heart disease (CHD).

Although saturated fat is the main dietary culprit that raises LDL, trans fat and dietary cholesterol also contribute significantly.

Are all fats bad?

Not at all, Fats are a major source of energy for our bodies and they aid in the absorption of vitamins such as A, D, E, and K as well as carotenoids. Both animal and plant derived food products contain fat, and as long as it is eaten in moderation, fat is helpful for proper growth, development, and maintenance of good health.
Fat, as a food ingredient, provides taste, consistency, and stability. Fats are also an especially important source of calories and nutrients for infants and toddlers especially up to 2 years of age. But while unsaturated fats (monounsaturated and polyunsaturated) are beneficial when consumed in moderation, saturated and tans fats are not. It is therefore advisable to choose foods low in saturated fat, trans fat, and cholesterol as part of a healthy diet. However, it is also recognized that eliminating these three components entirely from one's diet is not practical, as they are unavoidable in ordinary diets.

Which foods contain trans fats?

Trans fat can be found in products such as vegetable shortenings, some margarines and other foods made with or fried in hydrogenated oils.

A small amount of trans fat is also found naturally, primarily in some animal-based foods.

What are the precautions to avoid trans fat consumption?

Declaration of transfat on nutritional labels will aid the consumer in deciding his/her personal consumption level.

Tips to healthier consumption of fats

- Choose foods lower in saturated fat, trans fat, and cholesterol
- Replace saturated and trans fats in your diet with monounsaturated and polyunsaturated fats. Sources of monounsaturated fats include olive and canola oils. Sources of polyunsaturated fats include soybean oil, corn oil, sunflower oil and foods like nuts.
- Choose vegetable oils and soft margarines more often because the combined amount of saturated fat and transfat is lower than the amount in solid shortenings, hard margarines, and animal fats, including butter.
- Choose foods low in saturated fat such as fat free or 1% dairy products, lean meats, fish, skinless poultry, whole grain foods, and

fruits and vegetables.

Be better informed so as to be able to make a healthier choice for yourself and your family. Wish you healthy eating & happy living!

(source : News Letter, January 2009)

IMPORTANT

Biodiesel

ASTM publishes biodiesel blend specifications

ASTM publishes biodiesel blend specificationsASTM International (West Conshohocken, Pennsylvania, USA) has published new biodiesel blend specifications on its website, www.stom.org. These will benefit biodiesel producers, petroleum companies, engine and vehicle manufactures, pipeline, engine and vehicle manufacturers, pipeline operators, fleets, and private consumers. They include the following :

- ASTM D 975-08a, Specification for Diesel Fuel Oils –used for on-and off-road diesel applications; revised to include requiremeents for up to 5% biodiesel;

- ASTM D 396-08b, Specification for Fuel Oils used for home heating and boiler applications; revised to include requirements for up to 5% biodiesel; and

- ASTM D 7467-08, Specification for Diesel Fuel oil, Biodiesel Blend (B6 to B20), a completely new specification that covers finished fuel blends of between 6 to 20% biodiesel (B6 –B20) for on-and off-road diesel engine use.

ASTM also approved updates to ASTM D 6751, the existing ASTM bio-diesel standard that addresses the product quality of pure biodiesel (B 100) before blending it with conventional diesel fuel.

ASTM specification provide details on requirements for fuel characteristics as well as the relevant standard test methods to use for each. The new biodiesel standards apply to all finished biodiesel blends, regardless of the type of feedstock used to make the fuel.

(source :Inform, December 2008,Vol. 19 (12)

RIDE ON!

Defatted soy flour as filler substitute for rubber tires

US Department of Agriculture Research Service (ARS) scientists Lei Jong and Jeffrey Byars are testing soy flour as a “green” filler for tires and other natural rubber products. (J. of App. Polym. Sci. 111.2049-2055, 2009).

Current filler generally are petroleum-based particles known as “carbon black.” Manufactures use them in rubber to improve tensile strength and wear resistance. However, Jong and Byars’ research at the ARS Cereal Products and Food Science Research Unit of the National Center for Agriculture Utilization Research in peoria, Ilinois, USA, indicate that soy flour could serve as an alternative to carbon-black tire fillers.

The scientists use defatted soy flour that has been dispersed in water to form aggregates 20 microns in diameter (about 1/1000th of an inch). Then they add the aggregates to rubber latex and freeze-dry the mixture. This causes the aggregates to form a tight interconnecting network through the rubber.

To test the soy-based rubber, the researchers mold it into samples and subject them to shearing and other forces. Of particular interest is the “Storage modulus,” which measures the elasticity of a material. On average, the storage modulus scores of composites containing 30% soy flour are 20 times higher than filler-free rubber, but somewhat lower than those reinforced with carbon black.

(source : Inform , March 2009, Vol. 20 (3))

THE FALLOUT

Chemicals from glycerol

Scientists from South Korean universities, the sate-run Korea Research Institute of Chemical Technology, and GS Caltex have collaborated to extract glycerol carbonate (GC) and 3-hydroxproprionic acid (3-HP) from glycerol by using "a special catalyst." The scientists calculate that production of these chemicals from by-product glycerol, remaining after biodiesel synthesis, can reduce biodiesel production costs by 15%.

GC is a solvent used for industrial and medical purposes; it could replace propylene carbonate. 3-HP is a water-soluble compound sued in the industrial production of various chemicals such as acrylates.

A Korean official speculated that a fully optimized process for large-scale production could be completed by 2012.

(source : Inform, March 2009, Vol. 20 (3))

PRICES TUMBLE

Airlines test aviation biofuel

On January 8, 2009, Continental Airlines became the first North American airline to test biofuels in one of its planes. One of its Boeing 737 airliners took off from Houston, Texas, operating one engine on a B50 (50% biodiesel, 50% Jet A) blend during a two-hour flight. UOP LLC (Des Plaines, Illionis, USA) created the biofuel for the flight, comprising 94% jatropha oil, provided by Terasol Energy (Texas, USA), and 6% algae oil, supplied by Sapphire Energy (San Diego, California, USA). Preliminary date indicated the engine performed as predicted. No problems were encountered during the flight.

UOP anticipates licensing its fuel technology by mid-2009, according to Biofuels Digest.

On January 30, Japan Airlines also tested a biofuel blend (50% traditional Jet A fuel, 50% biofuel) in a Boeing 747-300 aircraft powered by a Pratt & Whitney engine; 84% of the biofuel came from camelina seed oil, under 16% from jatropha oil, and under 1% form algal oil. Camelina was selected because the plant can grow in dry areas and at high latitudes; these characteristics make the plant less competitive with food crops and thus mote sustainable. Sustainable Oils Inc. (Bozeman, Montana, USA) provided the camelina fuel, Terasol Energy the jatopha oil, and Sapphire Energy the algae oil.

(source : Inform , March 2009, Vol. 20 (3))

DUEL IN THE SUN

Jatropha possible source for both biodiesel and ethanol

Mission New Energy (formerly, Mission Biofuels) of Perth, Australia, announced the successful pilot-plant production of celluosic ethanol from agricultural waste material, specifically jatropha plant waste, in late 2008. Mission has sponsored the planting of over 360,000 acres (146,000 hectares) of jatropha with the intent of processing the seeds for biodiesel. The ability to produce ethanol as well from jatropha waste will allow the company to achive further value from its jatropha acreage. Before this announcement, few alternatives were available for further use of jatropha waste because of its toxicity.

A November 2008 company press release (accessible at www.missionne-wenergy.com) said they are able to separate lignin fully from cellulose and hemi-cellulose, enabling complete hydrolysis of the separated components into c5 and c6 sugars, without using enzymes. Complete hydrolysis and formation of both C5 and c6 results in higher yields of fermentable sugars for alcohol production.

The pilot plant was set up in a joint venture with a scientific team in India. According to Biofuels Digest, this is one of the first successful non-US cellulosic projects.

(source : Inform, March 2009, Vol. 20 (3))