



ADAPT Council Industry Newsletter



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3rd Annual Canadian Renewable Fuels Summit

Dec 10-12, 2006

Be a part of the exciting growth of the biofuels industry in Canada!

According to the organizers, you won't want to miss this year's Summit in Banff where some of the best international speakers will come together to talk about the Canadian biofuels market and its massive expansion.

You'll have the opportunity to learn the latest information about the ethanol industry, network with key leaders and meet the players at this third annual Canadian Renewable Fuels Summit, to be held December 10-12, 2006, at the Fairmont Banff Springs Hotel.

For more information see: <http://www.greenfuels.org/events/index.htm>

Promising Future for Biofuels

For 'The Energy Blog'

http://thefraserdomain.typepad.com/energy/2005/10/biofuels_have_g.html

Science News Online has a great article reviewing the emerging technologies in biofuels. Many of them have been subjects of previous posts in The Energy Blog, but putting them all together puts a fresh perspective on the future of biofuels. With the rising prices of oil products biofuels are about the only answer to augmenting our liquid fuels supplies, not to diminish the importance of the conservation benefits of more fuel efficient vehicles, plug in hybrids, electric vehicles and

mass transportation. Neither conservation efforts or biofuels alone can totally mitigate increasing prices, but without extreme efforts on both fronts supply and demand can do nothing but increase the price of fossil fuels.

ORNL published a report early this year that projected that we could get 30% of our liquid fuels from biomass without displacing any land used for crop production or grazing. Government funding as provided in the Energy Act will be of great assistance in assuring that some of the technologies outlined below get developed and brought to the commercial market to allow attaining this goal.

Ethanol Developments - By far the most emphasis has and is being placed on ethanol production in a biorefinery. The first group of technologies are related to improving this process.

Bruce Dale of Michigan State University is working on a liquid ammonia pretreatment process to prepare wastes for enzymatic treatment. The Ammonia Fiber Explosion System (AFEX) "blows apart" plants reducing the pretreatment cost in half.

The development of low cost enzymes that enables converting cellulose into its constituent sugars is a breakthrough that will enable making ethanol from corn stover, bagass, grasses and perhaps waste wood products. Novozymes, Genencore and Iogen are producing such enzymes. Novozymes in particular has reduced the price from \$5.40/gallon to \$0.20/gallon.

Instead of the two steps of first breaking down the cellulose into sugars and then fermenting the sugars into alcohol, Lee Lynd and Yi-Heng Percival Zhang of Dartmouth College have discovered an anaerobic microbe that will do both tasks. These microbes still need some bioengineering tweaking before they can produce ethanol.

Enhancements of ethanol production to produce byproducts such as the Panda process which makes biodiesel from waste corn oil in dry mill processes. They intend to build a 30 MMgy biodiesel production facility and will process the crude corn oil in a new facility that is expected to be completed in 2007. The University of Missouri has developed a process for converting glycerin, a byproduct of biodiesel production, to propylene glycol, a nontoxic antifreeze. This technology can reduce the cost of biodiesel production by as much as \$0.40 per gallon of biodiesel. The process has been licensed to three biodiesel plants.

Biodiesel - Biodiesel at present is produced in much smaller quantities, but larger quantities will be required as our oil supplies deplete. These technologies need much more development than the ethanol process. The use of algae or the alkane process are both very promising but little work is being done on algae and the alkane process is in early stages of research.

Production of biodiesel from algae has long been proposed, Greenfuels Corporation has developed a process that it is being demonstrated on pilot scale that uses algae and smokestack emissions to produce biodiesel. The biodiesel is a byproduct resulting from using the algae to clean up the smokestack emissions.

Distillation of the impure alcohol from the digestive process is the most energy intensive step in the production of ethanol. George Huber and his colleagues at the University of Wisconsin are developing a process to produce alkanes from cellulosic sugars. Alkanes are oil-like hydrocarbons that can be blended with diesel fuel just like biodiesel.

Thermochemical processes can be used to produce either a synthetic gasoline or synthetic diesel by modifying the synthesis step. These processes consist of two steps, gasification and Fischer-Tropsch synthesis. One process has stepped to the forefront of this technology.

Choren Industries is well on its way to develop a gasification process which, used in conjunction with a Fischer-Tropsch synthesis process, is being used to produce SunDiesel. Their Carbo-V's three step biomass gasification process produces syngas without the tars and other impurities usually associated with biomass gasification. By partnering with Shell and using the Shell Middle Distillate Synthesis (SMDS) technology, a low-temperature, cobalt catalyst based FT process, they are able to produce SunDiesel, a synthetic oil liquid that is very clean, sulfur free and aromatic free; that meets the most stringent environmental standards.

A continuing debate is underway as to whether ethanol is an energy efficient fuel; is there more energy used in the production of ethanol than is contained in the product ethanol. Both sides of the argument keep refining their arguments with rebuttals to the other sides latest calculations. The pro-ethanol side seems to be winning in my opinion. There are also discussions as to whether there are better uses for the feedstocks, such as burning the feedstock to provide heat or electricity. I think this argument is mute, we need to supplement our liquid fuel supplies, other uses do not answer that need. Conservation alone cannot make up for declining oil production.

Production of ethanol from corn and biodiesel from oil seeds will not enable us to meet our production goals. There is not enough land to produce the corn and oil seeds. Development of process that use cellulosic feedstock is a necessity and should be a national priority. Biorefineries should meet this requirement, but either the alkane process or thermochemical processes are needed to supplement our diesel supplies. Use of these processes should end the energy debate once and for all.

Implementation of the technologies described above could cut the energy consumption considerably. Some of them are ready for large scale demonstration that is badly needed. Development and implementation of these technologies will go a long way towards supplanting the worlds energy needs.

New Process Makes Diesel Fuel and Industrial Chemicals from Simple Sugar **Source GreenBiz.com**

URL: http://www.greenbiz.com/news/news_third.cfm?NewsID=33203

MADISON, Wis., July 7, 2006 - Soaring oil and natural gas prices have fueled a race to find new sources for chemical intermediates -- compounds that are the raw material for many modern plastics, drugs, and fuels. But there's a better way to make a chemical intermediate called HMF (hydroxymethylfurfural) from fructose, according to James Dumesic, a University of Wisconsin-Madison chemical and biological engineering professor. Dumesic reports in the June 30 issue of the journal Science that HMF can be converted into plastics, diesel-fuel additive, or

even diesel fuel.

The new process goes beyond making fuel from plants to make industrial chemicals from plants. "Trying to understand how to use catalytic processes to make chemicals and fuel from biomass is a growing area," says Dumesic, who directed the HMF research. "Instead of using the ancient solar energy locked up in fossil fuels, we are trying to take advantage of the carbon dioxide and modern solar energy that crop plants pick up."

The new, patent-pending method for making HMF is a balancing act of chemistry, pressure, temperature and reactor design. After a catalyst converts fructose into HMF, the HMF moves to a solvent that carries it to a separate location, where the HMF is extracted. Although other researchers had previously converted fructose into HMF, Dumesic's research group made a series of improvements that raised the HMF output, and also made the HMF easier to extract.

Once made, HMF is fairly easy to convert into plastics or diesel fuel. Although the biodiesel that has made headlines lately is made from a fat (even used cooking oil), not a sugar, both processes have similar environmental and economic benefits, Dumesic says. Instead of buying petroleum from abroad, the raw material would come from domestic agriculture. Expanding the source of raw material should also depress the price of petroleum.

Using biomass-waste products of agriculture and forestry-can also cut global warming caused by carbon dioxide emissions from fossil fuels, says graduate student Yuriy Roman-Leshkov, first author on the Science paper. "The nice thing about using biomass as a replacement for all these petroleum products is that it is greenhouse-neutral," he says. While burning and otherwise using fossil fuels moves an enormous amount of carbon from the Earth into the atmosphere, the carbon released when a biofuel burns is eventually taken up by growing plants. "This process is really important," Roman-Leshkov says, "because it does not introduce additional carbon dioxide into the atmosphere."

Juben N. Chheda, a second graduate student working on the HMF project, sees the work as part of an explosion of interest in finding alternative sources for petroleum-based chemicals. "We need to develop new process technologies, and HMF is a building block that can replace products like PET, a plastic used for soda bottles," he notes. "This is a first step for a range of chemical products that can be obtained from biomass resources, replacing those that come from petroleum sources."

Dumesic is also exploring methods to convert other sugars and even more complex carbohydrates into HMF and other chemical intermediates. "Solar energy and biology created the stored hydrocarbons in the fossil fuels we have used for so long. Our interest in biomass is driven by the belief that if we learn to use solar energy and biology in a different way, we can address problems related to price, supply, and the environmental impact of industrial activity."

Dumesic's research on environmentally friendly sources of common chemicals is supported by the U.S. Department of Agriculture and the National Science Foundation.

For Small Scale Blueberry Growers, Harvesting the Crop Can Be a Challenge.....

The choices often come down to purchasing a conventional harvesting system that may be hard

to justify financially or hiring pickers in a tight job market. However, John Handrahan hopes his walk behind harvester will prove to be a popular alternative.

The Tignish area grower worked with Acadian Machine Works in his home community to design the prototype. He received \$7,650 from the P.E.I. ADAPT Council under the Advancing Canadian Agriculture and Agri-Food Program.

ACAAF is a national funding program designed to help implement innovative projects that will benefit the production and processing sector, bolster the industry's capacity to address current and emerging issues and position the agriculture and agri-food industry to seize new market opportunities.

Instead of being mounted on a tractor, operators walk behind the 300 pound machine. Handrahan said the harvester is well balanced and maneuverable, allowing the operator avoid obstacles in the terrain.

The original concept began when John's father, Leo Handrahan of Christopher's Cross, experimented with a high speed head design in 1999. This was the second design Leo explored; in the early 1980's he and Acadian Machine Works developed a tow-behind blueberry harvester.

The newer design also showed promise and testing was carried out, but lack of time and funds for further development caused the project to be put aside temporarily. In 2003, after viewing a similar concept in a walk-behind harvester from Maine, John was encouraged to pursue the concept further by the manufacturer of the Maine model.

In September of 2005, John approached Acadian Machine Works to develop the concept into a commercial design. At first, a larger tractor-mounted design was discussed, but to reduce cost and risk, it was decided to start with a smaller unit.

He explained the machine works like a combine, and its 5.5 horse power engine has six forward and one reverse gear. To help remove leaves and debris, it is also equipped with a fan. The picking head is "high speed" or faster than ground speed, and is not calibrated to the speed the harvester is travelling. John said early testing indicates the machine recovers a very high percentage of the crop and causes very little bruising.

Handrahan is pleased with the reaction his creation is receiving from the industry. It was demonstrated at the Nova Scotia blueberry field day in Debert, Nova Scotia and a P.E.I. showing was held in late July at the Wyman's blueberry plant in West St Peters.

"We have 40-50 growers out to the demonstration at Wyman's and Acadian Machine Works took orders from two growers," he said.

Handrahan said the machine will sell for approximately \$11,000, compared to over \$40,000 for a traditional harvester. He added 'we really wanted to make sure this was affordable for the small and medium sized grower."

Ethanol - a New Way to Prevent Potato Scab

William Visser will be keeping a special eye on part of this year's seed potato crop. With \$4,500 in financial assistance from the P.E.I. ADAPT Council (which administers the Advancing Canadian Agriculture and Agri-Food Program in the province for Agriculture and Agri-Food Canada), the Orwell Cove seed and table stock producer is trying a new method of protecting his spuds against 'scab' – a soil borne disease that can impact the look of potatoes.

Visser said he had heard about laboratory research in Ontario that involved dipping potatoes in ethanol in an attempt to sterile the seeds against disease. He explained the principle would be roughly the same as sterilizing a wound with alcohol.

"We wanted to see if it would be possible to duplicate the experiment on a commercial scale," Visser said.

First of all, he said they worked with agrologist at FoodTrust to the determine how long the potatoes should be dipped in the solution without impacting germination. As part of that research, the spuds were soaked for up to 30 minutes.

Meanwhile back on the farm, the potatoes were dipped in fish tubs filled with ethanol for between a minute and a minute and a half. Visser said he is satisfied that technology can be developed to perform the task on a large scale.

However, he said it is far from clear whether the technology will work. It won't be until this year's crop is harvested before a determination can be made on the technique's effectively as a scab fighting tool. This fall, Visser said they will compare the rate of scab on treated potatoes compared to those not dipped in the solution.

However, he said it is always clear the dipped potatoes do not germinate as well. Visser added it would take further testing to determine exactly why, but one theory is the ethanol dries out the plant.

William said he would like to try the experiment another year, adding he feels there are still many unanswered questions that only further research could answer. He added "I think the project has been very worthwhile and we can't be afraid to try new approaches but we have to realize they won't always work out like we hope."

Certified Organic Wild Blueberry Orders Taking Off

From: ACORN News

A recent decision by a major nationally-known food chain has major potential for certified organic wild blueberry producers in Atlantic Canada.

The firm has placed an order for up to 100,000 pounds of quality certified wild blueberries with a partnership located near Middle Musquodoboit, N.S.

Orv Pulsifer of McFetridge Farm, in association with Jim Burgess of Glenmore Industries Ltd.

have been working since 2001 to develop a certified organic wild blueberry industry.

“Yes, we have to admit, it’s been a challenge,” says Pulsifer. “It’s been a chicken-and-egg puzzle. Potential growers have hesitated to commit to organic wild blueberry production because there was no marketing vehicle or brokerage tailored to handle the product. So there was very little product available, and that’s still the case today.”

Now in their fifth year of developing the industry, Burgess and Pulsifer have seen their volume triple. But it’s still only a few tons a year. “Demand has consistently outstripped supply, and it will be that way for years to come” says Pulsifer. “But this latest commitment is a tremendous step forward,” he notes.

The notice of intention from this national firm is a multi-year development. “This firm has simply said to us: ‘Gentlemen, you will never have an industry if major buyers don’t support you. So that’s what we’re going to do!’”.

Pulsifer feels it’s an excellent combination. “This order is based in large part on the fact that Glenmore Industries’ state-of-the-art processing and packaging plant, which opened in 2005, is HACCP compliant. So it meets a world standard.

“The days of processing food like wild blueberries - or any food for that matter - by sweeping out the barn floor and putting in tables and chairs is long gone. Jim’s plant here in Musquodoboit is a major multi-hundred –thousand dollar investment and his staff, operating 24/7 in season, receives specific operational training in HACCP standards and requirements.

“ I guess we were the first to realize that someone had to build a professional handling and brokerage system with this product and that’s what we’ve done. Certified organic wild blueberry growers on Canada's east coast have quite small fields on average. It’s been impossible for them to market very far beyond the farm gate. We’ve been working to overcome that handicap,” says Pulsifer. “Major buyers want volume and state-of-the-art production every step of the way. They also want to order via one phone call, not thirty or forty!”

Both Burgess and Pulsifer see the certified organic wild blueberry business following the growth patterns of the past. “Eastern Canada’s non-organic wild blueberry industry has exported tens of millions of pounds a year for decades. It’ll be the same eventually with organic,” says Pulsifer. “I’ve been getting calls from Ontario, Alberta, Pennsylvania, California and as far away as Denmark and Germany - even Australia...they’re usually about 3 a.m.!”

“It will still be growing long after I’m gone!,” he says, with a wistful smile. “But today we need more growers! Fast. You can’t sell from an empty wagon.”

Natural/Organic Sales to Grow Another 63 Percent by 2010: Report

MAY 24, 2006 -- NEW YORK -- Given their current momentum natural/organic foods ought to grow 63 percent to surpass the \$46 billion mark by 2010, according to "Natural and Organic Food and Beverage Industry Trends: Current and Future Patterns in Production, Marketing,

Retailing, and Consumer Usage," a new report from market research publisher Packaged Facts here.

The segment has already gone from a hippie "fad" to an industry worth \$28.3 billion last year, according to the report. The next stage in its stratospheric rise will be due to the growing popularity and availability of natural/organic products, spurred by such factors as Wal-Mart's entry into the organics arena, increases in all the top supermarkets' private label organic items, and expansion of the supermarket "lifestyle" formats emphasizing natural and organic products.

In general, leading natural/organic brands' growth continues to outpace that of their respective categories by a wide margin, while organic products themselves are selling more than "natural" items, because of their relative newness to mass channels and the fact that consumers find their government-regulated aspect compelling.

"Organics have clearly become a way of life for millions of health-conscious Americans, and the success of the big three – Whole Foods, Wild Oats, and Trader Joe's -- has finally awakened mainstream American retail to the viability of this market," said Packaged Facts publisher Don Montuori in a statement. "This research delves into the inner sanctum of the industry, showing why it has become -- and will continue to be -- the hottest area in food retailing."

"Natural and Organic Food and Beverage Industry Trends" probes new product and promotional trends; includes competitive profiles of producers, marketers, and retailers, and examines consumer trends and behaviors relating to organics and natural products. Priced at \$3,000, the report can be downloaded from Packaged Facts at www.packagedfacts.com/pub/1187212.html, and is also available at <http://www.marketresearch.com/>

Organic Industry Development:

PEI Agriculture, Fisheries and Aquaculture Announces Details of New Program

The Department of Agriculture has released details of their new Organic Industry Development Program. According to the the program description, the objective of the initiative is to encourage growth in the organic sector through the establishment of value chains. The value chain marketing

method refers to the collaboration of producer groups,

processors and food retailers to deliver a branded quality food product. The value chain term refers to

the delivery and receipt of value to and from the total supply chain. According to the program description, preference will be given to projects which are innovative, well planned, and demonstrate

profit potential.

Further to the program description, funding can be utilized for a broad range of activities supporting

product and value chain development. Activities required to support transitional measures are eligible only if they lead to expansion of organic production and sales. Activities might include the following:

- Education and training for the applicants and suppliers – for example, attending specialized
- educational events and courses, on-line courses, or mentoring activities with both local and off Island experts;
- Market identification and development activities in conjunction with other funding agencies;
- Assistance for conversion of production / processing facilities to address organic certification requirements;
- Assistance to conform to export and international organic certification requirements;
- On-farm trials;
- Product development research;
- Assistance to reduce market risk (assistance for production shortfalls during transition are not eligible).

Assistance may be up to 50 percent of the costs associated with the execution of the project. Training will be funded at 75 percent. In-kind contributions will be considered. The maximum allowable assistance per project is \$100,000. For more information you may contact the Department of Agriculture, Susan MacKinnon at 1-866-734-3276 or 902-368-5657 or by emailing sdmackinnon@gov.pe.ca