

Commercializing 1st- and 2nd- Generation Liquid Biofuels from Biomass

Task 39 Newsletter • Issue # 23 • August 2009

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FROM THE TASK

Welcome to the second edition of the IEA Bioenergy Task 39 (Liquid Biofuels) newsletter for 2009!

In this issue, we have provided a summary of the two very successful Task 39 meetings that took place in San Francisco (USA) and Dresden (Germany). This issue also profiles the biochemical conversion research and development (R&D) activities in Japan, one of our member countries. We are very grateful to our colleague Prof. Shiro Saka for his tireless effort in putting together the article on Japan's biochemical conversion R&D. Prof. Saka, one of Task 39's hardworking colleagues, is currently recovering from some health issues and we wish him a speedy recovery on behalf of the entire Task 39 Network. Typical of Prof. Saka's working spirit; he is still directing and managing his research while recuperating!!

Tribute to Ray Katzen: Our network is saddened to report that on 12 July, Dr. Raphael "Ray" Katzen passed away at the age of 93. Ray was an ethanol pioneer who dedicated his life to competitively producing cellulosic ethanol.

A quote from Phil Madson, who serves as President of Katzen International, Ray's former company: "Where the world is today with ethanol was very clear in his mind in the 1940s. I think he has challenged more people in this field – scientists, engineers, owners, bankers, lawyers, and government officials – than any other one person has ever challenged the industry. When Ray would go to conferences, he was always the first to the microphone after a speech to raise the really challenging question. And when you would watch this in various settings – from the Fuel Ethanol Workshop to the Society for Industrial Biology that is dominated by true dedicated scientists – he challenged everyone with the same amount of vigor and he didn't challenge them to accept his ideas but he challenged them to be very sure and very clear that their science was true, that their technology was true, that their economics were valid."

Ray received a number of awards throughout the years, including the inaugural Raphael Katzen Award by the Symposium on Biotechnology for Fuels and Chemicals, which recognizes outstanding individuals who have greatly contributed to the commercialization of biotechnology to produce fuels and chemicals. IEA Bioenergy Task 39 also celebrated Ray's contributions to the biofuel field by hosting him and an international group of colleagues to an informal "roasting" at our first IEA Bioenergy Multi-Task conference three years ago in Vancouver. When one participant stated that 'they thought Ray had likely forgotten more than they would ever learn', Ray retorted that this would be difficult as he had never forgotten anything! We celebrate knowing and benefiting from individuals such as Dr Raphael Katzen and all our Task 39 activities will build on his legacy.

Task 39 is also helping to organise the IEA Bioenergy Multi-Task Conference in Vancouver, Canada from August 23-26, 2009. This meeting, entitled "*Biofuels and Bioenergy: A changing climate*", will bridge topics from conversion technologies to socioeconomic impacts and trade. More information is available on the conference website, <http://www.ieabioenergyconference.org>.

This newsletter marks a change in the Task membership. We are very happy to welcome Dr. Hans-Jürgen Froese, who has replaced Dr. Gerhard Justinger as our new Task 39 Executive Committee Member from Germany. Dr. Justinger played a very active role while in Task 39 and the Network would like to collectively thank him for his effort. Similarly, we would also like to welcome our new Country Representative from Japan, Mr. Hamamatsu, who has come to substitute Mr. Yukinori Kude. Mr.

Kude made numerous contributions to Task 39 for which we extend our profound gratitude. Finally (but not the least), we are excited to welcome our new member country, South Korea, represented by Drs. Song-Chul Park, Jin-Suk Lee and Junsuk Kim, Seonghun Park to Task 39.

As always, we invite you to continue to use the Task 39 [website \(www.task39.org\)](http://www.task39.org). Task members can access presentations from past Task 39 meetings as well as up-to-date reports, such as the Biofuel Implementation Agendas. All visitors to our website will find older reports and a wealth of information on liquid biofuels. We hope to continue to expand the website into a one-stop resource for those looking for information on Task 39 personnel and biofuels research – Jack Saddler, Warren Mabee and Emmanuel Ackom.

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IN THE NEWS

Australia: Second generation biofuel funding announced

The Minister for Resources and Energy, Martin Ferguson AM MP, recently announced the successful applicants for funding under the Australian Government's \$15 million *Second Generation Biofuels Research and Development Program*. This program supports the research, development and demonstration of new biofuel technologies which address the sustainable development of the biofuels industry in Australia. [More information](#)

Beneficial Biofuels: The Food, Energy and the Environment Trilemma

A group of experts including Dr. Timothy Searchinger, publisher of last year's article "*Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change*" in Science, met in Princeton, New Jersey to discuss sustainability issues associated with biofuels, food and the environment. The group emphasized on the complex nature of the food, energy, and environment debate. A key conclusion from the deliberation was the need for active collaboration among all stakeholders. Findings from the meeting have been published in Science entitled "*Beneficial Biofuels: The Food, Energy and the Environment Trilemma*". [More information](#)

USA: DOE announces Recovery and Reinvestment Act Funding of up to \$85 million for Algal and Advanced Biofuels

The US Department of Energy (DOE) recently announced the \$85 million fund from the Recovery and Reinvestment Act for the development of algae-based biofuels and advanced infrastructure-compatible biofuels. DOE is seeking to bring together leading scientists and engineers from universities, private industry, and government to develop new methods to bring new biofuels to market in an accelerated timeframe. [More information](#)

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RECENT PROGRESS OF BIOFUELS IN JAPAN

by Professor Shiro Saka
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1. Introduction

Since the Industrial Revolution, our civilization has developed with the support of fossil fuels like petroleum. However, the use of fossil fuels releases greenhouse gases such as carbon dioxide (CO₂) that result in global warming; recent indications point to the danger linked with weather anomalies, changes in the ecosystem, and other radical transformations of the global environment. Moreover, there have been apprehensions since the middle of the twentieth century regarding depletion of fossil resources due to its massive consumption; thus, making it difficult for civilization to survive.

Under such circumstances, in recent years "biofuels" such as bioethanol and biodiesel, developed from biomass raw materials, have captured the world's attention as clean energy alternatives to petroleum. In Japan, as well, biofuels are regarded as one of the renewable "new energy" petroleum alternatives, with the Kyoto Protocol for liquid biofuels accounting for 500 million liters (on crude oil basis) of liquid fuels used for transport by the year 2010. As a part of this total, gasoline blended with bio-ETBE (ethyl tertiary butyl ether) went on sale at 50 gas stations in the greater Tokyo metropolitan area beginning on April 27th, 2007, and the effective usage of biomass resources is being advanced nationwide.

2. Biomass Resources in Japan ^(1,2)

According to our research in recent years, approximately 370 million tons of biomass resources are annually produced in Japan. Among these, approximately 77 million tons are disposed of without effective utilization, and converted to carbon dioxide (CO₂) into the atmosphere. By weight, this amounts to approximately 127 million tons of CO₂, and accounts for approximately 11% of Japan's CO₂ release in 1990 ^{1,2)}. Consequently, the use of these biomass resources as biofuels and useful chemicals is not only helpful in achieving Japan's target of reducing the greenhouse gas emission in the Kyoto Protocol but also a key issue of the Post Kyoto Protocol.

3. Bioethanol

3.1 Government Bioethanol Policies

In June 2003, the government of Japan lifted the ban on the use of gasoline mixed with 3% of bioethanol (E3). At a low concentration (3%) there are no problems regarding engine corrosion, and today's automobiles are able to use E3 unaltered. On Miyakojima Island, the usage of E3 gasoline was scheduled to begin in 2008 throughout the island as part of a national collaborative government agency project, but coordination with the Petroleum Industries Association of Japan has been delayed. Moreover, the government plans to study an envisioned future expansion to E10, but in order for it to be effective, 6 billion liters of approximately 60 billion liters gasoline that Japan consumes would have to be substituted with ethanol. Therefore, there lies a challenge in securing this kind of volume.

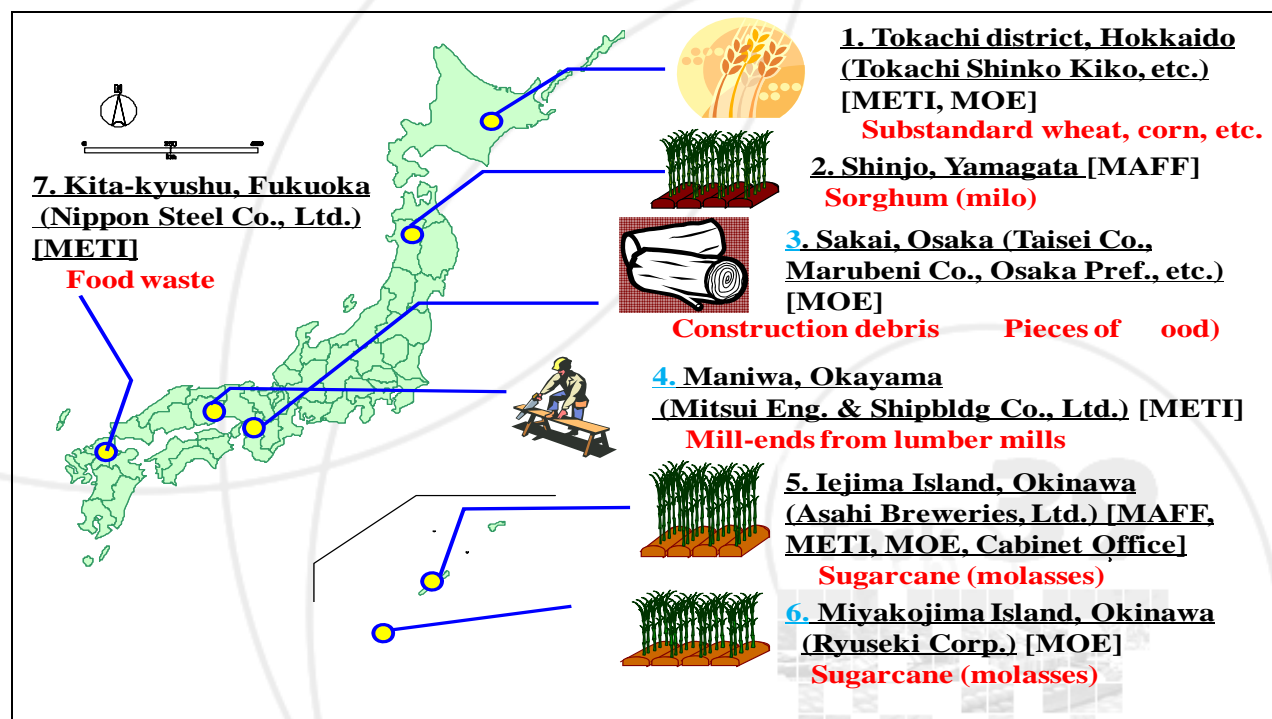


Fig. 1 Regional projects on bioethanol production ³⁾

For this challenge, various regional projects on bioethanol production are now ongoing as in Fig. 1. Sugar and starch resources, and lignocellulosics are the ones suitable for ethanol production. For the former at present, sugarcane molasses on Miyakojima Island and substandard wheat in Hokkaido are coming into use. However, due to concerns regarding food problems, the latter lignocellulosics is studied for practical use in Sakai, Osaka of

construction debris and in Maniwa, Okayama of mill-ends from lumber mills.

For the use of ethanol into gasoline, however, there are several problems encountered in the mixing of ethanol with gasoline. One of these is that the vapor pressure of mixed gasoline increases due to an azeotropic phenomenon with ethanol, with an increase in evaporative emissions. Furthermore, addition of ethanol, which absorbs water readily, contaminates the mixed gasoline with moisture, leading to phase separation, thereby resulting in deterioration of fuel quality, which is problematic. Keeping these points in mind, the addition of ETBE to gasoline was studied, and “bio-gasoline”, or gasoline to which 7% ETBE (the equivalent of 3% ethanol) has been added, went on sale at 50 gas stations in the greater Tokyo metropolitan area from April 27th of 2007, as previously mentioned. It is predicted that this will spread nationwide by 2010, with a usage of 840 million liters (equivalent to 360 million liters as ethanol; 210 million liters as crude oil)⁴⁾.

It is believed that bioethanol will henceforth garner more and more attention. In particular, the establishment of technologies for converting ethanol from lignocellulosics is extremely important in the generation of “Japan-produced energy”, and is a big challenge faced by Japan that prides itself on being a nation formed on the basis of scientific and technological innovation. Towards this end, the Biofuels Technology Innovation Council, in which the author serves as a committee member, is making keen investigation regarding the development of innovative technologies for the manufacture of bioethanol from lignocellulosics, with special focus on timber residues.

Lignocellulosics is the resource used for a long term with a yearly available volume of roughly 30 million tons in Japan including unused timber resources and forest and agricultural waste products, etc.^{1,2)}. From this, it will be possible to obtain an estimated 8.4 billion liters of ethanol a year through traditional fermentative ethanol production. These unused and waste resources, though, are expected also to be used in applications other than that of ethanol production; therefore, not all lignocellulosic resources will be put to use in the production of ethanol. Thus, it is incumbent upon the nation to establish a stable biomass usage framework for the required amount of resources, securing, for example, the production of bioethanol from a resource ten times more abundant.

In this sense, Japan lacks the volume of resources such as rice and wheat straw sufficient to last out as raw materials for wide variety of biofuels. Timber is the only resource in sufficient abundance, and it is strongly desired that cedar trees planted after the World War II will also be used. In fact, cedars were planted as a useful resource at the end of the war; however, the plan for which they were intended to be used was futile and now they cause allergic reaction for human beings. The mountains harbor forests which cover 67% of the surface of Japan, but not all mountains are steep. Moreover, trees should be used effectively from easily-accessible forest land; the time has come for serious investigation regarding the effective use of mill ends, etc., in conjunction with lumber material use, as raw materials for the production of ethanol. We fervently appeal for the effective use of cedar trees in a manner which will be convincing to the public.

3.2 Fermentative Ethanol

Among ethanols, bioethanol is derived from biomass, and synthetic ethanol from ethylene, a fossil resource, with the former being only capable in controlling global warming. Among bioethanols, there is fermentative ethanol, synthetic ethanol made from biogas, and also bioethanol via acetic acid fermentation.

For fermentative ethanol raw materials, molasses from sources such as sugarcane, starch from sources such as rice and wheat, and lignocellulosics from sources such as wood, rice straw, and wheat straw can be used. In whichever case, fermentation is to D-glucose ethanol, D-glucose being a constituent of sugar, with molasses and starch resources having mainly been used thus far, but because of the relationship with food problems, attention has been given to lignocellulosics in recent years.

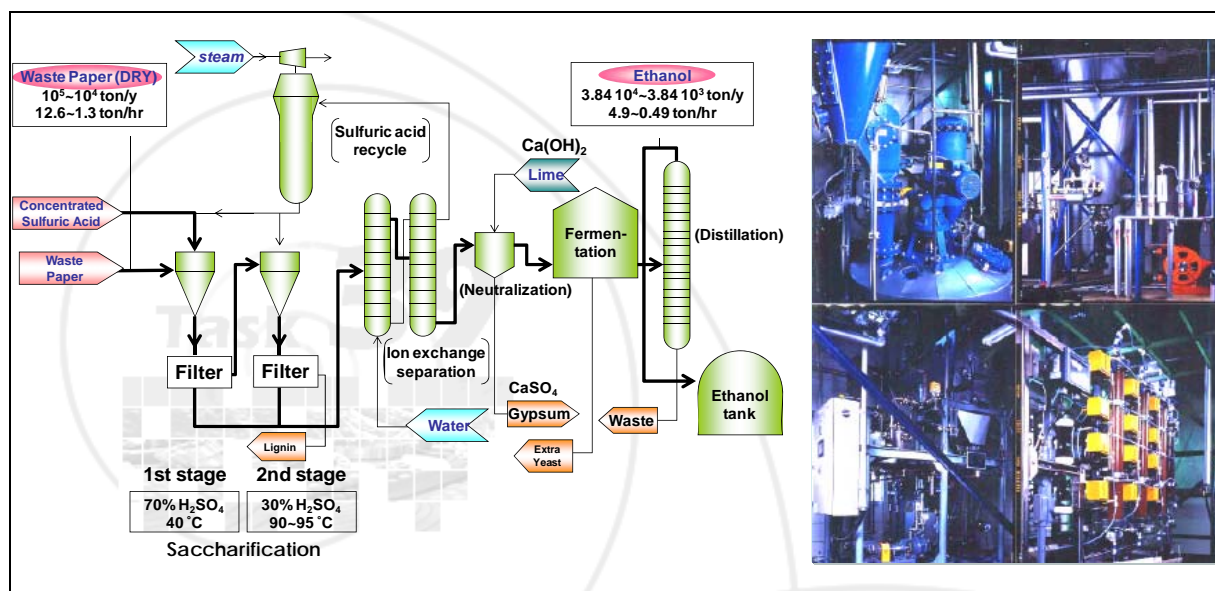


Fig. 2 Concentrated sulfuric acid process (Arkenol process) for lignocellulosics and NEDO pilot plant in Izumi, Kagoshima ⁵⁾

As one example of the established bioethanol process for lignocellulosics, the concentrated sulfuric acid process developed by Arkenol Inc., USA, was imported to Japan for further development by JGC Corporation (Fig. 2) under the NEDO project of High Efficiency Bioenergy Conversion (FY2001-FY2005) ⁶⁾. This concentrated sulfuric acid process involves the two-stage treatments, first with 70-75% sulfuric acid at 30-40°C to hydrolyze hemicelluloses and to de-crystallize cellulose. Subsequently, it is diluted with hot water to 30-40% in sulfuric acid, raising the temperature to 90-95°C to hydrolyze de-crystallized cellulose. The hydrolysates from these two-stages in sulfuric acid are then separated through ion-exchange column, and separated sulfuric acid will be recycled. The obtained saccharides are then fermented by genetically modified micro-organisms such as yeast under anaerobic conditions to get ethanol. This Arkenol-JGC Process is now under way for commercial application in the US.

More recently, for a big challenge towards the generation of “Japan-produced energy”, the Biofuels Technology Innovation Council has been making keen investigation regarding the development of innovative technologies for the manufacture of bioethanol from lignocellulosics. Towards this end, the Biofuels Technology Innovation Council has proposed the ethanol production model in cost of □40/liter by the year 2015 with plantation of high yield plants such as *Erianthus* spp. and *Miscanthus sinensis*, whose yield can be more than 50dry tons/ha/year, thus in a field of 6.5km in diameter, raw materials can be efficiently harvested for ethanol manufacturing plant of 100-200 million liters annual production ⁷⁾. As another candidate, fast growing woods such as poplar and willow are nominated with a yield of more than 17dry tons/ha/year. For these raw materials, the innovation technologies of the fermentative ethanol production will be soon developed.

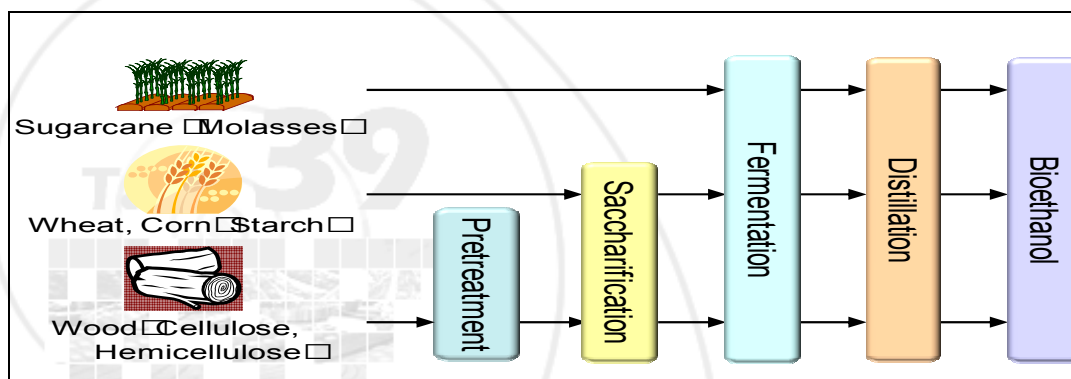
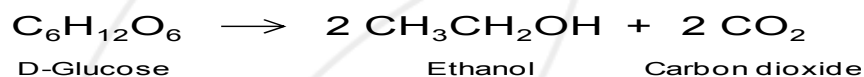


Fig. 3 Various production types of bioethanol ⁵⁾

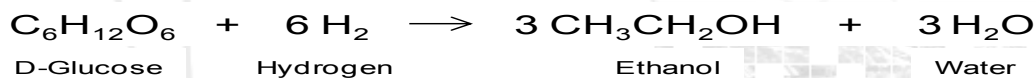
However, as shown in Fig. 3, lignocellulosics does not saccharize into simple sugars as easily as starch or molasses, and must be pre-treated. In addition, As shown in Eq (1), in any event, 1 mole of glucose is converted to 2 moles of ethanol and CO₂ by micro-organisms such as yeast under anaerobic conditions; thus, indicating low utilization efficiency of carbon to ethanol. Because of this, some researchers are skeptical whether the use of fermentative ethanol can contribute to CO₂ reduction.



Eq (1) Anaerobic ethanol fermentation by yeast

3.3 Second Generation Bioethanol via Acetic Acid Fermentation

The research of the bioethanol production by acetic acid fermentation is currently under way as the NEDO Development of Preparatory Basic Biomass Energy Technologies Project ⁸⁾. This bioethanol production involves 3 stages: 1) decomposition of lignocellulosics by hot-compressed water, 2) the conversion of decomposed products such as sugars etc to acetic acid through its fermentation, and 3) the hydrogenolysis of acetic acid; from these stages, the following reaction can be derived. Here, it should be noted that, as shown in Eq (2), all carbons that make up glucose are converted efficiently via acetic acid to bioethanol without releasing any CO₂, producing 1.5 times the amount of ethanol when compared with fermentative ethanol (Eq (1)) as discussed previously. Fig. 4 shows this ethanol production process studied in this project.



Eq (2) Ethanol production by acetic acid fermentation

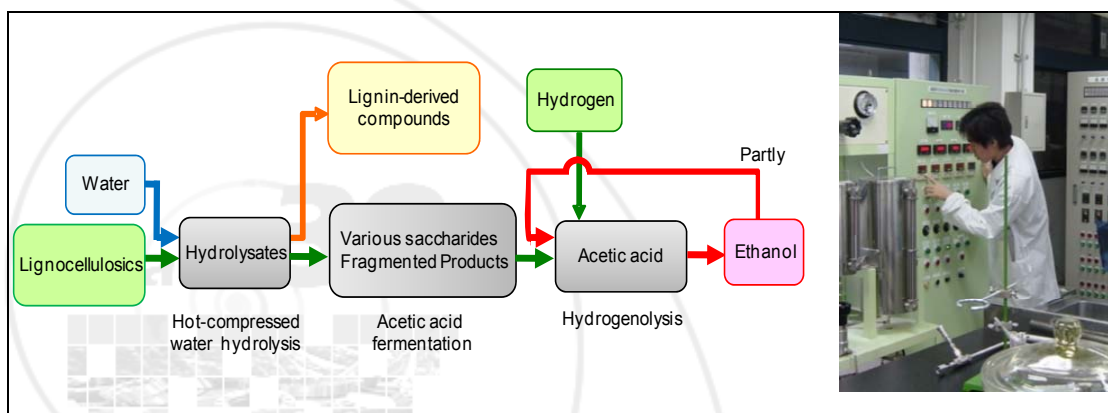


Fig. 4 Eco-ethanol production from lignocellulosics with hot-compressed water treatment followed by acetic acid fermentation and hydrogenolysis⁸⁾

4. Biodiesel

Biodiesel fuel (fatty acid methyl ester) being one good use of oil resources, has captured the world's attention as clean energy alternatives to petroleum, and has been commercially produced with the alkali-catalyzed method. In Japan, as well, biodiesel of 5,000 liters/day is produced in Kyoto from waste oils/fats collected from household sector such as restaurants and individual homes (Fig. 5).

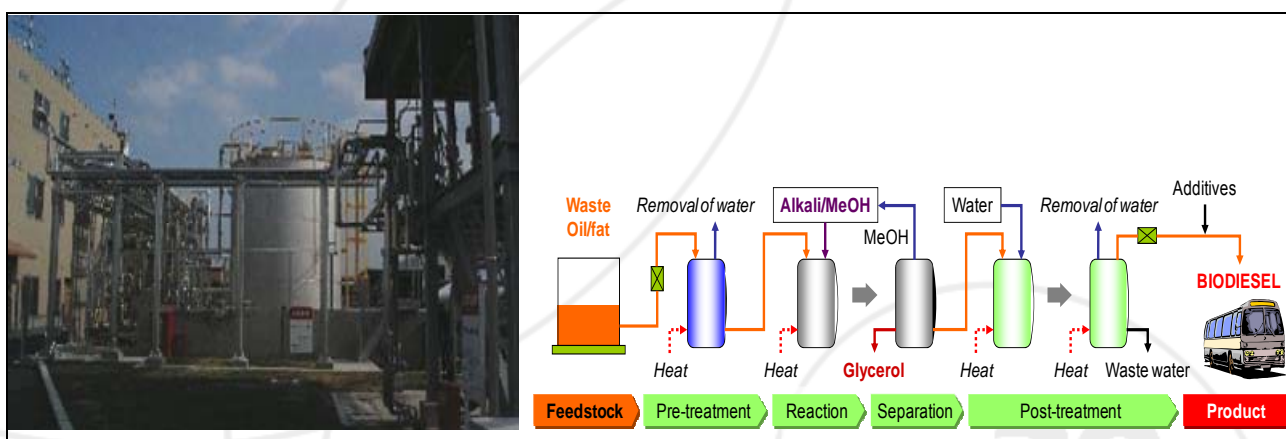


Fig. 5 Kyoto Municipal biodiesel production plant by alkali-catalyzed process

The European Union uses biodiesel in a 5-30% additive mixture with light diesel oil, and has achieved a production of 4.89 million tons for EU 27 countries in 2006⁹⁾; however, the usage in Japan has stagnated at a level of only 4-5,000 tons, centered mainly in the city of Kyoto. Japan's yearly waste oil volume is between 420-560,000 tons, although in reality only 40-50,000 tons of this waste oil is expected to be re-collected. This will account for no more than 0.1-0.2% of the 41 billion liters of light diesel oil now being used in Japan (as of 2003)¹⁰⁾. Hence, one of the issues will be to secure resources, of whether to promote rapeseed cultivation in an effective usage of fallow farmland, or to divert our attention towards Southeast Asia for the use of palm oil from oil palms. There is also a copious amount of oil contained in the seeds of trees such as the physic nut (*Jatropha curcas*), the sandbox tree (*Hura crepitans*), and the sea mango tree (*Cerbera manghas*)¹¹⁾.

In addition, biodiesel is inter-connected with global warming; its practical usage, based upon preferential tax treatment, is quite far advanced, mostly in the European Union. Things have progressed in a way that from August

of 2006, Germany went to a 9% tax levy, with a 45% tax to be imposed, in a sequential manner, by 2012, while in Japan quality standards have finally been decided, becoming taxable under local tax laws. We strongly hope that citizenship will be granted to biodiesel in Japan as quickly as possible, through preferential tax treatment.

4.1 Biodiesel Production Technologies

In many parts of the world such as in Europe, the US, and Japan, research on the conversion of vegetable oil /animal fat and their wastes to biodiesel is performed, and already put to practical use. While animal fat is solid, and vegetable oil has a viscosity of approximately 50mm²/s, they have a high flash point of 300°C, and cannot be used as diesel fuel without further treatment. Therefore, under atmospheric pressure, and at 50 to 60°C, methanol and alkaline catalysts are added to vegetable oil triglycerides for their transesterification reaction. By this way, their viscosity and flash point are brought down, and fatty acid methyl ester (FAME) is produced.

However, this process has a heavy environmental load. More specifically, sodium hydroxide and potassium hydroxide are used as alkaline catalysts, however, for catalyst removal after the reaction, several stages of water washing are required. Furthermore, by reacting with free fatty acids, which are contained in particular abundance in waste cooking oil, results in alkaline soap, making the separation and purification thereof indispensable, and causing a surplus need of catalysts. Therefore, alkaline catalytic methods are difficult to use for palm oil and waste oil, which contain a higher percentage of fatty acids, and the application of alkaline catalytic methods for a wide variety of oils and fats proves a difficult task.

In order to solve the various problems of these procedures, a non-catalytic biodiesel manufacturing processes by using the lipase method, ion-exchange resin catalyst method and supercritical methanol method ^{12,13)} were developed (Fig. 6). In the latter supercritical method, first the oil is treated with subcritical water leading to the hydrolytic degradation of triglycerides, which are converted to fatty acids and glycerin. Subsequently, the reaction liquid is allowed to stand, and the fatty acids containing oily layer as well as the glycerin containing aqueous layer are separated. Next, methanol is added to the oily layer under supercritical conditions to produce FAME by conducting an esterification reaction of fatty acids. As the reaction conditions are comparatively mild to be 270°C /7MPa, almost no degradation of unsaturated fatty acid occurs. Thus, it can be said that the process (Saka-Dadan Process) is suited for practical application.

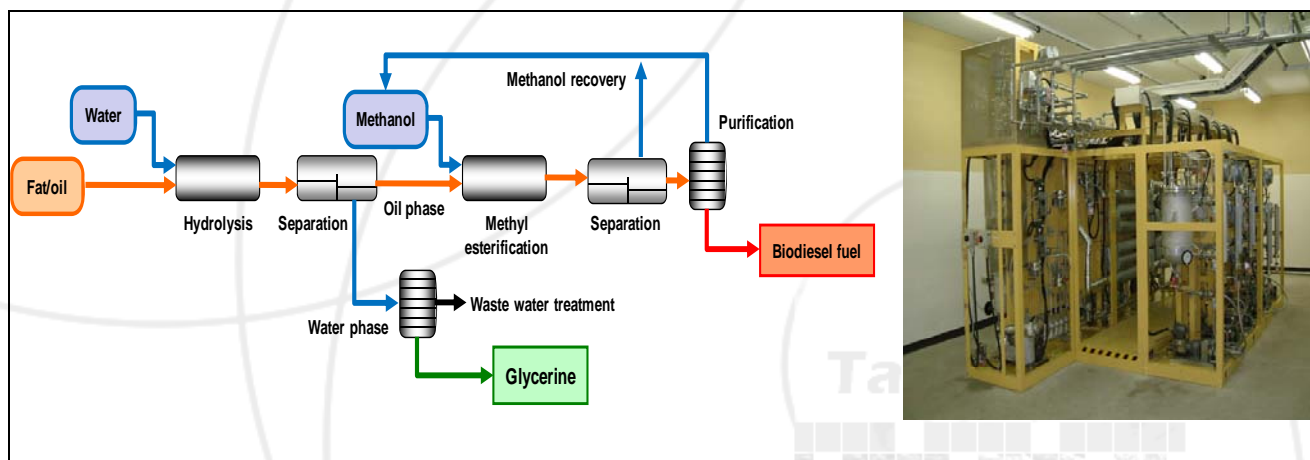


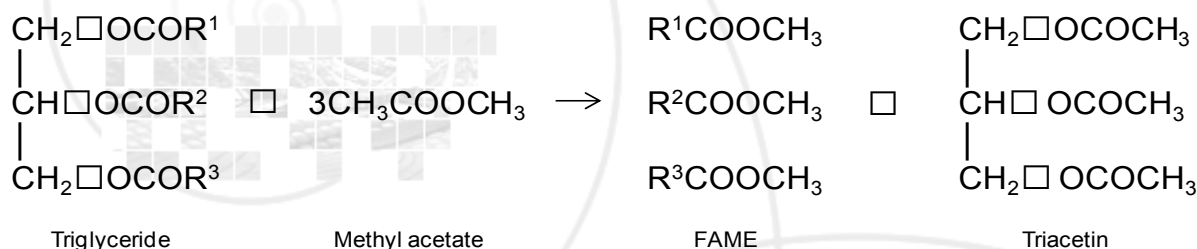
Fig. 6: Biodiesel production process by the two-step supercritical methanol method (Saka-Dadan Process) and its pilot plant ¹³⁾

4.2 Second Generation Biodiesel ⁽¹⁴⁻¹⁶⁾

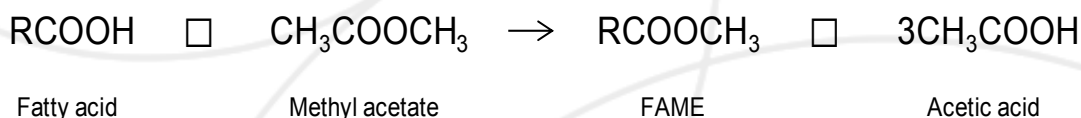
In the methanol-using processes such as those mentioned above, the development of glycerin as a by-product cannot be prevented. Therefore, in recent years along with the enlargement of the amount of biodiesel production, the amount of glycerin production has also drastically increased. However, in alkaline catalytic methods, glycerin is discharged as an admixture of methanol and water, as well as alkaline catalyst, etc. The sale value of such crude

glycerin, of approximately \$0.10/kg is very low compared to purified glycerin, which costs approximately \$1.30 to \$2.00/kg. However, when considering transport costs, its disposal by sale is regarded as economically incommensurate. Therefore, it is expected that in the future, the amount of disposed glycerin will increase, and as long as no effective utilization methods are established, this is likely to become a huge problem.

To deal with this problem, interesterification reaction, which are one kind of transesterification reactions, was focused and, under NEDO project of the Development of Preparatory Basic Bioenergy Technologies¹⁴⁾, a novel biodiesel manufacturing method was developed that does not produce any glycerin. As a result, it was found that in the supercritical state, interesterification reaction of methyl acetate and triglycerides proceeds non-catalytically, and that FAME and triacetin are generated (Eq (3))¹⁵⁾.



Eq (3) Biodiesel production from triglyceride under non-catalytic supercritical condition of methyl acetate, as one of the carboxylate esters through intertransesterification¹⁵⁾



Eq (4) Biodiesel production from free fatty acid under non-catalytic supercritical condition of methyl acetate, as one of the carboxylate esters through esterification¹⁵⁾

For examining the effects of the triacetin obtained on the properties of fuel, triacetin was combined with methyl oleate, and as a result of evaluating all sorts of fuel properties, we judged that when combined at a molar ratio of 1:3, which is theoretically obtainable from the interesterification reaction of oils and fats with methyl acetate, it does not only have no adverse effect on the principal properties of fuel, but the admixture of triacetin enhances the oxidation stability of biodiesel, and also exerts favorable effects on the current point. Furthermore, it was demonstrated that if biodiesel is defined as a mixture of FAME with triacetin, biodiesel will be 125% in theoretical yield which far exceeds previous manufacturing methods.

Furthermore, by focusing on “neutral ester” as a substitute for carboxylate ester, a biodiesel fuel manufacturing method was studied using a supercritical method under milder conditions that does not trigger corrosion of the reaction tube. This non-catalytic supercritical method, which uses dimethyl carbonate as neutral ester, is a new process that also received recognition due to the fact that glycerin is converted into a highly useful chemicals with added value¹⁶⁾.

These series of non-catalytic biodiesel production methods by supercritical fluid technologies are all world-leading research that was exclusively conducted in Japan.

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Updates from Task 39 meetings (San Francisco) and Workshop (Dresden):

Business Meeting, San Francisco, USA - May 2, 2009

Task 39 held its biannual business meeting on May 2, 2009 in conjunction with the 31st Symposium on Biotechnology for Fuels and Chemicals in San Francisco, USA. Country progress reports from around our Task were provided. Presentations by Australia, Austria, Canada, Denmark, Finland, Ireland, Japan, South Africa, Sweden, United Kingdom and United States were discussed. Presentations by Country Representatives from member countries were structured to cover similar issues for each country such as:

- Amounts of biofuels used within each country (current market and trends)
- Biofuel production and projects under construction (first and second generation)
- Current legislation and policy changes being considered and "in the pipeline"
- Demonstration plants and research initiatives that have been funded
- Other items of note in the biofuels area in member countries.

IEA Bioenergy Task 39 delegates at the Business Meeting in San Francisco (May 2, 2009).



Left to right: Manfred Wörgetter, Bill Cruickshank, Jack Saddler, Emile van Zyl, Lisbeth Olsson, Tony Sidwell, Jim McMillan, Les Edye, Jerry Murphy, Warren Mabee, Niklas von Weymarn, Henning Jørgensen, Michael Persson and Emmanuel Ackom.

IEA Tasks 39 and 40 Special Session, San Francisco, CA, USA – May 5, 2009

An IEA Special Session was held on the evening of May 5 in conjunction with the 31st Symposium on Biotechnology for Fuels and Chemicals in San Francisco, USA. This special session was organized by Jim McMillan and Jack Saddler. The topic for this session was: *International Commercialization of 2nd Generation Biofuels*. Presenters for the session mainly featured prominent industry leaders in the liquid biofuels area. Speakers included Martin Junginger (IEA Bioenergy Task 40), Jason Kwiatkowski (POET Research), Quang Nguyen (Abengoa Bioenergy), Carsten Lauridsen (Novozymes China), Tony Sidwell (British Sugar), Jack Newman (Amyris) and Lee Lynd (Dartmouth College). This special session highlighted recent international progress to accelerate deployment of advanced biofuels technologies.

Policy and Implementation Workshop, Dresden, Germany – June 3-5, 2009

Task 39 held a Subtask Policy and Implementation Workshop in Dresden, Germany from June 3-5, 2009.

This two day workshop was attended by approximately 70 delegates. The workshop served as an information exchange between stake holders, decision makers and leading scientists from industry, government and funding organizations as well as lobby groups, standardization organizations and research institutes.

Topics discussed at the workshop included biofuels policy in Europe and North America, feedstock, sustainability, and 2nd generation conversion technologies. Activities of other networks on biofuels were also discussed in a separate session.

A panel discussion on the different views on biofuels was held which also provided suggestions for future efforts. There was also a study tour to the TU Bergakademie Freiberg; Siemens Gasification Test Center and CHOREN's FTdiesel production plant in Freiberg.

The workshop was supported by the German Federal Ministry for Food, Agriculture and Consumer Protection through the Agency for Renewable Resources (FNR).

Presentations from the Policy and Implementation Workshop would be available on the Task 39 website (www.task39.org) by August 31.

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UPCOMING TASK 39 MEETINGS

Task 39 is assisting to organize the [IEA Bioenergy Multi-Task Conference in Vancouver, Canada](#) from August 23-26, 2009. In case you are attending the conference, we would encourage you to visit the conference website (<http://www.ieabioenergyconference.org>) for more details regarding the final program and travel information.

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NEW REPORT

1. Update on Implementation Agendas 2009: A review of key biofuel producing countries

This Task 39 report is available to all Task members on Task 39's website. Non-members wishing to view the report should contact their appropriate country representative.

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TASK 39 MANAGEMENT TEAM

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