



# Industrial Biotechnologies China News

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# Biotechnologies

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## Editor notes

Food prices have experienced sharp rise partly caused by raw material shortages during 2010. The CPI was 5.1% in November 2010, reaching the record high for the past 28 months. Among the major raw materials of foodstuffs, corn also witnessed a remarkable price rise in 2010, with average price growth rate of 5%-10% in different areas. Owing to the higher prices of domestic corn than foreign one, the corn import volume reached a record high in 2010, almost 20-45 times higher than those during the past four years.

People have attributed shortage of corn supply to fuel ethanol production since 2006. In 2010, fuel ethanol production has been accused of “competing for food with human being” by the public again. Although the accusation has been proved false by some people since the corn consumption in fuel ethanol production accounted for only 2.3% of the total output of corn in 2010 in China. To avoid further dispute over this matter, currently the Chinese government is promoting non-grain fuel ethanol production on a national scale. For example, Henan Tianguan and COFCO are both accelerating the commercialization of cellulosic fuel ethanol at present and expected to realize it within two years. Also, methanol gasoline might get an authorized entrance to a larger market after the M15 national standard is officially issued in the first half of 2011. Furthermore, domestic biodiesel has been officially announced on December 24, 2010 to be exempted from consumption tax since 2009, which boosts the advancement of domestic biodiesel industry.

The corn price rise will also make other biomaterial and bio-based chemical producers select other affordable raw materials, like straw, or plan capacity expansion in order to further cut down the current production costs. For example, Songyuan Bairui officially launched its 50,000t/a production line of bio-based polyol in early December 2010 based on straw material. Shenzhen Ecomann and Shandong Full Win are preparing for capacity-expansion projects.

## Main companies and institutes mentioned in this issue



## Headlines

- Anhui Yineng, with 10,000t/a production demonstration base of biomass oil located in Hefei City, Anhui Province, is focusing on promotion of their production technology and biomass oil at present.
- China decides to promote the methanol gasoline at the end of 2010. In the future, ethanol gasoline and methanol gasoline may probably co-exist in the market with little impact on each other.
- On December 24, 2010, State Administration of Taxation issues a Notice which explicitly indicates that biodiesel should have been exempted from consumption tax since January 1, 2009, which undoubtedly is a big news to the biodiesel producers.
- Henan Tianguan will realize cellulosic ethanol commercialization production in 2012 if everything goes on smoothly.
- The recent shortage of corn supply has aroused wide disputes over fuel ethanol competing for food with human being lately.
- BRI of CAAS recently issues the test results of its T4 lysozyme pilot-scale production and is awaiting investments in its T4 lysozyme industrialization.
- The first domestic producer of polyol with straw as raw material is officially launched its 50,000t/a production line of bio-based polyol in early December, 2010 in Songyuan City, Jilin Province.
- Inner Mongolia Runbang plans to build a 15,000t/a (designed capacity) production line of gellan gum in 2011, which fuels competition in gellan gum market.
- Shenzhen Ecomann's second phase PHA project is still under environmental impact assessment and land evaluation. The construction is estimated to be started in April or May at the least, 2011.
- Xinfu Pharmaceutical got a national patent of bio-succinic acid .
- Whether it is legal to use disposable foam tableware in China causes intense dispute by various society organizations recently.
- Bio-based PVA will be first launched in China in early 2011, which will meet strong competition from traditional PVA in the market.
- Corn is reliable as raw material as its prices can be kept relatively stable in China, which can avoid high operation risks for biomaterial producers.
- In early January 2011, Shandong Full Win succeeds in a pilot production of PBS with its self-invented pilot-scale production equipment.
- Both China's PLA export volume and import volume grow in 2010.

## Bio-fuel

### Anhui Yineng promotes biomass oil

**B**iomass oil, made from agricultural residue and applied in agricultural or industrial machinery to replace ordinary diesel, was firstly industrialized over the country by Anhui Yineng Bio-energy Co., Ltd. (or Anhui Yineng). Till now, Anhui Yineng is claimed still being the only manufacturer producing biomass oil on an industrialization scale domestically.

Currently, the company has been focusing on promotion of biomass oil and production technology rather than R&D since last September. Thanks to being widely press-exposed domestically as early as 2007, the company earned its fame. Because of unpredictable high investment risks for technology improvement, the company only selects investors or business partners with strong economic strength.

In spite of good reputation, the company's products are often confused with other types of bio-based fuel products by customers due to irregular domestic biomass oil market, impeding the company's promotion process.

By now, Anhui Yineng's 10,000t/a production demonstration base of biomass oil is located in Hefei City, Anhui Province. 1.2-1.5 tonnes biomass can be

made from two tonnes straw within one hour. The prevailing advantage of the company is that it can make full use of the raw material without discharging any pollutants. Besides biomass oil, the by-products of flammable gases and ashes can be applied in plant and fertilization respectively, which help cut production cost and make more profit. A tonne of biomass oil can gain profit of USD45-75 without any governmental fiscal support.

Anhui Yineng adopts pyrolytic decomposition technology to produce biomass oil, which cohered its over ten years' painstaking R&D efforts. Besides China, Canada and Netherlands are the other two countries mastered this technology. Through this technology, agricultural residues like straw, wood chip, peanut shell can be thermo-decomposed into combustible biomass oil within one hour.

On the basis of combustion efficiency, 1.5 tonnes of biomass oil is equivalent to 1 tonne diesel. However, the price of 1 tonne of diesel is almost twice as much as that of 1.5 tonnes of biomass oil; therefore, the market potential of biomass oil is considerably high.

### Methanol gasoline and Ethanol gasoline might co-exist in China in the future

**D**uring 2010, the use of methanol gasoline (usually a gasoline blend of 15% methanol, or M15) has been promoted in some cities, aiming to reduce the reliance on petroleum. Evidence is mounting that methanol gasoline may pose a threat to ethanol gasoline (usually a gasoline blend of 10% ethanol, or E10), which has been promoted for several years in ten provinces.

First, methanol gasoline's prices are less subject to oil prices than ethanol gasoline's prices, which can lower the operation risks that methanol gasoline producers take. The E10 ceiling prices have officially been set by the Chinese central government to be 91% of the gasoline prices while the M15 prices have only 85% dependence on the gasoline prices, indicating that E10 prices would easily exceed M15 prices if gasoline prices continue going up. Actually, the domestic gasoline prices have seen four times rises during 2010 and may continue to grow as the international oil prices are reported to be still seeing upward trends. At present, the M15 prices are similar to the E10 prices.

Second, according to Zhejiang Sapphire Energy Science Co. Ltd. (or Zhejiang Sapphire, the first methanol

gasoline producer in Zhejiang Province), fuel ethanol consumes massive tonnes of corn while fuel methanol is made from coal which is quite rich in China now. In fact, the total capacity of methanol was reported to reach 35-38 million t/a currently but the operating rate could only reach at 35%-40% in recent two years, suggesting a huge supply potential of methanol to methanol gasoline industry.

Based on these facts, the Chinese central government started to promote the methanol gasoline. In 2010, some cities in Zhejiang Province and Shaanxi Province were successively selected as trial zones for methanol gasoline (M15) use. Also, Ministry of Industry and Information Technology of the PRC has officially chosen Shanghai City, Shaanxi Province and Shanxi Province as trial zones for trial use of high-proportioned methanol gasoline (gasoline blends of 85% methanol, or M85). Meanwhile, the national standard for M15 is expected to be officially issued in the first half of 2011, suggesting a wider application of M15 in China.

Although methanol gasoline prevails over ethanol gasoline in many aspects, the wider application of M15 is still up in the air even after the national standard of M15 being issued. Once methanol gasoline enters into the gasoline market on a large scale, 15% of original gasoline will be substituted by methanol, which can break the original supply and demand balance of gasoline in the market and probably damages the interest of the petroleum giants (mainly referring to Sinopec Corp. and CNPC), who may block M15's entrance into gasoline market, after they own almost half amounts of domestic gas stations.

Furthermore, even if M15 enters into the gasoline market on a large scale in the future, there is small chance that the government will allow M15 to capture the original market for E10, because the fuel ethanol in E10 comes from recoverable materials, which complies with the sustainable development strategy. Actually, the current places where M15 is promoted do not overlap with the places where E10 is sold. In the future, ethanol gasoline and methanol gasoline may probably co-exist in the market but be sold in different zones with little impact on each other.

## Biodiesel officially exempted from consumption tax again

On December 24, 2010, State Administration of Taxation issued a document Guo Shui (2010) No.118, (the Notice of Biodiesel Produced with Waste Animal and Vegetable Oils be Exempted from Consumption Tax), which explicitly indicates that biodiesel should have been exempted from consumption tax since January 1, 2009, thus biodiesel producers who paid consumption tax after January 1, 2009 will get the refund.


"The official release of the document cut down about USD140/t from the production cost of biodiesel currently", said by Mr. Ning, president of China Biodiesel Coordination Group (CBCG), "Undoubtedly, it is a good news to the biodiesel producers and it will possibly initiate a new round biodiesel investment boom."

China used to exempt biodiesel from consumption tax in 2006. State Administration of Taxation issued the document Guo Shui Han (2005) No.39, (Written Reply about Problem of Biodiesel Consumption Tax), explicitly indicating that biodiesel with animal and vegetable oils as raw materials is not belonging to the scope of levying consumption tax in December 2006. But on December 19, 2008, State Administration of Taxation issued the Document No. 168 (2008) of the Ministry

of Finance, (Notice of the Ministry of Finance and the State Administration of Taxation on the Relevant Tax Policies Concerning Refined Oil Consumption after the Increase of the Refined Oil Consumption Tax Rates) and simultaneously abolished the Document Guo Shui Han (2005) No.39. Since then, no specific document indicates clearly whether consumption tax should be levied on biodiesel.

Therefore, some provinces such as Shandong, Hebei, Jiangsu, Zhejiang, Sichuan and etc., levied consumption tax from biodiesel producers, resulting in high-cost pressures. Mr. Ning claimed that many biodiesel producers shifted to industrial chemicals industry which does not need to pay consumption tax, thus weakening biodiesel's function as alternative energy.

The notice of exempting biodiesel from consumption tax has obvious effects on regulating biodiesel market. Firstly, it will inspire biodiesel producers' enthusiasm for the relatively relieving cost pressure. Secondly, some used-to-be illegal small biodiesel producers will positively apply for the business license, entering the biodiesel market through legal means.



**CCM's Market Reports Announcement**

For more details, please contact CCM at [econtact@cnchemicals.com](mailto:econtact@cnchemicals.com)

- Study on Lignin and Lignin-based products in China
- Major producer info of Lactic acid in China in 2010
- Biomass Energies Market in China
- Major producer info of Sodium Gluconate in China in 2010



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- Major producer info of Lysine in China in 2010
- Major producer info of Corn starch in China in 2010
- Export summary data of Corn starch in China in 2010

## Henan Tianguan may realize cellulosic ethanol commercialization production in 2012

“After updating, at present Henan Tianguan Group (Henan Tianguan)’s cellulosic ethanol production line has reached capacity of 10,000t/a,” claimed by Mr. Chen, a process engineer in Henan Tianguan, “this production line will realize commercialization production in 2012 if everything goes on smoothly.”

As early as 1997, Henan Tianguan had begun R&D of production technologies of cellulosic ethanol. In Dec. 2007, Henan Tianguan launched a demonstration cellulosic ethanol production line with capacity of 5,000t/a. In order to reduce total production cost, the company began to renovate the demonstration production lines of cellulosic ethanol and enlarge the capacity into 10,000t/a in 2010.

According to Mr. Chen, at present, about 7 tonnes straw can produce 1 tonne cellulosic ethanol in Henan Tianguan, and the total cost of cellulosic ethanol is still too high, at about USD1,210/t. Simultaneously, to realize cellulosic ethanol commercialization production, there are some problems need to be solved.

First is the high production cost. Mr. Chen claimed that there are two methods to reduce production cost., improving the processing technique to reduce the cost of cellulose and making full use of the by-products lignin in the pot ale, and the company is making effort towards these two directions.

Second is the difficulty in raw material collection. China’s agriculture is using separate management system, leading to difficulties in massive straw collection. If government can provide subsidy for straw collection and assistance to build up straw comprehensive utilization recovery stations around China, the situation may turn better.

Because of high cost of cellulosic ethanol production, Chinese central government has to issue policy of public subsidies for cellulosic ethanol to accelerate the cellulosic ethanol commercialization process.

China already leapt to the second largest petroleum consumption country, it is imminent to seek new alternative energies. So China will strengthen degree of support and issue related policies to advance the development of cellulosic ethanol industry. Nowadays, Henan Tianguan has applied for a cellulosic ethanol project with the total capacity of 120,000t/a to National Development and Reform Commission. Mr. Chen claims that Henan Tianguan plans to construct 12 cellulosic ethanol production bases each with capacity of 10,000t/a in Henan at the end of 2012.

## Fuel ethanol competing for food with human being?

Food prices have experienced sharp rises partly caused by raw material shortages during 2010. The CPI was 5.1% in November 2010, reaching the record high for the past 28 months. Among the major raw materials of foodstuffs, corn also witnessed a remarkable price rise in 2010, with average price growth rate of 5%-10% in different areas. People has attributed shortage of corn supply to fuel ethanol production since 2006. Fuel ethanol production has been accused of “competing for food with human being” by the public.

Owing to the high price of corn, corn-based fuel ethanol production can be seen as a losing business or a behaviour of food wasting. There are now only four producers of fuel ethanol who can gain governmental subsidies to offset their losses from selling fuel ethanol. According to the financial report of Anhui BCCA Biochemical Co., Ltd. (Anhui BCCA, one of the four fuel ethanol producers), its gross profit rate of the fuel ethanol business in the first half of 2010 was -10.75%. To make things worse, the production costs of fuel ethanol is too high, at around USD1,182/t, about USD40/t higher than the current price of conventional

gasoline fuel.

Based on these facts, the chairman of PFCGCC once proposed suspending all the current capacities of corn-based fuel ethanol to National Development and Reform Commission in early August 2010, calling for guaranteeing the national food security. There has been no reply yet. And this proposal seems a little extreme to CCM, but it still arouses disputes over fuel ethanol competing food with human being.

However, some oppose this view. The total output of corn in 2010 is reported to be around 172 million tonnes while the total consumption volume of corn for fuel ethanol production is estimated to be only 4 million tonnes based on the current fuel ethanol capacity of 1.13 million t/a from corn (yield rate: 1t ethanol / 3.5t corn), accounting for only 2.3% of the total output of corn. In fact, most corn in China is applied in feed production, with about 70% of corn output consumed in feed production in 2009. Therefore, the view of “fuel ethanol competing food with human being” seems not so convincing.

Aiming to avoid further dispute over this matter, China has decided to stop approving any corn-based fuel ethanol project as early as 2006 and started to promote non-grain fuel ethanol in 2007. Till now, China has approved for at least five fuel ethanol construction projects distributed in five provinces based on tuber materials like potato, cassava. And ZTE Energy Co., Ltd. (or ZTE Energy) built a 30,000t/a fuel ethanol pilot production base with sweet sorghum as raw material in Inner Mongolia in 2010. COFCO Corporation (or

COFCO), cooperating with China Petroleum & Chemical Corporation (or Sinopec) and Novozymes, was reported to launch their first domestic pilot sales of cellulose-based fuel ethanol by the end of 2011.

Notes: PFCGCC stands for Petroleum Flow Committee of China General Chamber of Commerce, is a not-for-profit organization launched by domestic producers and distributors of petroleum products.

## Bio-products

### BRI of CAAS awaiting investments in T4 lysozyme industrialization

**B** iotechnology Research Institute of CAAS (or BRI of CAAS) recently issued its test results of its T4 lysozyme pilot-scale production through fermentation method using *Pichia Pastoris* (a kind of yeast) in December 2010. According to BRI of CAAS, launched in 2006, the research project, namely “T4 lysozyme production through fermentation method using *Pichia Pastoris*”, was actually a national level project jointly responsible by China Animal Husbandry Industry Co., Ltd. (or China Animal Husbandry) and BRI of CAAS. Undertaken by China Animal Husbandry, the pilot-scale production tests lasting for about eight months were just finished.

According to the project leader, Professor Liu from BRI of CAAS, T4 lysozyme is a kind of enzyme ever found with the highest lysis effect (kill through decomposing cells) on bacteria worldwide. The ordinary lysozyme which has already been industrialized originates from chicken egg white, while T4 lysozyme originates from T4 phage (bacteria virus). Through years of effort in genetic modification on *Pichia Pastoris*, BRI of CAAS has enabled the research institute to use ordinary *Pichia Pastoris* producing T4 lysozyme. Till now, there has been no T4 lysozyme industrialization globally, according to Professor Liu. So the genetic-modified *Pichia Pastoris* and its relevant culturing conditions can be seen as the core technologies for T4 lysozyme industrialization. Because the *Pichia Pastoris* is genetically modified, the T4 lysozyme industrialization needs to get approvals for environmental evaluations from the local government.

However, Professor Liu disclosed that the industrialization process of T4 lysozyme might be hampered because its project partner, China

Animal Husbandry, attaches not much importance to this project and has no intention to invest in the industrialization researches temporarily. But in view of the partnership, BRI of CAAS is not allowed to invite other business partners unilaterally. In the future, BRI of CAAS will continue doing R&D work to improve the productivity and activity of T4 lysozyme and create new dosage forms.

Notes:

Lysozyme is a kind of enzyme having lysis effect (kill through decomposing cells) on bacteria. It can be widely found in mammal's body fluids (including human) like tears, breast milk, saliva, and especially rich in fowl's egg white. Thanks to its non-toxicity without side effect, lysozyme can be safely and widely applied to food as food preservative and to medical-care as antiseptic. Lysozyme can also be used as tool enzyme in genetic engineering operations.

CAAS stands for “The Chinese Academy of Agricultural Sciences”. CAAS is China's national agricultural research organization, directly affiliated to the Ministry of Agriculture.

Founded in 1998, China Animal Husbandry Industry Co., Ltd. (or China Animal Husbandry) is a large multi-service corporation who got listed on Shanghai Exchange Stock Market in 1999. Now it has eight bio-product companies, eight feed companies and four veterinary drug companies through wholly-owned, holding and joint-ventured ways.

## Bio-based chemicals

### Songyuan Bairui debuts their bio-based polyol

Songyuan Bairui officially launched its 50,000t/a production line of bio-based polyol in early December 2010 in Songyuan City, Jilin Province. Its polyol is originated from renewable biomass materials, namely cellulose and lignin, both of which are outsourced and made from straw. And Songyuan Bairui is the first domestic producer of polyol based on straw material, showing unrivaled raw material advantage as the supply of straw is ample (estimated 70 million t/a) in China.

Furthermore, the core production technology originated both from Songyuan Bairui and South China University of Technology (or SCUT, located in Guangzhou City). According to Songyuan Bairui's General Manager, Mr. Ma, its technology was developed mainly by itself and SCUT just offered some advice or instructions. At present, its production technology is relatively mature. Songyuan Bairui and SCUT have jointly applied for several patents since July 2010.

According to Mr. Ma, the bio-based polyol is a thick and dark liquid with hydroxyl contents of 0.3%-0.35%, which is suitable for the production of rigid or semi-rigid polyurethane foam products. This type of bio-based polyol shares similar chemical structure with ordinary petroleum-based polyether polyols but they are quite different in nature. According to previous test results, 50%-60% petroleum-based polyether polyol (hydroxyl contents: 0.42%) can be replaced by bio-based polyether polyols in the application of semi-rigid polyurethane foam products. The bio-based polyether polyols is only sold at USD1700/t, USD370/t lower than the petroleum-based one, enjoying a favourable

price advantage in the market.

The company has already opened business negotiations with some enterprises in Guangzhou City and will put more weight on the domestic market. Mr. Ma disclosed that the company would rather sell its products at present than sell their production technology or company's shares. In the foreign market, Mr. Ma suggested that they should cooperate with Bayer or BASF and sell their products abroad through these companies.

Notes:

(1) The company's raw material, namely cellulose and lignin, outsourced from Songyuan Laihe Chemical Co., Ltd., who launched their 300,000t/a straw-based production line in September, 2010 in Songyuan City, Jilin Province. With capability of processing 300,000t/a straw material, this production line can produce 30,000t/a high-purity lignin, 120,000t/a cellulose and 50,000t/a total capacity of butanol, acetone and ethanol. And Mr. Ma used to be one of share holders of Songyuan Laihe before he became the General Manager of Songyuan Bairui. So these two companies have very close business relationships.

(2) Polyether polyol is a type of polymer commonly applied in polyurethane rigid foam products which are intended for heat insulation of buildings, pipes, and refrigerators. Polyether polyol is also used for waterproof and airproof.

### Inner Mongolia Runbang fuels competition in gellan gum market

In early December 2010, Inner Mongolia Runbang Bio-technology Co., Ltd. (or Inner Mongolia Runbang) was reported to build a 15,000t/a (designed capacity) production line of gellan gum in 2011. Technical-supported by Jiangnan University and a biotech company from Hong Kong, this construction project will gain a total investment of around USD44 million, 2/3 of which belongs to fixed assets, aiming to realize an estimated sales revenue of USD148 million annually. Its first-phase construction will be initiated in April 2011 and finished at a capacity of 5,000t/a within one year, and is estimated to offer 300 job vacancies.

Though the current domestic gellan gum market has been facing serious over-capacity, the company still thinks highly of this market, but the expanded capacity

will obviously fuel competition in the domestic gellan gum market.

According to the top two gellan gum producers, namely Zhejiang Tech-Way Biochemical Co., Ltd. (or Zhejiang Tech-Way) and Zhejiang DSM Zhongken Biotechnology Co., Ltd. (or Zhejiang Zhongken), the domestic total capacity of gellan gum reaches around 1,000t/a currently but the domestic annual consumption is only 400 tonnes at most. To increase sales, the domestic enterprises have to export their products but still are severely challenged by the like products from CP Kelco (headquartered in the U.S.), the global leading producer of various bio-gels, including gellan gum.

The low demand for gellan gum can be attributed to the following two aspects:

The immature application technologies limit application fields of gellan gum. Gellan gum is a kind of thickener. Currently, about 90% of gellan gum is mainly applied in the food and beverage industry in China, mainly for beverage and jelly. There is also a small amount used in solid air fresheners. Many domestic producers find it quite hard to apply gellan gum to their products effectively. Only a few professional formulators can provide relevant application technologies for some other application fields. But these formulators keep their application technologies or experience in hand very tightly, limiting the wide application of gellan gum to a large extent. Moreover, the biggest foreign competitor CP Kelco is much stronger than the domestic enterprises in this aspect.

The extremely high price is another major factor impeding the promotion of domestic gellan gum. Among them, xanthan gum is the most competitive one against gellan gum as its similar performances to gellan gum. Although gellan gum has many advantages over xanthan gum such as higher transparency, higher chemical stability, and much lower addition rate (about 1/5 of xanthan gum), yet the price of gellan gum is around ten times higher than that of xanthan gum, which keeps the gellan gum from being widely applied to more fields.

Although some existing producers of gellan gum expressed their concerns upon the intensified competition brought about by the new project, they paid more attention to the development of application technologies of gellan gum as well as production cost cut.

# Corn Products China News

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## Bio-materials

### Shenzhen Ecomann's second-phase PHA project still under preparation

Shenzhen Ecomann Bio-technology Co., Ltd. (Shenzhen Ecomann) is the second largest Polyhydroxyalkanoates (PHA, one kind of biodegradable resins) producer in China. Its second-phase of PHA construction project in Zoucheng City, Shandong Province, which was supposed to be initiated at the end of 2010 based on their original plans, is still under preparation, according to Shenzhen Ecomann. Considering the project is still under the environmental impact assessment and land evaluation, the construction is estimated to be started in April or May at the least, 2011.

After completing the second project with a total investment of almost USD52 million, Shenzhen Ecomann will boost their current designed capacity from 5,000t/a up to 50,000t/a and fulfill an estimated sales revenue of about USD590 million. Aiming to accelerate the process of this project, the local government has deployed a special working group to help fund-raising for this project. Till now, Shenzhen Ecomann has signed long-term supply contracts with many enterprises from the UK, South Korea, etc. and has reached cooperation intention with some domestic well-known enterprises.

Shenzhen Ecomann started its PHA project in Zoucheng City, Shandong Province in May, 2008 and launched its first PHA production line of 5,000t/a in July, 2009. Once the second-phase project is launched, the company will continue building its third PHA production line of 50,000t/a also located in Shandong Province, which is supposed to be completed by 2012. In 2013, the company plans to build another two PHA production lines distributed in North-western China and North-eastern China respectively. All these expansion plans aim to sharply cut the production costs through economy of scale.

Owing to the higher prices of PHA resins than that of conventional plastics, most of their PHA resins are exported to developed countries. In early December 2010, Ecomann's PHA resins gained approval from the European Union to be used in foodstuffs, offering wider applications chances of Shenzhen Ecomann's PHA resins in food and beverage industry. In fact, in March 2010, Shenzhen Ecomann has signed an agreement with A&O FilmPAC (a resin distributor in the UK) to entitle it as the sole EU distributor for its PHA resins. Shenzhen Ecomann does not set any other agents except A&O FilmPAC in other countries.

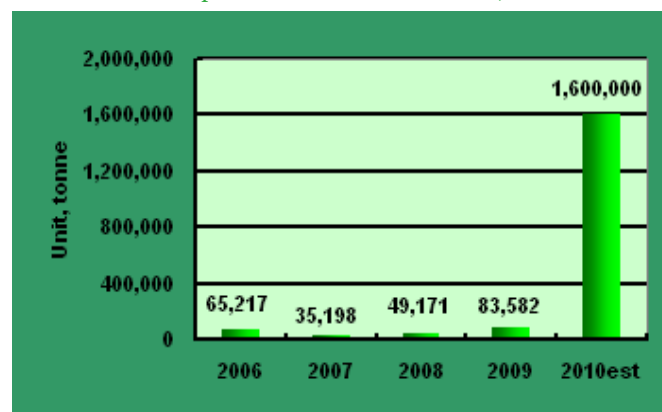
### Biomaterial producers rely on corn as raw material

Many biomaterials originate from corn, such as PLA, PHA and starch-based materials. These materials are always being bragged about their independence from global volatile oil prices because over half of oil consumption in China is imported. However, since China saw a record high of its corn import volume in 2010, news has spread like wildfire that corn might fall in the same old trap like oil and become reliable on imports in the future. If so, many biomaterial producers in China might probably take much higher operation risks owing to unstable costs of their raw material, namely corn.

Although the corn import volume reached a record high in 2010, yet many domestic industry insiders did not show much concerns about this problem. They believed, even though the corn import volume could reach 7,500,000 tonnes in five years, merely equal to 5% of the Chinese corn output of 2010, which would exert very little impact on domestic corn prices. Furthermore, the corn prices can become much more stable when Chinese government takes relative measures to balance

the price. Lastly, some also thought that import volume of corn in 2010 would be pretty small if the corn output had not been decreased in 2010. It is believed that corn can be self-sufficient for China thanks to its huge corn output, which enables corn to be a reliable raw material for many biomaterial producers.

FIGURE 1: Import volume of corn for China, 2006-2010



Source: CCM International

The corn import volume was estimated to reach 1,600,000 tonnes in 2010, almost 20-45 times higher than those during the past four years. Since mid 2010, a few foreign media have predicted the corn import figure for China could be 7,500,000 tonnes after five years.

The sudden rise of the corn import volume can be directly attributed to the higher prices of domestic corn than foreign one. The high prices of domestic corn were dragged up by corn-supply shortage. First, the corn consumption in feed industry grew steadily by 3% in

2010 over 2009 because of pig farming industry thriving since mid 2010. Currently, about 70% of corn output in China is consumed in feed industry. Also, starch deep-processing industry saw a growth of 30% in corn consumption in 2010 over 2009. Lastly, the bad weather conditions in late 2009 led to corn output's fall in 2010 by 20 million tonnes, which was also responsible for the corn-supply shortage in 2010. This shortage problem was also firstly and officially issued in 2010 by a Chinese authority.

## Shandong Full Win succeeds in pilot production of PBS

In early January 2011, Shandong Full Win New Material Co., Ltd. (or Shandong Full Win) succeeded in a pilot production of PBS with its self-invented pilot-scale production equipment. The PBS of the company was reported to be superior to other like products at home and abroad in terms of the product's physical and chemical properties.

According to the company, its PBS is produced through direct polymerization of the two raw materials, namely 1, 4-butanediol (or BDO) and succinic acid, without adding any chain extenders, attaching the PBS with superb hygiene feature. Till now, the product has got relevant approvals from Chinese Centre for Disease Control and Prevention for its qualification of application in food and drug package, suggesting a much wider range of applications than those without the qualification.

Actually, Shandong Full Win is one of the two subsidiaries of China New Materials Holdings Limited (or China New Materials). China New Materials is a manufacturer engaged in the production of three chemical materials including BDO, GBL and THF and plans to penetrate into domestic PBS market and build two PBS production lines with capacities of 5,000t/a

and 20,000t/a in Zibo City, Shandong Province, which would be finished in June 2011 and September 2011, respectively. Aiming to raise funds for this project, China New Materials launched IPO in Hong Kong in December 2010.

Although PBS is quite mature on the basis of production technology, yet it is still new to most domestic or even foreign customers. Moreover, as the price of PBS is more expensive over the conventional plastic materials, quite a long time is still needed to gain profit after the launch of the production lines. Also, more and more PBS producers are emerging in China, severely intensifying the competition on the domestic PBS market. Meanwhile, according to a staff in a recoverable material research centre in South China University of Technology, most high quality PBS products come from Japan can become tough rivals to Chinese PBS products.

To survive the current situations, China New Materials is reported to adopt direct sales model instead of a distributorship sales model, giving it the ability to obtain first-hand market information directly from their customers and build long-term and close relationships with customers.

## Trade analysis of China's PLA

### ■ Export analysis

#### Export volume

China's total PLA (polylactic acid) export volume reached about 530 tonnes in the first eleven months of 2010 (TABLE 1). With domestic PLA quality improving and recovery of global economy, China's PLA export would keep growing in December 2010 and the total annual export volume could reach about 600 tonnes in 2010 (FIGURE 2), twice as many as 2009.

#### Export price

China's average export price of PLA reached about USD2,388/t from January to November 2010 (TABLE

1). The price of corn which is PLA's raw material kept stable or even fell a little in December 2010 thanks to relatively adequate corn supply during this time. Therefore China's PLA export price in 2010 kept at around USD2,380/t (FIGURE 3).

#### Major domestic PLA export provinces

By now, Zhejiang Hisun Group Co., Ltd. (Zhejiang Hisun), the largest domestic PLA producer, and Nantong Jiuding Biological Engineering Co., Ltd. (Nantong Jiuding), located in Zhejiang Province, are still two major domestic PLA producers (TABLE 2).

## Major export destinations

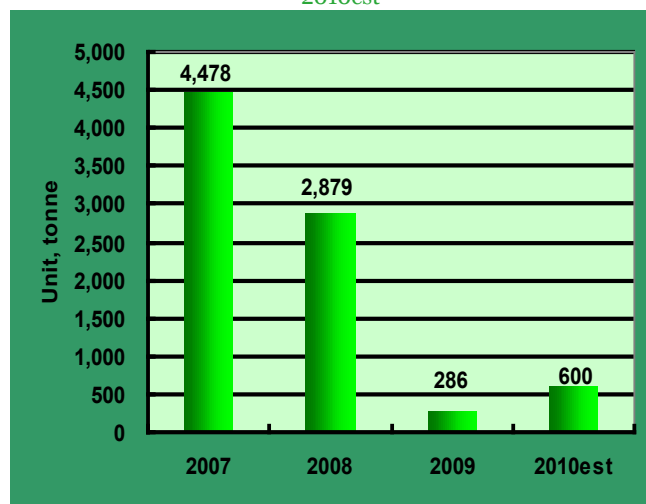
Both Zhejiang Hisun and Nantong Jiuding are still applying for ASTM (American Society of Testing Materials) and EN (European Norm) identification, which has not been authorized yet, therefore, China's PLA export aims mainly at Asian regions (TABLE 3).

TABLE 1: Export volume, value and price of China's PLA, Jan. - Nov., 2010

Month	Quantity, tonne	Value, USD	Price, USD/t
Jan-10	29	73,463	2,578
Feb-10	65	166,573	2,555
Mar-10	55	121,470	2,222
Apr-10	80	173,085	2,164
May-10	41	101,773	2,478
Jun-10	77	181,783	2,371
Jul-10	40	113,361	2,848
Aug-10	67	151,565	2,279
Sep-10	23	51,958	2,307
Oct-10	1	3,531	2,716
Nov-10	54	128,025	2,362
<b>Total</b>	<b>530</b>	<b>1,266,587</b>	<b>2,388</b>

Source: CCM International

FIGURE 2: Annual export volume of China's PLA, 2007-2010est



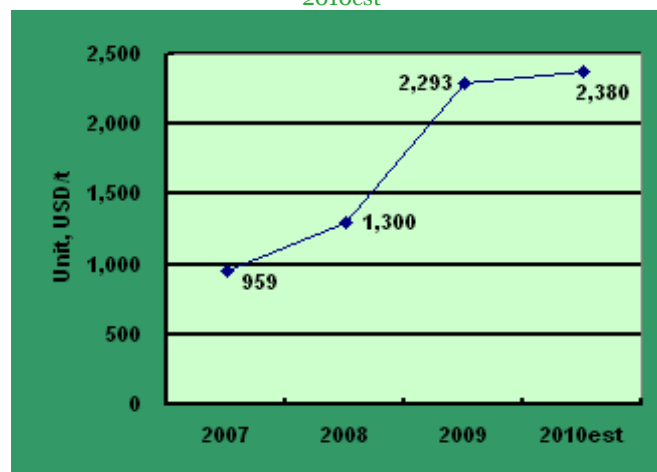
Source: CCM International

## ■ Import analysis

### Import volume

China's total PLA import volume reached about 2,417 tonnes in the first eleven months of 2010 (TABLE 4). As a global important processing country of PLA-based products, China's annual PLA import volume would at least reach 2,500 tonnes in 2010 (FIGURE 4), nearly parallel with the level of 2009.

FIGURE 3: Average export prices of China's PLA, 2007-2010est



Source: CCM International

TABLE 2: Export volume of major domestic PLA export provinces, Jan.-Nov., 2010

No.	Province	Quantity, tonne	Value, USD
1	Zhejiang	337	819,840
2	Jiangsu	145	335,586
3	Anhui	26	42,988
4	Guangdong	14	42,896
5	Tianjin	2	7,217
6	Inner Mongolia	1	1,750
	<b>Subtotal</b>	<b>523</b>	<b>1,250,277</b>

Source: CCM International

TABLE3: Major export destinations of China's PLA, Jan.-Nov., 2010

No.	Destination	Quantity, tonne	Value, USD
1	Japan	297	711,594
2	Hong Kong	72	166,208
3	Taiwan	61	155,936
4	Thailand	54	102,088
5	Germany	10	32,886
	<b>Subtotal</b>	<b>494</b>	<b>1,168,712</b>

Source: CCM International

### Import price

Since most PLA imported by China in 2010 mostly came from the U.S.(TABLE 6), the imported-PLA prices mostly depended on the corn prices in the U.S. Boosted by the thriving fuel ethanol industry in the U.S., the corn prices has seen sharp rise since the fourth quarter of 2010, which further dragged up the PLA prices in the U.S. Therefore, the PLA price of December 2010 would also keep at USD2,800/t at least, close to the level of November 2010(TABLE 4), which would make the annual average import price for 2010 to be about USD2,400/t (FIGURE 5).

## Major import destinations

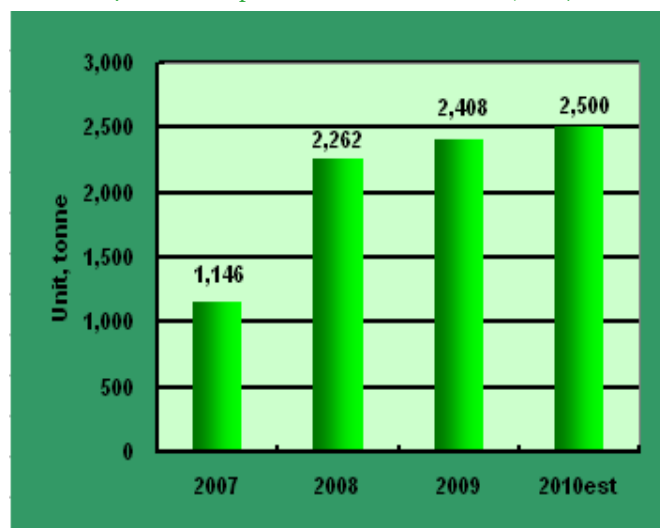
Because most domestic PLA-based products producers and domestic PLA trade companies concentrate in Guangdong Province and Zhejiang Province, which are the two largest PLA import destinations in China (TABLE 5).

TABLE 4: Import volume, value and price of China's PLA, Jan. - Nov., 2010

Month	Quantity, tonne	Value, USD	Price, USD/t
Jan-10	176	416,725	2,366
Feb-10	169	419,099	2,485
Mar-10	114	294,322	2,580
Apr-10	216	459,349	2,125
May-10	161	389,740	2,428
Jun-10	397	852,480	2,147
Jul-10	388	847,780	2,185
Aug-10	468	1,039,936	2,223
Sep-10	117	248,369	2,132
Oct-10	110	278,705	2,532
Nov-10	102	284,735	2,790
<b>Total</b>	<b>2,417</b>	<b>5,531,240</b>	<b>2,288</b>

Source: CCM International

FIGURE 4: Annual import volume of China's PLA, 2007-2010est

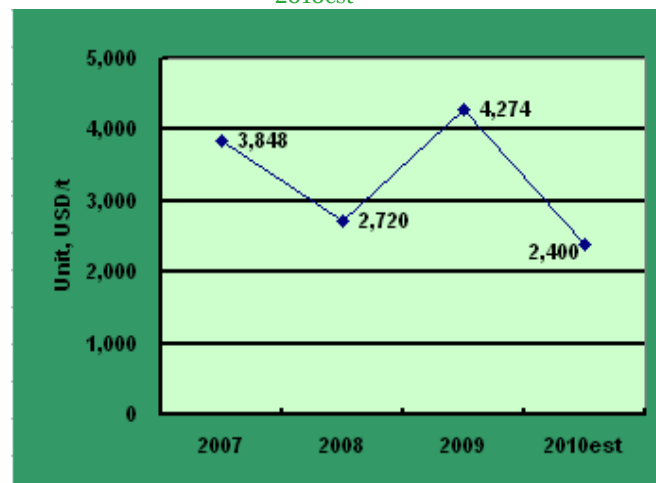


Source: CCM International

## Major China's PLA import origins

By now, NatureWorks LLC, the largest global PLA producers located in the U.S, still has absolute advantages of unrivaled PLA capacity of 70,000t/a and mature PLA processing technologies, therefore, the company still captures most global PLA market (TABLE 6).

FIGURE 5: Average import prices of China's PLA, 2007-2010est



Source: CCM International

TABLE 5: Import volume of major domestic PLA import provinces, Jan.-Nov., 2010

No.	Province	Quantity, tonne	Value, USD
1	Guangdong	1,055	1,977,424
2	Zhejiang	452	959,017
3	Jiangsu	273	533,094
4	Tianjin	236	556,711
5	Fujian	181	381,940
6	Shanghai	128	582,895
7	Beijing	40	267,991
<b>Subtotal</b>		<b>2,365</b>	<b>5,259,072</b>

Source: CCM International

TABLE 6: Major PLA import origins to China, Jan.-Nov., 2010

No.	Origin	Quantity, tonne	Value, USD
1	the U.S.	1,764	3,704,720
2	Taiwan	314	657,888
3	Japan	147	677,037
4	Korea	88	135,077
5	China	44	57,025
<b>Subtotal</b>		<b>2,357</b>	<b>5,231,747</b>

Source: CCM International

## News in brief

### CEBH plans to construct 300,000t/a biodiesel production line in Hainan Province

On January 3, 2011, China Integrated Energy, Inc. (Nasdaq: CBEH) announced that CBEH plans to construct biodiesel production line with capacity of 300,000t/a in Hainan Province, China, and the first-phase project of biodiesel production line with capacity of 100,000t/a will be launched in 2012.

### Chinese Bio-ethanol output to reach 10 million tonnes in 2020

According to the Global Bio-Refining Industry Report which was announced in The World Economic Forum 2010, fuel ethanol, produced with crop straw will substitute for 31 million tonnes gasoline, causing China's petroleum import volume to reduce by 10%.

### CIBE EXPO 2011 to be held in April 8-10, 2011

The 3rd China International Bioenergy Exhibition & Technical Conference (CIBE EXPO) 2011 will be held in April 8-10, 2011 in China International Exhibition Centre, Beijing.

### China's renewable energy sources account for 9.6% of the total energy consumption quantity

On December 15, 2010, China National Energy Board claimed that in 11th Five-Year plan period, China's renewable energy sources would expand by leaps and bounds. In 2010, China's renewable energy sources reached 300 million tonnes standard coal, accounting for 9.6% of the total energy consumption quantity.

### XTBG successfully increases six times fruit yield of *Jatropha curcas*

Recently, the researchers in Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences (XTBG) used technology of selection and breeding to increase six times fruit yield of *Jatropha curcas*, one kind of energy crop for producing biodiesel. The researchers discovered that 6-Benzylaminopurine can obviously increase flower number and female flower's proportion, simultaneously can induce hermaphroditic flowers, thus obviously increasing the fruit yield.

### 1st World Congress of Bioenergy 2011 to be held in April 25-30, 2011

The 1st World Congress of Bioenergy 2011, which is hosted by China Medicinal Biotech Association, will be held in April 25-30, 2011 in Dalian World Expo Centre. The Theme of this congress is to develop natural bio-renewable energy.



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