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A new gateway to China feed industry

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The exclusive interview to the Executive Director of Continent Biotech
see page 36

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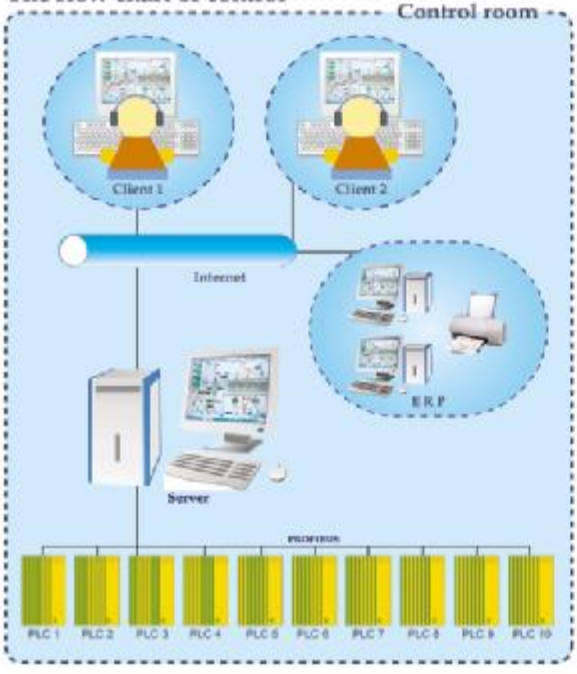
China National Seed Group Corporation

GuangDong HaidGroup's Production Site

The Production Site of Tong-Wei Group Co., Ltd.

The flow chart of control



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Accreditation Certificate of National Institute of Metrology P.R.China., Certificate No.:LXmw2001-0076

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Foreword for Publication

Bai Meiqing
Chairman of China Feed Industry Association

Through the rapid development over 30 years, China feed industry has become a major industry in the national economy of China.

With the growth of feed industry, a great number of industry media have emerged and become a tremendous force of publicity. Industry media has played a unique and irreplaceable role in the development of the feed industry. However, the media of feed industry, especially paper media has long been in Chinese language only, short of a platform of publicizing in English language to the world audience.

Now, here comes finally the platform of publicizing in English language for the feed industry - the refreshing English version of China Feed Industry.

Creating the magazine of China Feed Industry is a move to catch up with the time, beneficial to the growth of both the enterprises and the people.

Presently, the feed industry in China is transitioning from a large manufacturer to a powerhouse. With the globalization of economy and market, China feed industry must follow the track of modernization and internationalization before becoming truly a powerhouse. The feed products and enterprises need to "go global", going onto the world stage to both cooperate and compete globally with major transnational feed companies. To access the global market and secure a market share, the products, the technology, the service and the enterprises of our country have to be recognized and accepted by overseas customers first, so good communication and advertising via media shall be the first step toward the goal.

The English version of China Feed Industry will make every endeavor to be the showcase for the development and trends, the latest technology and research achievements of China's feed industry; it will also dedicate space to the success stories of leading domestic enterprises as well as interpretation of Chinese government's policies of animal husbandry, feed industry and agriculture, thus offering the overseas enterprises opportunities to better understand the development of China market, enabling Chinese enterprises to go international faster and in a better way; meanwhile, it aims to introduce the advanced technology and intelligent management of international feed community and promote the international exchange.

The world market is undergoing tremendous changes, and only those who catch up with the changes survive and prosper.

I would like to extend my very best wishes to the English version of China Feed Industry for a great beginning, for blazing new trails and growing continuously when serving China feed industry in its move onto the world stage.

序

中国饲料工业协会会长　　白美清

经过30多年的快速发展，中国饲料工业已经成为国民经济中的一个很大的产业了。

伴随着饲料行业的发展壮大，相应发展了众多的行业媒体，形成了一支相当可观的宣传舆论队伍。行业媒体，为饲料工业的发展做出了独特的、不可替代的贡献。但是，长期以来，饲料行业媒体——尤其是纸介媒体，局限于国内的中文版，缺乏面对国际的英文宣传载体。

现在，饲料行业终于有了一份英文版宣传载体——《饲料工业》(英文版)，令人耳目一新。

创办《饲料工业》(英文版)，是一件兴企育人、顺乎潮流之举。

目前，我国饲料工业正处在从生产大国向强国跨越的阶段。在世界经济一体化、市场全球化的大形势之下，我国饲料工业要实现向强国的转变，必须走现代化、国际化之路。饲料产品、饲料企业要“走出去”，走出国门，走向世界，与饲料强国的跨国公司合作与争锋。而要进入国外的市场，占据一定的国际市场份额，就需要使你的产品、你的技术、你的服务、你的企业被人认可，被人接受，为海外了解，为客户欢迎，先行的工作是要有很好的资讯传播，出色的媒体宣传。

《饲料工业》(英文版)，将尽力展示中国饲料行业的发展现状与趋势，宣传国内先进的饲料工业科学技术、科研成果，报道国内饲料工业科研领域的最新进展，介绍国内领军型企业的发展之路，解读中国政府的畜牧饲料业和农业政策。从而让国外企业更多地了解中国市场的发展现状，将中国的饲料企业更好、更快地推向国际市场，同时吸取国际饲料界的先进技术和智能管理，加深国际交流。

世界市场的潮流浩浩荡荡，能顺时达变者昌。

祝愿《饲料工业》(英文版)问世畅达，并在为我国饲料工业走向世界的服务中开拓新路，不断发展。

白美清

In Focus

The Integration & Upgrading of Feed Enterprises and the General Development Trend of Feed Industry in China

In face of the rising price of raw material and the increasing risk of epidemic diseases, the enterprises are trying to survive and prepare for a long-term struggle

Accelerated Enterprise Collectivized Integration

Due to the continuously rising price of raw materials and the increasing risks of epidemic diseases enterprises' profits are on the decline. Facing the situation of low profits many small enterprises have to withdraw from the market. The end result of this is a decrease in the number of enterprises.

In a survey it is said that in the first half of the year, 20% of small enterprises in Hebei Province were in the state of off production or half-off production. In Henan Province, by the end of 2006, there were 1,004 production enterprises but in June, there were only 901 enterprises remaining on-roll while the other 103 enterprises were pushed out of the market. In Hunan the sales of most feed enterprises were declining and about 20% of small enterprises are off production. On the other side, the large enterprises have occupied the market left by small enterprises via funding, service and brand advantages. Both their production capacity and output increased.

In 2006, there were 164 feed enterprises with a production capacity of more than 100,000 tons per year in China. The national top ten enterprises had a total output of 26.42 million tons which accounted for 24% of the total national output, 4% higher than that of 2004.

Regional Centralized Trends of Feed Enterprises

This relatively typical trend shows up in the areas of Foshan and Zhanjiang of Guangdong Province, Weifang and Zibo of Shandong Province, Yancheng of Jiangsu Province and Xinjin of Sichuan Province. Among them the most typical example falls in Xinjin feed enterprises.

In Sichuan Province there are 1,600 feed enterprises which accounts for 10% of the country as a whole. Among them, 130 feed enterprises have an annual output of more than 10 thousand tons and their total output exceeds 7 million tons annually.

By the end of 2006, in the region where Xinjin Feed Mill of New Hope Group locates as the central point with the semi-diameter of 2.5 kilometers, there were seven large enterprises. Some of them were domestically famous enterprises such as Tongwei, Haid, Aipu, Dabeinong and Shuang Baotai (Gold-apple), others are local enterprises such as San Wang and Chuantai.

There are about 20 feed enterprises in Shuangliu, Pengshan, Meishan, around Xinjin Qionglai, Wenjiang and Xindu, they are Chia Tai, Tongwei, New Hope, East Hope, Tangrenshen, Dachen, Zhengbang, CJ (Korea), Purina, Tie Qi Li Shi and Huaqiao Fenghuang.

Much Recognized Management Model of Industry Chain

Model of Integration Management

The enterprises under integration management show a strong energy in development. Take Wens Guangdong, Liuhe Shandong, Shiyang Shanxi for example. Their business is comprised of feedstuff production, livestock and poultry and food processing. Three of the primary businesses have shown a fast development and good profit. These enterprises, Tongwei, New Hope, Tangrenshen and Zhenghong are using both domestic and overseas model of integration management as reference.

Take New Hope Group for example, this year the New Hope Group obtained 60% stock of Qian Xihe, a meat processing enterprise, thereby entering the arena of meat processing. A relatively integrated industry chain is formed as well, from the production and sales of hog feed, to live pig breeding, live pig slaughtering, meat processing and distribution.

Model of Joint Management

The joint development is getting more and more attention. The cooperation between different enterprises appears such as the cooperation between New Hope and Liuhe, Liuhe and Shiyang Shanxi, Daxiang Shanxi and Shiyang Shanxi and Liuhe Shandong. Green Weinong complex also falls into this category. And Henan Beixu realizes its cooperation with Yurun Group and Liuhe Group respectively.

Leading feed enterprises probe a support model for livestock breeding

Large enterprises such as Liuhe of Shandong Province and Tongwei of Sichuan Province have established them-

selves as a model of the brinding development. These companies support competent individuals or enterprises to embark on the scale and standard breeding. This not only benefits breeders, binding companies, financial institutions, local governments, feed enterprises and food enterprises but also guarantees a substantial and healthy development of the livestock breeding industry.

Close Relationship between Management Situation and Main Product

Due to the variety of main products, great differences of the feed enterprises with different management situation exist. Most of the hog feeding producing enterprises shows a bad performance in both output and profit.

In contrast the enterprises of broiler feeding, meat duck feeding, layer feeding and aquatic feeding have a relatively statisfying situation. The poultry and aquatic feed production enterprises have undergone a fast increase since May. And there is a large potential increase in the feed output of the top poultry-breeding provinces such as Shandong, Hebei, Liaoning and Guangdong. Since July due to the high price of pork and the series of the preferential policies issued by the state government, the pig inventory has been increased which promotes the consuming of the pig feed. Thus a trend of going low in the first half and high in the second is formed.

Positive Public Listing of Feed Enterprises

At present more and more feed companies go listing. The early ones are Kondarl Shenzhen, Zhenghong Hunan, Tiankang Xinjiang, New Hope and Tongwei. Two more feed enterprises realized their successful listing this year. On 3rd April the Ningbo Tianbang Limited Company was listed. And on 17th August Jiangxi Zhengbang Science and Technology Limited Company came into listing.

The enterprises such as Guangdong Hengxing and Hunan Tangrenshen are active in preparing for their listing. More and more feed enterprises have been financed through listing which has become an obvious phenomena for the industry development.

In future, the general trend of China's feed industry will focus on the development where the whole industry is paying attention.

Mr. Bai Meiqing, Chairman of China Feed Industry Association, indicates that the development pace of enterprises is slowing down and the era of high profit margin comes to an end. At the same time the enterprises are facing the harsh situations such as the attack of animal epidemic disease, high price of the raw material, high standard of consumption demand and aggravated market competition.

The multinational companies have entered China feed and livestock market which results in a fiercer competition. Thus the feed enterprises must accelerate their integration and enlarge the combination to allocate relevant resources into the advantaged products and leading enterprises. By forming a best combination they can maximize and optimize their resource utilization. Only by the predominance formed in integration the enterprises can keep leading in competition.

For transferring our country from a large feed country to a powerful one it has become an important problem for us to integrate our country's exsiting feed resources. This is also the stage we have to undergo. In face of the new test, the whole industry must prepare for a long-term struggling.

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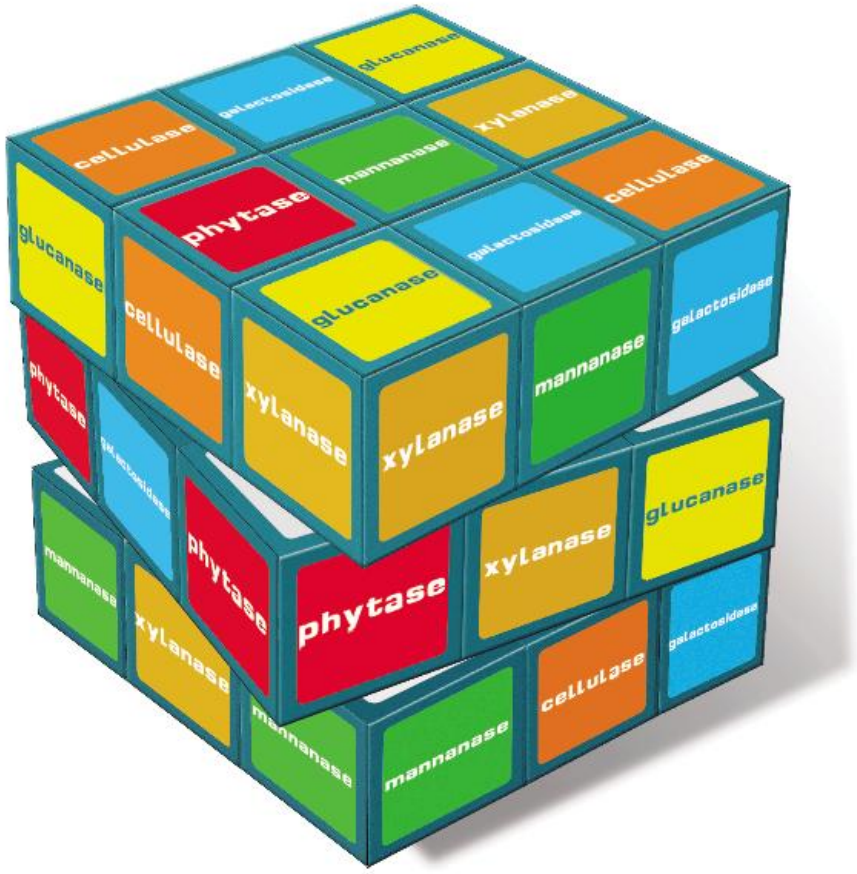

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In the Policy

Key Points of Feed Industry Development in China in the 11th Five-year Plan Period

Boost up the supply capacity of feed raw material and speed up the development of feed industry

Promote the ternary planting system steadily including food crops, cash crops and feed crops and enlarge planting of feed crops to make up the shortage of feed supply in China. Under the condition of protecting and improving grain production capacity, emphasis shall be given to expedite setting up the production base of high-grade feed and improve the quality of feed material and production capacity. Make full use of medium and low yield fields and winter fallow fields to grow the feed crop in order to enlarge cropping area including production of feed corn and soybean and further increase the source of quality protein materials. Make use of by-products of animals to produce feed protein with high quality. Enlarge the subsidy scale of fine corn, in particular subsidize silage corn cropping and expand planting area of silage corn to increase feed production.

Develop and utilize stalks resources and accelerate circular economy development in the countryside

Make full use of feed resources such as stalk and add value to stalk to develop circular economy in the countryside and improve the utilization rate of existing materials. Carry out combination of agriculture and animal husbandry to promote the development of crop-saving animal husbandry. At the same time, feed crops can be saved to relax pressure for the food crop. The concept of "Stalk feeds livestock and manure returns to field" will increase the content of organic matter in the soil, improve soil structure, accelerate the virtuous cycle and sustainable development of agriculture and animal husbandry and reduce environmental pollution.

Boost up feed additive industry and advance the industrial level of feed

Further extend feed additive production field. Emphasis shall be given to the production of amino acid and vitamin to change the passive situation of importing methionine and satisfy demand for amino acid from feed production; accelerate the development and production of new-type feed additive, especially the production of antibiotic replacement in order that feed additive industry of China can be further developed and improved in terms of quantity, quality and variety structure; realize domestic-made of main feed additive gradually to reduce the production cost and improve the competitiveness of home-made products in the international market. Make use of the global market to regulate need for varieties of those which have not been produced domestically or those of the current output fails to meet the demand.

Intensify innovation and promotion of feed science & technology and strengthen stamina of feed industry development

More inputs shall be given to scientific research to continually accelerate the step of rejuvenating feed industry through science and technology; provide sustainable support to feed industry in carrying out "science and technology tackling projects", "863 plan", "973 plan" and " new products promotion plan" to improve technical innovation capacity of feed industry and boost up technical upgrade. Intensify basic research and new & hi-tech research to solve outstanding technical problems in the technical problems in the feed industry development. Set up feed technology advancement operation mechanism involving feed manufacturers to promote enterprises to be the main body of R & D and the input

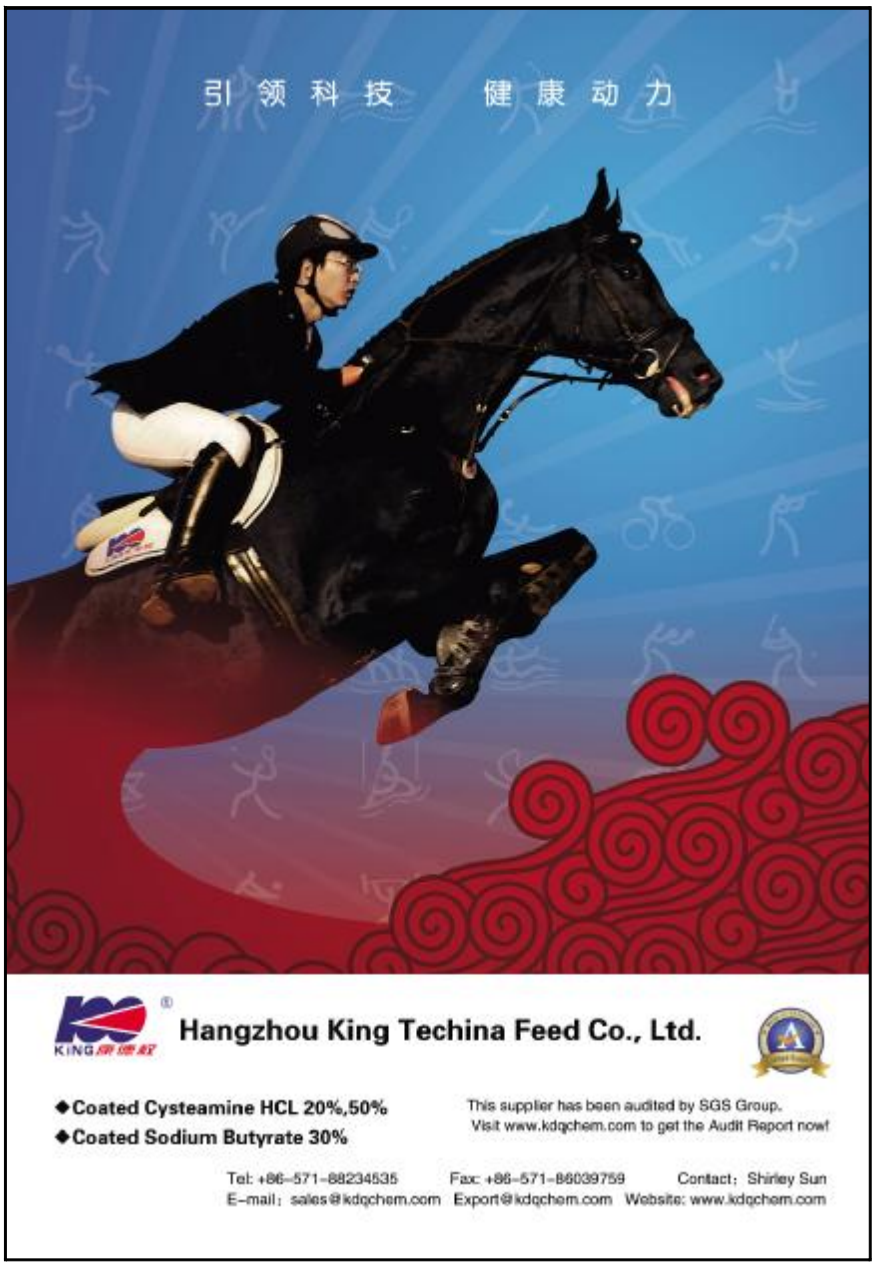
of science and technology. Mobilize input from various sides to share technical fruits by establishing the scientific outcome transforming system, i.e. common technology platforms. Establish combination in various types involving enterprises, colleges, and research institutes to encourage cooperation between them and realize direct connection between scientific research and market to speed up development and transform of science and technology outcomes related to feed.

Gradually set up a nation-wide technical exchange market encouraging the participation of agencies including research institutes, colleges, feed manufacturers and the relevant industry associations to promote new and hi-tech industrialization of feed industry and increase strength of transforming the research outcome to be productivity. Make full use of "green box" policy to strengthen feed science and technology training, demonstration, promotion and consultancy service. Carry out occupational skill testing and training concerning feed industry to improve the professional skill level of grassroot technical staff in the enter prise.

Establish feed quality safety systems and improve feed quality safety level

National feed quality testing center shall take the lead to further strengthen feed testing system construction where the ministerial and provincial level feed testing centers shall act as the backbone. Set up state feed security engineering technology research center and feed security assessment center and improve basic establishment of feed inspection institutions; gradually develop feed inspection institutions to be products quality testing and assessment center, technical consultancy service center and professional training center to improve the overall level of feed inspection system. Set up the feed safety early-warning system and carry out comprehensive research and analysis on various factors in order to give warning notice on feed safety and provide the prevention schemes and measures for government and enterprises as well as basis for government to make strategic decisions and policy adjustments.

Carefully carry out and constantly optimize the production licensing system, gradually implement whole-course monitoring covering production, management, and use of feed and additive and actively promote application of HACCP management system and feed products certification in feed enterprises. Make quality control of feed industry in China conform to the international standard as soon as possible and guarantee feed quality safety and sanitation.



Status of aquaculture and aquaculture feed industry in China

As an important component of the animal husbandry, aquaculture is the key industry in the New Rural Construction of Socialism. Since reform and opening-up, the aquaculture has acquired sustainable and fast development, achieving worldwide attention. The total aquaculture product is more than 4 million tons in 1983, 53 million tons in 2004. It is expected to achieve 55 million tons in 2007,14 times more than that in 1978, accounting 35% of the world total aquaculture product. China offors 75% of the aquaculture products in the world. Since 1990, it has been the leader of the world for 17 consecutive years, and China is the unique country in the world, that the amount of aquaculture products exceeds the amount of capture. The breeding fishery product of 2006 was 33 million tons, up 4.3% in the first three quarters of 2007 over the same period of last year, and the consumption prices rose 4.4% . The top five provinces with high consumer price were Shandong, Guangdong, Fujian, Liaoning and Zhejiang. China has become a veritable powerful country in fishery products breeding. 20 years ago, the price of fish was two times of pork. But the price of pork is two times of fish by now. As the aquaculture developments, the conflict between fishery and marine resources turns to be a big problem. The main fishery products will be supported by breeding in the next 15 years, and its yield will surpass 56.3 million tons, freshwater aquaculture will account for 55% - 65%, and the intensive of freshwater aquaculture be greatly enhanced. The export volume exceeded Thailand in 2002, ranking first in the world. In 2004, the export volume and value were 2.085 million tons and 4.69 billion dollars respectively, accounting for 7% of total exports of agricultural products; the export volume and amount of money were 2.421 million tons and 6.97 billion dollars respectively, accounting for 30% of the total exports of agricultural products, ranking the first in the export of the agricultural product. According to "The Development Outline of China Food and Nutrition" by the Ministry of Agriculture in 2001, per capita share of fishery products should be 44 kilograms in 2001, 57.2 million tons in total; aquaculture production should be 33 million tons. Referring to the production, 20% was from aquaculture feed production and 80% was from rapeseed meal culture and others, which caused massive pollution. Therefore, aquatic feed has a huge development potential. It is expected that aquaculture in feed can reach from 20 percent to 30% in three years through efforts. In 2010, aquatic feed will rise to 15-20 million tons, accounting for 1.5 to 2.5 times of the current level.

Reinforce support standard for brood sow From 50 yuan per head to 100 yuan

"Notice of the General Office of the State Council on Further Support Pig Production to Stabilize the Market Supply" made it clear that government would further strengthen its subsidies to brood sow in 2008 with standard increased from 50 yuan to 100 yuan per head.

The supply and demand of live pigs appeared unbalanced conspicuously in 2007; the price of pork has continued to run high. Therefore, government has promulgated a series of financial support policies to promote the industrial development of live pigs. According to current policy, the state's financial department supplies direct support to all breeders according to the quantity of sows insuranced with the subsidy of 50 yuan per head per year, with the aim of enhancing the ability of breeders' resisting risk of soaring cost.

"Central financial authorities have issued ten financial policies to promote the industrial improvement of live pigs this year", said Shaochun Zhang, Vice Finance Ministor, "and financial policy system has been constructed initially to support the industrial improvement of live pigs".

According to reports, our finance department has expended 14.6 billion RMB to support the live pigs industry, containing subsidizing the brood sow and its insurance system as well as the live pigs seed subsidy. 2.44 billion yuan of 4.848 billion yuan was granted by the central financial authority.

Liu Yonghao

Pork price rising makes people return to old business

Liu Yonghao, who started out selling pig feed and later became one of the mainland's richest, sees recent pork price hikes as a call to go back to his old business.

The price of pork is now 60 percent higher from the same time last year, according to official figures. The price rises since last May have been mainly attributed to a decrease in supply and rising feed costs.

But Liu thinks there is a fundamental cause behind the price hike. "Individual farming households are quickly quitting pig raising but large producers haven't stepped in to fill the breach, hence supply cannot meet demand," says the 56 year-old who started his business as a street vendor in the 1980s.

"As the largest consumer and producer of agricultural products, China needs a bunch of large agricultural companies," said Liu.

His company, New Hope Group, whose interests range from high-tech to chemicals, is on the way to become one of the first and biggest of such giants.

From 2005, through a series of mergers and acquisitions, Liu - a Sichuan native - now controls nearly 10 leading agricultural companies in various regions, including Kinghey, the pork supplier for the Beijing Olympic Games.

Liu is trying to build the whole supply chain of agricultural products from animal feed and pig and poultry raising to meat processing.

Liu and his three brothers were among the earliest and most famous private entrepreneurs back in the 1980s. After raising chicken and quail, they turned to making pig feed as pork production boomed.

The Liu brothers then became the largest animal feed producers in the country, with a market share of nearly 10 percent at the peak.

(Information from www.chinaview.cn)

Ministry of Finance :

China will reinforce support for dairy industry in 2008

Mr. Guimin Lu, deputy director of the Agriculture Department under the Ministry of Finance, was quoted as saying that China had issued six financial and taxation policies to ensure the healthy development of the dairy industry in 2008, and three of them were in the process of implementation with obvious effects. And our government will intensify its support for the dairy industry next year.

According to Mr.Lu, the State Council distributed a document on promoting sustained and healthy development of the dairy industry and issued six financial and taxation support policies. The first keeps allocating subsidies for well-bred cows and expanding the coverage of the subsidies. The second involves establishing subsidy systems for reserve cows and giving the improved variety of reserve cows subsidies in a one-off way. The third contains compensating breeders whose cows are culled due to brucellosis and tuberculosis. The fourth includes the purchasing of animal husbandry and milking equipment will also be subsidized. The fifth, insurance system will be set up, under which the government will grant certain premium subsidies to cow breeders. The sixth, the credit offers to breeders will be improved.

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In-Depth Report

Contemplation of the Acquisition by the Bluestar Group

Editor's note: At the end of last year, Blackstone Group, a leading global alternative asset manager and provider of financial adversary services listed on New York Stock Exchange (NYSE Code: BX) became a shareholder of China National Bluestar (Group) Corporation with 600 million USD. At the beginning of 2008, everything has been settled down for China Bluestar Corporation and Adisseo to set up a new factory by investment in China. What profound effect will it bring to China feed additive industry in the future? Comprehensive analysis and interpretation have been made by this magazine.

Market information

Bluestar hand in hand with Adisseo makes investment in China, echoing to increase demand for the methionine market

China National Bluestar (Group) Corporation ("China Bluestar") is to build a new base for the production of methionine in China, in partnership with its subsidiary company Adisseo. This project is a major focus of Adisseo's development in Asian markets. "The new factory is scheduled to put into production in 2011, when our existing production capacity of European methionine will no longer be able to satisfy global demand alone, especially demand from Asian countries. The growth of methionine demand from Asia-Pacific region will account for more than half of the global growth of the methionine market over the next decade," points out Gé rard Deman, CEO of Adisseo.

The global methionine market should be growing at an average rate of about 4% annually by 2015. This growth will come with the increase in the world's population which will need, according to Food and Agriculture Organization of the United Nations (FAOUN), a global production of almost 300 million tons of meat by 2015. Poultry should account for half of the growth of total meat production, while 40% of poultry meat production should take place in Asia.

Initially, the new factory will have an annual capacity of 70,000 tons. The designed total capacity can be doubled over the initial point. This new site of methionine factories will be integrated into a petrochemical industrial zone owned by China Bluestar and all the primary raw materials (propylene, methanol, sulphur, etc.)can be provided locally.

The new factory is located in the outskirts of Tianjin, a major port in northern China with geographical convenience for logistics and transportation in Asia. The new factory possesses not only Adisseo's up-to-date technology in the field of methionine production, but also China Bluestar's advanced industrial experience.

This project further confirms the significance of China Bluestar's involvement in animal feed production, that is to satisfy demand for feed in China and Asian region with competitive price and superior geographical position.

Background Information

Why did Bluestar acquire Adisseo?

The significance of the aquization by Bluestar Group

China National Bluestar (Group) Corporation is a large-scale state-owned enterprise, which is under the management of ChemChina Group Corporation. Headquartered in Beijing, Bluestar focuses on the production of special chemical products

and new materials. With a total asset of over 30 billion yuan, and over 30 billion yuan sales revenue, Bluestar takes a holding share of 3 public listed companies including "Bluestar Cleaning Co.", "Bluestar New Materials Co.", and "Shenyang Chemical Co." and has 25 plants and 4 scientific research institutes nationwide , and 15 plants, 7 R&D and technical service institutions overseas. A marketing network has extended over more than 140 countries worldwide.

On Jan. 17, 2006, China Bluestar acquired French Adisseo Group as a wholly owned subsidiary at the price of 400 million Euros (about 4 billion yuan). This acquisition filled blank in methionine production and technology and reversed the passive situation of relying on methionine import, which will have far-reaching impact on China methionine market. Subsequently, Bluestar will make full use of methionine technology of Adisseo and improve the domestic methionine project and introduce liquid methionine technology to set up new production facilities in China. Bluestar will gradually establish liquid methionine production capacity of 200,000 tons per year in China and promote all-round localization in terms of technology, production, and distribution. Domestic production of feed methionine will achieve a breakthrough at hand. In addition, Bluestar is in the top 3 listed in the global market share of Vitamin A and E and top 5 of bio-enzyme output. Strong support was provided by National Development Bank together with a majority of funds for acquisition.

French Adisseo Group is the largest supplier specializing in animal nutritional additives in the world, in possession of many patent technologies. The marketing network is extended to 140 counties and regions. In 2004, Adisseo became the second largest methionine producer in the world, accounting for 29% of the global market share. Five plants under Adisseo have a real value of 12 billion yuan. Sales income exceeded 5 billion yuan in 2005. With the most advanced technology of methionine production, Adisseo is the only major methionine producer of both liquid and solid forms globally. Global methionine output was 260,000 tons in 1993 and increased to 300,000 tons in 1996, 450,000 tons in 1999, 550,000 tons in 2002 and 600,000 tons in 2006, twice as much as that of 10 years ago. At present annual demand for feed methionine is estimated to grow by 5% on average in the global market and 7%-8% in the domestic market. Driven by such demand, methionine producers around the world will exert efforts to increase production capacity and output, with global total production capacity reaching about 1.1 million tons per year. It is obvious that supply of methionine exceeds demand in the global market. Under the condition of imbalance of overall demand and supply, why did Bluestar acquire Adisseo?

In the 1980s, China introduced methionine production technology from Rhdne-poulenc S.A. to set up a methionine production line with an annual production capacity of 10,000 tons in Tianjin. This production line had been closed for many years due to various reasons. Methionine production in China is still a blank page. In the past, owing to high cost of production, methionine has been basically used for medical raw material. Domestic feed industry has to rely on import 100,000 tons of methionine every year to meet demand in the market. China imported over 85,800 tons of methionine in 2004, a 17.77% increase from 2003; 66,700 tons imported in 2005, 22.3% lower than that of previous year. The acquisition of Adisseo by Bluestar can help to reverse the tide of relying on long-term methionine import. Moreover, external resources can be used to fill in the gap in this field of China chemical industry.

Lu Xiaobao, Vice General Manager of China Bluestar pointed out: "The acquisition of Adisseo by Bluestar is different from previous acquisition of French companies by Chinese enterprise. Previous acts aimed to expand the market, while our acquisition is to meet domestic demand in the market. This acquisition enables us to intensify our technical strength." In addition, methionine is widely used in China and has a huge market. It is expected that the domestic demand for methionine will be increased by 10%-15% annually.

Moreover, China Bluestar is confident that Adisseo will be more competitive than any other foreign enterprises through localized innovation. Bluestar has always followed a principle that cooperation comes earlier than joint investment, acquisition comes late. There are extremely strict requirements on methionine production in terms of safety specification, management procedure and production experience. Bluestar initiated a plan to introduce production technology and cooperation in 2002 and got in touch with Adisseo Group in 2003. Bluestar aimed to introduce advanced technology for the innovation of methionine facilities with annual production capacity of 10,000 tons which had stopped production for many years. As this technology was monopolized by a few companies in the world, Adisseo Group has refused to transfer this technology. With a history of 60 years in the production and management, Adisseo Company has established a complete management system and mature operation mechanism in various aspects concerning production, safety, R&D and marketing. Therefore, In the early days of turning over Adisseo, Bluestar set to work focusing on keeping existing managerial staff and organizational structure working steadily and soundly in order to guarantee production and operation in a steady running condition.

In accordance with localization principles, it is clarified in the acquisition agreement that all the staff shall remain unchanged in order to release Adisseo employees from worries about future. Priority has been given to budget management, which fully arouses enthusiasm of existing managerial staff and sets the proper business target to ensure income from investors. Bluestar gained strength of the group in methionine production accordingly. This acquisition of Adisseo by Bluestar aims to meet increasing demand for methionine in the domestic feed market. Greater cooperation will be achieved in the integration of China Bluestar and Adisseo.

Behind News

Analysis report on methionine market in China in 2007 and prospect in 2008

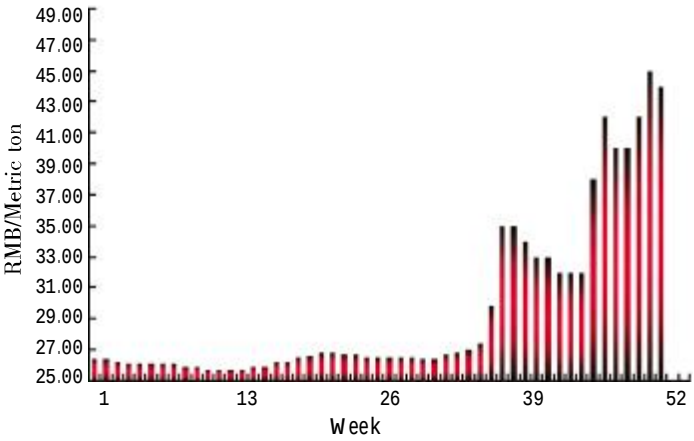
2007-a landmark year in the methionine market of China

The market price of methionine has hit a new record high, nearly one time higher than that of 2006. The pressure is on for pre-mix feed enterprises in China. Fast-growing demand for poultry feed resulted in a rapid increase of methionine demand in the market of China all through the year. Total methionine demand was around 100,000 tons in China in 2006 (including solid and liquid methionine and calcium salt).In 2007, the total methionine demand was estimated between 115,000 and 118,000 tons in China, an increase of 15% -18%. Sudden and sharp rises of crude oil prices in the global market caused a jump of methionine raw material price.

According to customs statistics of (solid) methionine in 2007, China has imported about 80,610 tons of solid methionine in the first 10 months of 2007.

Review and Analysis of Market Trend in 2007

Week 1-33: between January and the first half of August of 2007, there were no great changes in the supply and demand in the methionine market in China.



Weekly Chart on Average Price Trend of Methionine Market in China in 2007

Week 34-43: Since mid August, French workers on strike caused serious shortages in the supply of methionine from Adisseo. Parallel to this, there was an obvious increase in demand for poultry feed methionine in the domestic market. Degussa Company has adjusted their sales strategies with the intention of controlling the market supply. All these finally resulted in the lack of methionine supply in the market and a sharp price rise as well.

Week 44-47: some suppliers have already fulfilled the sales tasks of the year ahead of schedule in November. In the wake of sudden and sharp price rises of crude oil, some suppliers, such as Novus reduced supply of methionine to a great extent. And Adisseo played its old trick once again. The price of raw materials rose suddenly and sharply in November. Sales increased tremendously in the domestic feed market in November, which overdrew half sale of December. In this background, domestic methionine market experienced another price rise.

Week 48 till now: from the end of November to the beginning of December, several main suppliers were much more reluctant to release goods because they were unwilling to increase sales for next year. And it was peak time when suppliers in Europe placed quarterly orders. The China market was lacking in supplies once again and price went up rapidly. However, due to the overall decrease of the animal and poultry feed sales in December in the market of

China, in addition to expectation of large goods release in January, price rises in this round was limited to some extent. Price recovery was seen in the mid and late of December.

Interpretation of Sales Strategy of Methionine Suppliers in 2007

Degussa

Degussa changed its Regional President of the Greater China market and made obvious adjustments to its sales strategy. Priority has been given to end users in terms of supply and price. More attention has been paid to end users instead of dealers. Due to big changes in the market in the second half of the year, direct end users enjoyed quite a lot benefits. Price rise has been realized by controlling the release of goods and promoting lack of goods supply in stead of direct raising price. Though dealers got fewer goods than before, they obtained a better profit. The strategies of Degussa is workable and effective, and will have far-reaching impact on the methionine market of China in the future.

Adisseo

China Bluestar acquired Adisseo in 2006. Unsettled issues led to a long-playing nationwide strike in France in 2007. Adisseo used this as an excuse to prolong supply to the China market, which became the cause of methionine price rise in China in 2007.

Novus

Novus laid marketing emphasis on calcium salt instead of liquid methionine in 2007; Because other companies can produce methionine by themselves, the sudden and sharp rise of crude oil price did not result in price jump of their methionine price. Novus has to outsource chemical intermediate, so Novus had set a higher price than that of other companies due to a higher cost of liquid methionine and calcium salt.

Prospect of Methionine Market in China in 2008

The price trend of methionine in the China market mainly rests with the following aspects in 2008.

Sales strategies of major suppliers have a great effect on the market, especially Adisseo's "playing strike trick as potluck" and Degussa's "priority to end users".

Price trends of global crude oil in 2008 and crude oil prices in 2007 that rose to $100 a barrel brought along price rises of many downstream products of crude oil in the global market. Chemical intermediate, one of crude oil downstream products is the main raw material for methionine production.

Demand condition of methionine in China in 2008. At present, methionine is mainly used in poultry feed. The amount of poultry on hand and demand increased greatly in 2007. Poultry feed sales of New Hope Group and Liuhe Group in 2007 doubled compared with that of 2006. Methionine demand increased rapidly in the market of China, while egg price initiated to linger around a lower level in the fourth quarter. Many enterprises washed out egg-laying chicken ahead of a schedule in December, sales of baby chicks of the breed chicken farm were on the decline. Some people forecast that the amount of egg-laying chickens will tend to decrease in the first quarter of 2008. And it is not rather optimistic for meat chicken sales. According to the view of chinafeedonline.com, if no big epidemic situation happens, sales of poultry will be still on growing trend in 2008.

Progress on setting up new factory by Adisseo in China. It is said that Adisseo has chosen several sites in China. However progress is sluggish. It seems less possible for a factory to be up runing in 2008. However, the operation of the new factory, once started will have a far-reaching impact on methionine market in China.

For the above reasons, methionine price in the market of China will vary between 30 and 50 yuan per kg in 2008. Accurate estimation can only be made in consideration of the above four aspects.

Magazine Viewpoint

Acquisition of Adisseo by China Bluestar is a win-win act

In China Bluestar's own words, acquisition of Adisseo is a land-mark transnational acquisition. In Sino-French economy and trade exchange, the biggest investment in France, exceeding total investments in the years before. This sets a record of overseas acquisition in the shortest time (6 months) by Chinese enterprise and fills the space in the methionine production technology of China.

The Principal of China Bluestar expresses that the acquisition of Adisseo is a necessary step taken catering to the national economic development of China. This acquisition enables China Bluestar to have production technology, device, R&D team, and global sales network related to methionine. China Bluestar strides forward to become the second biggest producer of methionine in the world, and creates a China brand for the first time in this field.

China Bluestar, together with Adisseo will generate a huge cooperative effect. Gerard Deman, CEO of Adisseo expressed, "acquisition is a win-win action", "China enterprise is a good partner". China Bluestar has established solid foundations in the chemical industry and is in possession of the well-established marketing network and distribution channel. Adisseo group has advantages in the global market in terms of excellent management, advanced technology, and quality products, which integrates with the China market and domestic marketing network of Bluestar, can further improve profit and competitiveness in the global market of Adisseo Group and accelerate steps in the international development for China Bluestar.

It is a rare case in overseas acquisition history that a large China state-owned enterprise acquires a leading European enterprise with an operation history of over 60 years. The successful acquisition has provided China Bluestar with a positive experience in implementing "going global" policy and encourages other enterprises in China to develop in the overseas market. It is an undoubly shortcut in the international development for domestic enterprises to acquire brand enterprises overseas and make use of their foreign counterparts' existing technology and management experience when they fail to make breakthrough in some key technologies domestically. In recent years, feed additive enterprises have sprung up unceasingly. This promotes industry development and helps to achieve a prosperous market on one hand, and causes complicated situation in the industry with less effective use of resources on the other hand. In such conditions, acquisition is a most effective measure to solve various problems and promote industrial development. Acquisition of Adisseo by China Bluestar generated a great disturbance in the feed additive field, arousing the wide concern from relative aspects. However, acquisition can not be a common phenomenon in the field in short time. This is because most feed additive enterprises are still at developing stage. Moreover, many middle and small-size feed additive enterprises would not like to retreat from the market competition to reserve dignity and strength. However in the field of amino acid, vitamin, and choline chloride, it is possibile to have other acquisition and reshuffle cases. In addition, acquisitions can bring along a sense of pressure to enterprises and new thoughts for business management as well.

Shenyang Wellhope Bio-tech Co.,Ltd.

Shenyang Wellhope Bio-tech Co., Ltd. is always dedicated itself in promotion of the animal health care industry development in China by advanced technologies, perfect services and excellent products. It is making great efforts to become a best company in the biopharmaceutical industry and bring benefits to the whole human society.

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Analysis Report on Lysine Market in China in 2007

The fluctuating trend of the feed ingredient market

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Analysis on supply and demand of lysine market in China

Chinese enterprises produced in total about 360,000 tonnes of lysine in 2007 and imported about 16,000 tonnes. Total export of the year was about 138,000 tonnes. Total domestic supply was about 240,000 tons and demand was 210,000 tonnes. There were 30,000 tonnes of lysine in market inventory, and supply exceeded demand. Total export of 2007 gained an increase of nearly 15% over 2006 and import decreased of 36% over the same period of last year.

Lysine supply exceeded demand in the market of China in 2007. As a result of the elimination and merging of lysine industry in 2006 enterprises numbers in the market reduced significantly. With active efforts in opening up the export market by Global Bio-Chem and the Gold Corn Companies, the price of lysine in domestic market in 2007 was obviously higher than that of 2006. Lysine enterprises have gained more profit in 2007 than that of 2006.

Status of Lysine enterprises in China (unit in million metric tonnes)

Table 1. Recovery of ractopamine from the spiked feed samples determined by ELISA and HPLC-MS

Item	Lysine Item	2007 production expected	2007 production estimated	compared with that of 06
Global Bio-Chem	65%	22	17.5	Production expanding
	98.5%	12	8.5	Normal production
Gold Corn	65%	4	0.2	Produced in November
	98.5%	4	2.1	Normal production
CJ Liaocheng	65%	6	3.0	Productions decreased slightly
	98.5%	4	0.5	Being Produced in October
Ningxia E'ppens	65%	4	Under construction	Being Produced in 2008
	98.5%	3.2	2.5	Production increased slightly
BBCA Biochemical	98.5%	8	2.5	Unsteady production
Chuanhua Ajinomoto	98.5%	3.8.	3.3	Production expanding
Chia Tai Ling Hua	98.5%	4	2.0	Shaky production
Degussa Cathy	65%	4	Under construction	Being Produced in 2008
Heilongjiang Chengfu Group	65%	5	unproduced	Being Produced in 2008
total	Equivalent to 98.5% lysine	68	36	

The number of lysine producers decreased obviously in 2007 as a result of merging of lysine industry in 2006. Profit of the whole industry has increased to some extent. Some enterprises have extended production capacity including: Global Bio-Chem Company has increased the production capacity of 65% lysine; the Gold Corn Company and CJ Company have put into production of 65% lysine and 98.5% lysine respectively; Ningxia E'ppens Company and Degussa Cathay Company will go into production of 65% lysine respectively in 2008; Heilongjiang Chengfu Company has intention to put into production of 65% lysine.

The statistics of export lysine from Chinese customs in 2007 (Unit in metric tonnes)

Figures in the Table 2 are obtained from customs export statistics every month,

Table 2. The statistics of export lysine from Chinese customs in 2007 (Unit in metric tonnes)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Production capacity	18016	12819	14190	15171	11094	15229	13632	14727	12682	11200	13028

which is a sum of 98.5% lysine and 65% lysine exports for the sake of statistics analysis. The total lysine export was 127,000 tonnes in the first 11 months of 2007 if all converted into 98.5% lysine. Total export was forecasted to realize 138,000 tonnes; total export of lysine in 2006 was about 120,000 tonnes. It is estimated that the overall export of 2007 will be increased by 15% over the previous year.

The statistics of import lysine from Chinese customs in 2007 (Unit in metric tonnes)

China has imported 14,595 tonnes of lysine in the first 11 months of 2007. It is

Table 3. The statistics of import lysine from Chinese customs in 2007 (Unit in metric tonnes)

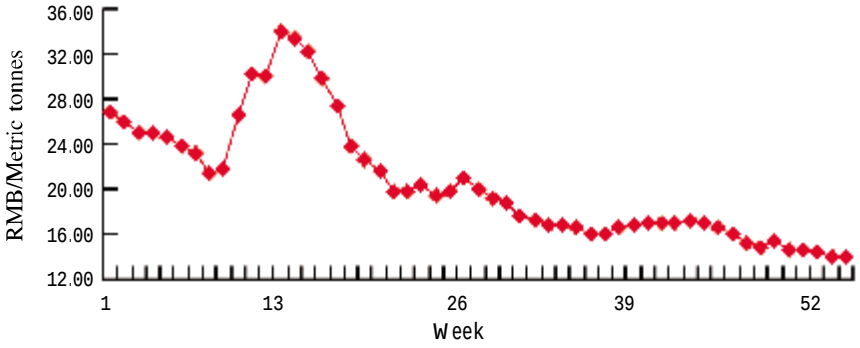
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Production capacity	1208	2140	2442	3016	833	1052	899	505	652	344	1504

forecasted that total import of lysine will reach 16,000 tonnes of the year.

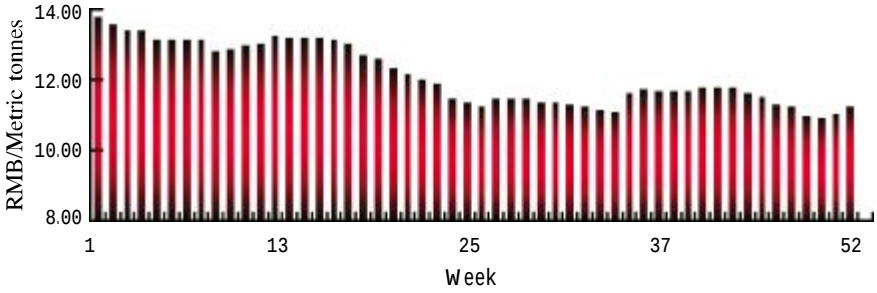
Lysine demand in 2007

Feed statistics in 2007 from China Feed Industry Association has not come out yet. We, Chinafeedonline.com, have obtained a general judgment from the survey of feed raw material suppliers, dealers, and feed enterprises. Pig sales in 2007 decreased to some extent compared with that of 2006; bird feed sales increased obviously, around 15%; the increase of bird feed had basically made up the drop of pig feed sales. Total sales of animal and poultry feed of 2007 was kept to the same level as the previous year; while lysine demand of 2007 were kept to the same level or declined slightly over 2006, which was still around 210,000 tonnes (in terms of 98.5% lysine).

Characteristics analysis on China's lysine market in 2007



The weekly trend graph of China's lysine average price in 2004

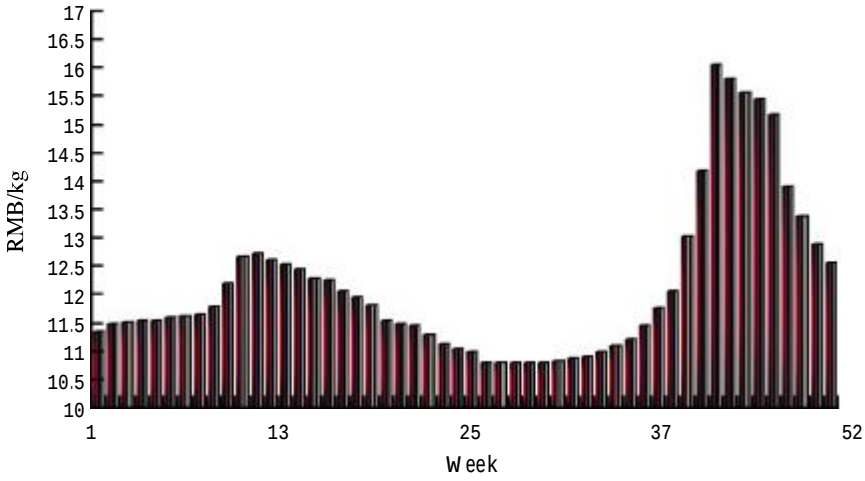


The weekly trend graph of China's lysine average price in 2005

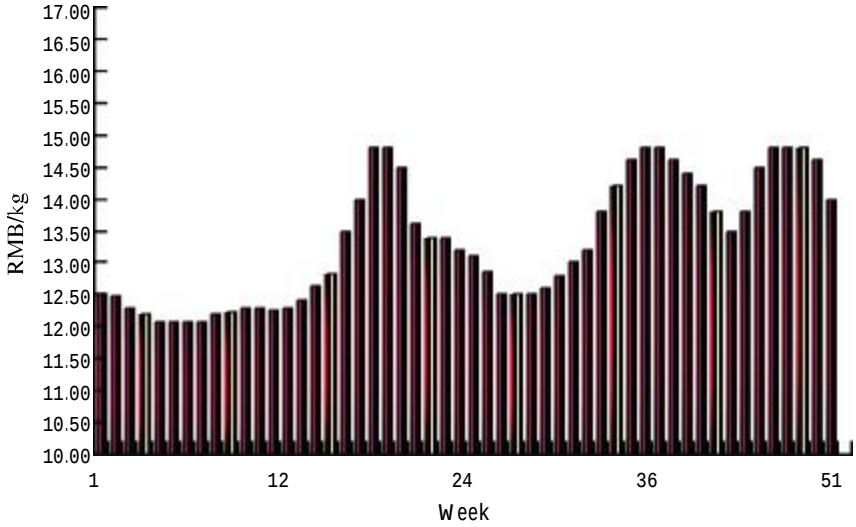
The Year of 2004 was the end to sudden huge profits in lysine industry. Market competition was intensified with more and more lysine enterprises putting into production. The price of lysine has not recovered from this setback. In the last three years, i.e. 2005, 2006, 2007, lysine price has been kept at a low level. In the harsh process of elimination and merging in 2005 and 2006 in particular, some enterprises were squeezed out of market. Only seven enterprises survived in 2007 including the Global Bio-Chem, the Gold Corn, the CJ (Liaocheng), Chia Tai Ling Hua, Fengyuan, Yipin and Chuanhua Ajinomoto. Profit of lysine producers has been improved. The price of lysine in 2007 was about 13 yuan per kg on average, greatly increased than that of 2005 and 2006.

The main characteristics of lysine price change in 2007

Price varied slightly: lysine price in 2007 varied between 12.0 and 14.5 yuan per kg. There was only 2.5 yuan per kg distance between lower limit and upper limit; price difference was about 5.0 yuan per kg in 2006; price difference in 2003 and 2004 varied as high as 20 yuan to 30 yuan per kg. Due to the slight difference of the price, in-between traders saw a shrinking profit. Enterprises and those engaged in lysine trade reduced sharply. Many trade enterprises retreated from this industry or adjust-



The week trend graph of China's lysine average price in 2006



The week trend graph of China's lysine average price in 2007

ed business operation direction. This trend continues for the moment.

Fluctuation cycle shortened: lysine price experienced ups and downs in 2007 like a switchback. It is unprecedented for such ups and downs to come out three or four times in a year. Reasons for this phenomenon vary in many aspects. It is only for reference that Chinafeedonline.com has made deep-seated analysis on reason as follows.

A continuing increase of lysine export and actively exploiting in overseas market by domestic enterprises resulted in a declining or short of supply of certain brands in China, which provided a clue for price-rise of lysine. It was so apparent in the case of the Global Bio-Chem Company.

Lysine enterprises have paid attention to mutual relations between each other and gave prominence to cooperation. Lysine supply exceeded demand in 2007 and only seven enterprises survived. The increasing cost due to the corn price rise and inflation promoted mutual cooperation between lysine production enterprises in addition to the competition so that bottom line price of lysine had been effectively under control within a reasonable scale in 2007.

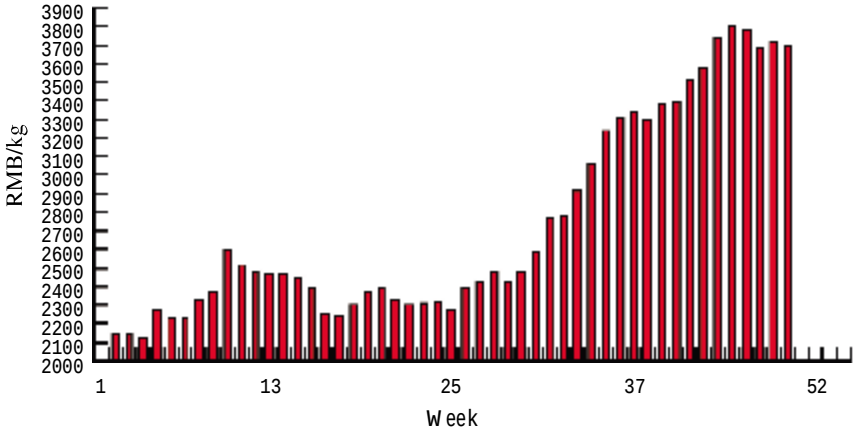
Linkage between lysine and soybean meal price trends has been intensified. Inflation problems were outstanding in the year of 2007. Prices increased for almost all the feed raw materials. Price records of many raw materials had been refreshed again and again. Especially in the second half of the year, the price of soybean meal had been kept in the rising trend in the domestic market. This brought along more difficulties to purchase of feed enterprise, while the sudden jump of soybean meal price provided opportunities for lysine enterprise to raise prices and get rid of difficulties. Chinese lysine enterprises demonstrated wisdom in marketing.

Prospect of lysine market in China in 2008

Lysine production capacity will continue to expand domestically in 2008, 65% lysine in particular due to a batch of new enterprises putting into production (such as the Gold Corn, E'ppens, Degussa and Heilongjiang Chengfu). Great changes will take place in 65% lysine market that used to be led by Global Bio-Chem Company. 65% lysine production enterprises will compete with each other for market share, price trend of 98.5% lysine will be affected as a result of this. In view of this, lysine price in 2008 is far from optimistic compared with that of 2007. However there are some favorable points:

China lysine enterprise will continue to expand export. The Gold Corn Company had achieved breakthrough in 2007 with an average monthly export of about 760 tonnes. Export-oriented strategy by China lysine enterprises will continue to help digest surplus production capacity in domestic market and relax the pressure of oversupply.

Pork price soared to new record in 2007, which aroused high attention on the



The weekly trend graph of the average price of China's coastal soybean cake(in stock) in 2007

development of pig breeding industry from Chinese government. The government continues to strengthen the support to pig breeding industry and increase subsidy to pig farmers. Sow inventory had been recovered steadily in 2007. Therefore the development of pig breeding industry of China in 2008 is worth expecting, which will stimulate the consumption of lysine.

Economic Review

A Comprehensive Analysis of 2007 Animal Feed Economic Situation

In the acceleration of large-scale breeding the product structure has changed

Mr Jin Weidong, the core initiator and the president of the Wellhope Group, got a master degree in Animal Physiology & Biochemistry of Shenyang Agricultural University. He worked as a teacher after graduation. In 1991, he worked as a salesman at the Continental Grain Company, and soon in less than three years, he was promoted as the president assistant, the highest ranking official of this company on Chinese mainland. In 1995, he established the Wellhope Group together with five of his counterparts who occupied important positions at the foreign enterprises as well.

The Wellhope Group holds 43 subsidiaries with 4,000 employees from home and abroad. The products cover 25 provinces and regions. The group has established the Joint Ventures in DPRK and Nepel. In 2006 a joint venture with De Heus Company, a Holland feed company with a hundred year of history, was established. The Liaoning Wellhope De Heus Company is National Agricultural Industrialization Key Leading Enterprise, Vice -president Enterprise of China Feed Industry Association. The trademark of Wellhope is authorized as the famous trademark in China. The sales revenue for 2007 exceeded 3 billion RMB. The company ranks the first in Liaoning Province and fifth among the feed groups in China.

Mr Jin Weidong holds a series of social titles, such as the vice president of China Feed Industry Association, the judge and the instructor for MBA program in Tsing Hua University. He has been a visiting professor for many universities, such as the Ocean University of China, Wuhan University of Technology, the Northeast Agriculture University, etc. In 2008, he was elected as the standing committee of Liaoning CPPCC, the representative to the National People's Congress of Shenyang City.

2007 was a year of significant growth for the animal feed market in China. Large enterprises continued to expand, and the creation of new and extensive business opportunities increased significantly. The deadly blue ears pig disease inevitably affected pig farming, and this pushed the industry to expand the scope of farming. Family-owned farms as well as small & medium-sized farms have altered their practices using synthetic feed due to the high price of raw materials in addition to the unstable quality of homemade feed. The high price of pork also boosted the market for poultry consumption, and this increased activity allowed the shortening of the poultry production cycle, which in turn led to the further development of poultry feed. The price of live pigs was high, even with a number of national policies that supported the development of live pigs; the development of aquaculture was stable and steady, and the restoration of exports has stimulated production. The fourth quarter performance reflected the resumption of pig production, and sales were expected to continue to rise; the sales of chicken feed were expected to decline, but due to the large scale of pig breeding, the demand for animal feed should not decline overall. The sales benefits of hen feed were expected to decline and accelerate towards obsolescence, thus the demand fell. However, the hen feed market in the first three quarters was quite good. The above factors led to the growth of the total market for animal feed.

Poultry breeding is a lucrative business, with poultry feed showing strong growth

In this past year, the strong ascension of the poultry feed market is due to the following four reasons:

1) In the wake of the stabilization of the bird flu epidemic, poultry breeding has significantly improved over the previous year.

2) Due to high prices of pork and to the known pig epidemic, consumers have shifted consumption to other types of livestock & poultry, and aquatic products, and this led to rising consumption prices; this effect was especially evident this past year at the end of May, and led to a large in-

crease of poultry supplements.

3) Due to the rise in prices of corn, soybean meal and other staple raw materials, many family farms have switched to buying compound feed and concentrated feed, instead of using homemade feed. This has increased the opportunities for poultry feed.

4) The export of frozen chicken meat was launched in June of this year, in response to strong domestic consumption. It has brought more good opportunities for chicken and duck production.

In short, this year's poultry feed market performance was positively affected by the above factors. The prices of eggs and poultry meat were significantly higher than that of the same period last year. This has stimulated farmers' enthusiasm; many large-scale poultry farms have been supplementing their businesses so that the demand of poultry feed substantially increased. In poultry feed, chicken feed as a whole has exhibited strong growth, but hen feed had only a small increase. Due to the Bird Flu of 2006, hen breeding has been steadily declining in certain regions.

Aquaculture enterprises accelerated their expansion such that the aquatic feed market has had steady growth

This year, the aquaculture industry was influenced by the "green" measures of the United States, Japan and the European Union; exports were blocked, but the increase of domestic consumption of aquatic products helped ensure the steady growth of aquatic feed, despite the export limitations during the aquaculture product market expansion. In summary, the Hengxing Group set up four new plants (three of them in Guangdong Province, in Zhaoqing, Huadu, Jiangmen respectively, and the forth in Hainan), and invested in a new plant (Yancheng, Jiangsu). The Haid Group has three new factories currently under construction (Taishan, Guangdong; Jingzhou, Hubei; Shaoxing, Zhejiang), invested in a new plant (Lianjiang, Guangdong), and acquired an existing plant (Fanling, Guangdong). Guangdong Yuehai Feed Group had sales of 180,000 tons of aquatic feed from January through November of this year; production and sales volume increased 25% in comparison with the same period last year. Its growth was primarily attributed to increased capacity of their production line, as well as the sustained capacity and scale expansion of the aquaculture industry in recent years. Guangxi Hong Brand Feed Co., Ltd. set up a new aquatic feed production line, enabling the aquatic feed production capacity to reach 14,000 tons, compared to 4,300 tons last year, equal to an increase by a factor of 2.25. In addition, in this past November an aquatic feed enterprise founded in Beihai City reached a new production capacity of 60,000 tons and was adding to production facilities; at the same time in Qinzhou City, another aquatic feed enterprise was founded and began construction. In particular, last year's high level of efficiency of Penaeus Vannamei in Zhejiang Province not only greatly benefited the company but also promoted aquaculture feed in a new round of expansion. According to statistics, Zhejiang Province has more than 130 aquatic feed plants; it was expected to reach 937,100 tons this year, with the growth of 32.2% over that of last year.

The price of beef has been stable and cow (cud) feed has maintained upward growth

The prices of beef and mutton are relatively stable, with only minor fluctuations in prices and demand for feed. Due to low milk prices within the livestock industry, in addition to high prices of raw materials used to make cow feed and dairy farmers buying expensive livestock early, most farmers operate in the red. These liabilities are often referred to as "cattle slavery". Many cow farmers have filed numerous complaints about a certain of enterprises' monopoly behavior regarding capital operation. Slaughtering the dairy cow is very prominent in some regions, and this restricts the cud feed consumption to some degree. However, due to the steady growth of beef, and with the encouragement from the mostly non-dairy cattle breeding industry, cud feed has maintained a momentum of positive growth.

Currently, special-animal feed is unique in the diversification of farming structure

As the preferential policies of special

High prices of raw material have become the primary factor that impacts the development of the feed industry.

animal breeding in some regions bolstered industry morale, this led to an increase in the production of special-animal feed. Parts of the fox and marten have turned into a market for a large-scale breeding, to the point of producing a surplus.

In the acceleration of large-scale breeding, the product structure has changed

Livestock models turn from family farms to intensive, large-scale breeding farms. The consumers with feed enterprises have changed to large-scale farms; sales volumes have increased steadily, yet the number of dealers decreased by 20%. In this new product structure, concentrated feed sales to family farms declined in the first half of the year with a declining rate of 17% in some areas. Sales in compound feed were growing while sales for concentrate feed were experiencing negative growth, leading to a change in product structure.

Increasing operating costs accelerate industrial restructuring

In 2007, some important raw feed material prices increased on an average of more than 30%; on one hand, bulk raw materials were in short supply and the prices continued to rise, and on the other hand some raw materials relied largely on imports, such as soybean meal, fish meal, DL-Met and vitamins. The international market dictated domestic supplies and market prices, which was a crucial factor that impacted current and future feed industry and husbandry conditions. Furthermore considering the costs of labor, electricity, coal, and increasing logistics and bank loans, these factors led to a substantial increase in feed costs.

According to an investigation in Guangdong Province, porters' expenses have increased by 50%. In one feed enterprise with a capacity of 250,000 tons, workers' salary have increased by over 100 million RMB, while heavy oil and diesel price rising were also adding cost over 100 million. The same phenomenon was also found in Hunan Province with production line workers' salaries increasing as much as 20%.

In order to stabilize the volume of original customers in the livestock breeding market, feed producers have allowed the rate of increase in feed prices to be substantially slower than the rate of increase in raw material prices for producing feed. Many enterprises went so far as to lose profit, hence enterprises overall have experienced a significant decline in profit margins. In this current situation, without financial benefits on raw materials and capital, small feed production factories found it difficult to survive and had to withdraw from the market. Hence, large enterprises that have the advantages of financial support, services, personnel training and strong brands are sharing the market. This led to a major polarization between large and small enterprises; small enterprises experienced an unprecedented high rate of failure, and new large-scale enterprises continued to merge and take over or lease smaller enterprises, as well as continue their expansion in production capacity.

Roughage Resources and Their Potential Use for Ruminant in China

Liu Jianxin, Wang Jiakun

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In China, there are about 66 million tonnes of grasses, 767 million tonnes of crop residues, 500 million tonnes of foliage resource as well as abundant bagasse and residues from beet, fruit, tea, bamboo shoot, and mulberry leaves, etc. Crop residues, with their total output, have been paid much attention to developing Chinese livestock production. About 200 million tonnes of crop residues were utilized in 2006, and were almost double that in 1990. Ensiling was more accepted than ammonia treatment. Silage additives have been accepted in China, ammonium bicarbonate becomes the preference in southern provinces as ammonia source to upgrade crop residues, and urea plus calcium hydroxide is widely used in northern provinces. With the development of ensilage and ammonia treatment of crop residues, more attention has been focused on improving the utilization efficiency. Supplementation, palletized total mixed ration, and varietal selection have great potential and have been put in practice in animal production system in China.

1.Introduction

It is a fact that China has to feed its huge population, equivalent to 22% of the world total, with only 7% of global farmland. How to feed over 1,300 million people is the central issue. Since the competition for grain between people and livestock, lack of feed grain is one of the main choke points in livestock production in China. However, the annual growth rates in total output of meat, milk and eggs from 1996 to

2005 were, on average, 6.0, 16.3 and 4.3 %, respectively (National Bureau of Statistics of China, 2006) (Figure 1), though the annual growth rate in grain yield was -0.5% during this period.

How can the stable growth of animal production be persisted in China? In China, over 65% of meat output came from pork production, while in the last decade, the increasing rate of mutton (10.2%) and beef output (8.0%) was higher than that of pork production (5.3%), respectively. It is the grain-saving strategy for the animal agriculture and crop residues-based animal production system that save large amounts of feed grain and change the structure of livestock production.

2. Roughage resources in China

2.1 Low yield of grass with abundant

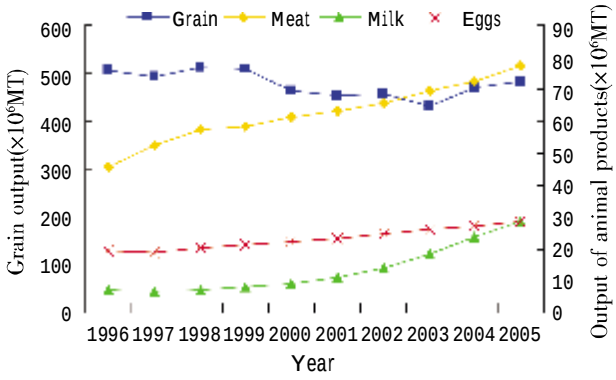

Figure 1. Output of grain and livestock products in China during 1996-2005 (China Statistical Yearbook, 2006)

Liu Jianxin, Professor of Zhejiang University, Tutor of postgradute of candidates, Associate Dean of College of the Animal Sciences, Director of the Institute of Dairy Research.

Table 1. The utilization of grassland for grasses production in China from 1998 to 2003

Year	Used grassland ($\times 10^6$ha)	Newly increased grassland ($\times 10^6$ha)		Output of grass ($\times 10^6$MT)
		Artificial pastures	Meliorated grassland	
1998	168.78	1.344	0.946	45.98
1999	203.01	1.480	1.312	40.35
2000	225.52	2.596	1.516	59.31
2001	203.46	2.617	1.280	47.91
2002	292.34	3.955	4.279	65.75
2003	284.11	3.459	2.115	82.36
Annual growth rate (%)	11.0	20.8	17.4	12.4

Source: China Stock Raising Yearbook (1999-2004)

species

According to an investigation, there were nearly 4,300 species of edible grasses in China, which belong to 915 genus and 184 families. In the edible grasses, 972 species were gramineous and 646 species were leguminous, others were family Sedge, Chenopodium, Composite, etc. (Ma, 2000). There were 397 species of grasses and plants used as feedstuff, in which cultivated and wild grasses account for 80% (Zhang, 2000).

China has 400 million hectares of natural grassland, in which the arable area is 313 million hectares, almost three times the total farming area of the country. For several decades, exploitative use (mainly overgrazing and excessive conversion of natural pasture to arable land) has caused serious deterioration in grassland. Consequently, forage output has declined by 30% -50% compared to that in the 1950s. During recent years, the Chinese government has paid much attention to the pasture problem through strengthening protective measures, reducing overgrazing and developing artificial pastures. From 1998 to 2003, the average annual growth rate of newly increased artificial pastures and meliorated grassland has reached 20.8% and 17.4%, respectively (Table 1). However, the annual growth rate of grass output is relatively low, only 12.4 % on average. In 2003, the forage output was about 82 million tonnes.

2.2 Potential crop residues

Crop residues are the most abundant and widespread non-conventional feed resources. According to the yield of major farm crops in the end of 1990s, it is estimated that 767 million tonnes of crop residues are available annually in China, in which straw and stovers account for 85 % (Zhang, 2000; Table 2). However, low content of nutrients and poor digestibility of most crop residues limit their efficient use in the diets for high-yielding animals. Currently, only about 31 % of the crop residues are used as feedstuff in China. Besides, 45% of crop residues is used for fuel energy, 3% for paper industry, and other 21 % is directly returned to farmland (Han et al., 2002). There is enormous potential to improve the feeding value and increase the use of crop residues in animal feeding.

2.3 Abundant but little used forest-industrial by-products

Forest-industrial by-products that can be used as animal feed are mainly foliage, twig and tailings of wood. There are about 500 million tonnes of foliage resources in China, 100 million tonnes of twigs, and 100 million tonnes of tailings of wood produced annually in China (Liang et al., 1996). From the point of view of chemical compo-

Table 2. The output of crop residues estimated from the major products in China

Crop (Year)	Major products ($\times 10^6$MT)	Crop residues($\times 10^6$MT)			Available for feeds($\times 10^6$MT)
		Straw & stovers	Pods & hulls	Total	
Paddy (1997)	200.74	194.72	42.16	236.87	118.44
Corn (1998)	132.95	182.14	31.91	214.05	107.02
Wheat (1997)	123.29	126.99	24.66	151.65	45.49
Sorghum (1998)	4.09	5.89	0.94	6.83	2.05
Millet (1998)	3.11	4.67	0.47	5.13	4.62
Soybean (1998)	15.15	25.91	6.21	-	-
Peanuts (1998)	11.89	18.07	2.80	21.88	10.94
Rape (1997)	9.58	28.74	-	-	-
Linseed (1998)	0.52	1.04	-	-	-
Sunflower (1998)	1.47	0.88	0.15	1.03	0.51
Sesame (1998)	0.66	0.42	-	-	-
Cotton (1997)	4.60	0.46	0.46	0.92	0.46
Sugarcane (1998)	83.44	5.01	-	-	-
Sweet potato (1998)	22.00	13.42	1.10	14.52	11.62
Sugar beet (1997)	14.97	7.49	-	7.49	3.74
Barley (1997)	3.35	6.36	0.84	6.20	3.10
Buckwheat (1997)	3.36	5.38	0.84	6.22	1.24
Oat (1998)	7.88	12.61	1.97	14.58	7.29
Broad bean (1998)	2.46	2.95	-	-	-
Love pea (1998)	3.59	4.31	-	-	-
Mung bean (1998)	0.79	0.95	-	-	-
Total		647.39	119.15	766.54	316.53

Source: Zhang (2000)

sition, some of the forest-industrial by-products have of high nutrition with high content of protein and plenty of vitamins. Some of them contain bioactive substances, which are beneficial to animals. At present, only about 1 % of available forest-industrial by-products is used as feedstuff in China (Liang et al., 1996).

2.4 Others

In addition to above resources, bagasse and residues from beet, fruit and tea are widely used as roughage sources in China (Wang and Guo, 1994abc). Bamboo shoot shell and mulberry leaves are also widely used in southern provinces (Liu et al., 2000; 2001).

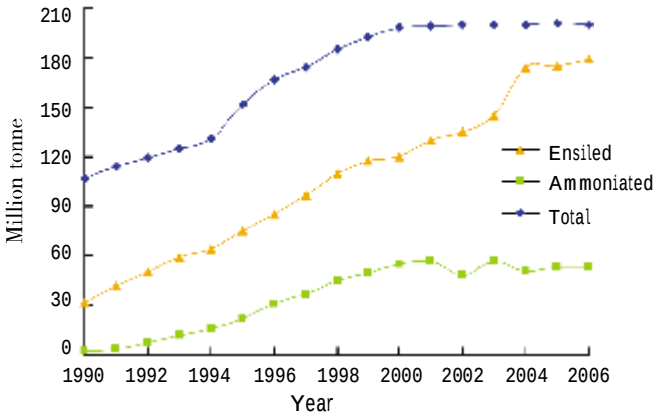

Figure 2. Quantity of crop residues used for animal feed in China during 1990-2006 (Department of Livestock production, 2007)

3. The Utilization of roughage resources for ruminant

In the mid-1980s, the Ministry of Agriculture of China introduced the techniques to improve the utilization efficiency of crop residues. With support by agricultural colleges, research institutions and agricultural technical services in different areas, some small-scale trials were conducted. From then on, the crop residues used as feedstuff has increased steadily year by year. The annual amount of crop residues used for animal feed in 2006 was almost double that in 1990 (Figure 2).

3.1 Utilization mode of crop residues

About 200 million tonnes of crop residues were utilized in 2006. The ammoniated straw increased more quickly than ensiled (11.4 vs. 20.7 %), but from the data of 2000 to 2006 it indicated that ensiling was more accepted than ammonia treatment (Figure 2).

3.2 Technology of ensiling and ammonia treatment

3.2.1 Use of silage additives

During the recent years, use of silage additives has been encouraged in China to ensure silage quality through promoting lactic acid fermentation, inhibiting undesirable microbes or improving its nutritional value. Commonly used silage additives include bacterial cultures (Xu and Yu, 2004; Zhang et al., 2004), acids (Guo et al., 2000a; Zhang et al., 2002b; Shen et al., 2004), inhibitors of aerobic damage (Xi et al., 2002; Yang et al., 2004), and nutrients (Guo et al., 2000b). Cereal straws and stovers are high in lignocellulose. A mixture of inoculum or enzymes containing cellulase and xylanase is often used (Zhang et al., 1997; Xing et al., 2004; Lv et al., 2005). A number of commercial preparations are available from foreign companies, and some have been registered by government authorities. During the Ninth and Tenth Five-Year Plan (1996-2005), Chinese scientists successfully produced a series of additives for ensiling fresh cereal straws and stovers.

Xing et al. (2004) investigated the effects of lactobacillus and cellulase on the fermentation characteristics and microorganism of whole-plant corn silage. Addition of 0.01 g/kg of lactobacillus (from Snow Brand Seed Co. of Japan), 0.033 g/kg enzyme (from Snow Brand Seed Co. of Japan), and 0.01 g/kg lactobacillus plus 0.033 g/kg enzyme had no effects on contents of lactic acid and acetic acid ($P>0.05$), but decreased the content of formic acid ($P<0.01$) by 100, 35 and 100 %, respectively. There was no butyric acid in the silage. Addition of lactobacillus reduced the content of acid detergent fibre and crude fibre by 2 %. Treatment with enzyme decreased neutral and acid detergent fibre content by 5 and 6 %, respectively.

3.2.2 Ammonium bicarbonate as source of ammonia for pretreatment

With regard to ammonia treatment, the use of anhydrous ammonia is unlikely to be widely accepted in China because of its high price and difficulties in transportation and handling. Urea is a chemical fertilizer in short supply and extensively used in agricultural production, which greatly influences market prices. Ammonium bicarbonate, with its abundant source and lower price, has been widely accepted, especially in southern provinces (Zhou et al., 1991; Liu et al., 1991, 1995; Xu et al., 1994).

Treatment with ammonium bicarbonate at 5 %-15 %, N content was doubled, NDF content was decreased by 8 %, and rumen dry matter digestibility was increased by 14 %. The highest N content was obtained at 12 % ammonium bicarbonate with 35 % moisture content (Xu et al., 1994). The ammonium bicarbonate treatment significantly increased intake and digestibility of rice straw by sheep and cows (Liu et al., 1991). Heifers consumed more dry matter from the treated rice straw even than from wild hay, which is a main roughage source in some regions of southern China. Besides, ammonium bicarbonate was superior to urea in preventing mould in South China (Liu et al., 1990), because, especially in warm seasons with high humidi-

ty, ammonia is released faster from ammonium bicarbonate than from urea.

3.2.3 Pretreatment with urea plus calcium hydroxide

Urea is mainly used in Northern China to treat wheat straw and corn stover (Guo and Yang, 1994). In order to decrease the usage of urea and to exert the alkali effect, treatment with urea plus calcium hydroxide had been used in northern provinces during the recent years (Mao and Feng, 2001; Zhang et al., 2002a; He et al., 2002b).

Though the chemical dosage used in treatment was different between researchers, the pretreatment with urea plus calcium hydroxide was better than urea or calcium hydroxide pretreatment alone. With 2.5 % urea and 5.0 % Ca $(OH)_2$, the content of neutral detergent fibre of wheat, oat and rye straw was reduced from 71% -81 % to 67 %-75 %, and the in vitro digestibility of organic matter was raised from 38 %-45 % to 57 %-65 % (Mao and Feng, 2001). With 4 % urea and excessive lime, the time expended in treating corn stover was decreased judging with in sacco 48 h dry matter digestibility (He et al., 2002a). The time was decreased from 30 d to 14 d at 20-27℃, which is better for the conditions in north China with its low ambient temperature.

3.3 Supplementation strategy

With the application of ensilage and ammonia treatment of crop residues, more attention was paid to the improvement of the feed quality. The combination of pretreatment and supplementation has been become popular.

3.3.1 Supplementation with protein source

When the fermentable N is provided or cereal straws are treated with ammonia, consideration should be given to the amino acids. Nitrogen has been found to have different effects on rumen fermentation and fibre-associated microbial populations (Chen et al., 2007a). Ruminal fibre digestion significantly increased with addition of nitrogen, but protein had higher efficiency to supply available nitrogen to microbial growth and resulted in greater degradation of straw than non-protein nitrogen compounds. A supply of protein nitrogen is likely needed for maximum degradation of straw. Protein supplements used in China are mainly oilseed cake/meal, such as cottonseed cake (CSC) and rapeseed meal (RSM). Sometimes farmers offer their animals agricultural by-products such as rice bran and wheat bran or concentrate mixtures which may be home-grown or self-mixed.

Data on animal performance supplied with CSC is given in Table 3. Chinese Yellow bulls without CSC gained only 250 g/day, but with CSC gained significantly more ($P<0.01$) (Zhang et al., 1993). There were no significant differences between 2 and 3 kg, and between 3 and 4 kg of CSC, but there was between 1 and 2 kg. The DM intake of wheat straw did not decrease when 1 kg CSC was supplemented, but it did at higher levels. The economic analysis indicated that a relatively high level of production and the highest profits were obtained with 2 kg of CSC. Similar results were obtained by Fan et al.(1993) and Ma et al.(1990) (Table 3). From the result of Ma et al.(1990), it is also found that there are consistent responses to protein supplements but the effects are more pronounced when the straw is treated by chemicals. When the straw became potentially more digestible using an ammonia treatment, supplementing greatly increased the straw intake and feed conversion ratio. This positive performance has been also observed by Liu et al. (1998), who used RSM as supplements to growing lambs offered untreated or ammoniated rice straw. With the in vitro gas test, a high quadratic relationship was observed between the performance and the ratio of rumen degradable N to digested organic matter (Chen et al., 2007b). It is estimated that optimal performance occurred when the ratio of rumen degradable N to digested organic matter was at 27.2 g/kg.

Table 3. Effects of supplementation with cottonseed cake (CSC) on performance of growing Yellow cattle fed untreated or urea-treated wheat straw

Ref[1]	Straw type	Straw intake (kg DM/day)	CSC (kg/d)	Initial weight (kg)	Daily gain (g/day)	FCR[2]
A	Urea-treated	5.0	0	182	250	19.6
	Urea-treated	5.1	1	183	602	9.9
	Urea-treated	4.5	2	183	704	8.9
	Urea-treated	4.2	3	183	836	8.2
	Urea-treated	2.9	4	183	878	6.8
B	Urea-treated	5.2	0	175.1	99	53
	Urea-treated	5.5	0.25	170.5	370	15
	Urea-treated	5.3	0.5	183.6	529	11
	Urea-treated	5.4	1.5	192.8	781	8.8
	Urea-treated	5.1	2.0	175.0	819	8.6
	Urea-treated	5.2	2.5	193.7	841	9.2
	Urea-treated	4.5	3.0	215.5	880	8.6
	Urea-treated	3.6	4.0	213.5	904	8.6
C	Untreated	4.3	0.5	187	100	44.3
	Untreated	4.9	1.0	194	240	20.6
	Urea-treated	4.8	0.5	198	485	10.8
	Urea-treated	4.3	1.0	213	660	8.0

1 A = Zhang and Yuan (1993); B = Fan et al. (1993); C = Ma et al. (1990);
2 FCR = feed conversion ratio.

(To be continued and the rest part of this dissertation can be found on the next issue)

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Determination of Ractopamine in Animal Feeds Using ELISA and LC-MS

He Pingli, You Jinming

The financial support from the National Natural Science Foundation of China (29975003) is gratefully acknowledged.

Ractopamine is a phenethanolamine leanness-enhancing agent recently approved as a feed additive but is not licensed for use in many countries. An indirect competitive enzyme-linked immunosorbent assay (ELISA) for the determination of ractopamine has been optimized and characterized. This assay is based on a monoclonal antibody generated from ractopamine-hemiglutarate-bovine thyroglobulin (BTG), which was applied to the analysis of ractopamine in animal feed samples. The sensitivity, estimated as the IC50 value, was 20.20 ng/mL, with a practical working range between 3.00 and 500 ng/mL. In addition, a liquid chromatography-mass spectrophotometry (LC-MS) confirmatory procedure was developed which was able to act as a confirmatory procedure for the ELISA results. An agreement was achieved between the ELISA and LC-MS results. The recoveries of ractopamine were 85% from both matrices. Thus, the procedures were useful for the determination of ractopamine by ELISA as well as by LC-MS.

Introduction

Ractopamine is a β -agonist belonging to the phenolic group. In the livestock industry, β -agonists have been used as repartitioning agents and there is a large body of research showing that β -agonists reduce carcass fat and increase muscle mass while improving growth rate and feed conversion when fed to calves, pigs, and poultry. Ractopamine was developed commercially in the United States where it is authorized for use with cattle and swine. It is sold commercially under the brand names Optaflexx[tt;] and Paylean[tt;] (Eli Lilly and Company, Indianapolis, Indiana). However, in the Euopean Union and Asia the use of ractopamine is banned completely.

Recently, the presence of drug residues in animal tissues was been a concern for food safety, especially when the compound has been used illegally or in a manner proscribed by regulatory officials. In an effort to combat the illicit use of β -agonist compounds, regulatory organizations worldwide test animal tissues or excreta for the presence of illicit drugs. Various analytical methods have been reported for determination of ractopamine residues in animal feed, tissues, and body fluids. These include liquid chromatography with various detection methods, gas chromatography with mass spectrometry, and immunoassay with antibodies.

Enzyme-linked immunosorbent assays (ELISA), because of their high sensitivity, high throughput, and rapid turnaround time, are convenient screening tools to detect the presence of an analyte in various matrices. At present, we describe the development of a monoclonal antibody against ractopamine. The selected antibody was used for the detection and quantitative determination of trace amounts of ractopamine in the spiked animal feeds using ELISA. In addition, a liquid chromatography-mass spectrophotometry (LC-MS) procedure was developed which was able to act as a confirmatory procedure for the ELISA results.

Experimental

Reagents and chemicals

Ractopamine hydrochloride was obtained from the National Feed Quality Evaluation Center (Beijing, China). Human serum albumin (HAS, MW 66,000), bovine thyroglobulin (BTG, MW 670,000), Freund's complete and incomplete adjuvants, and o-phenylenediamine were obtained from Sigma Company (St Louis, MO) and were used as received without further pu-

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rification. Goat anti-rabbit IgG-horseradish peroxidae was obtained from Jackson Immuno-Research Laboratories (West Grove, PA). HPLC grade acetonitrile was obtained from Fisher Scientific International (Hampton, NH). Hydrogen peroxide (H_2O_2, 30%) was obtained from Beijing Chemical Engineering Plant (Beijing, China). All other chemicals were the reagent grade.

Two-month-old BALB/c mice were purchased from the Institute of Genetics and Developmental Biology Chinese Academy of Sciences (Beijing, China).

Apparatus and procedures

The absorbance values for the ELISA were read in dual-wavelength mode (492-570 nm) using a TECAN SUNRISE Microplate Reader (Salsburg, Austria). LC-MS analysis was performed on an Alliance 2690 HPLC system (Waters Corporation, Milford, MA) with a Symmetry C18 column (2.1 mm 150 mm; 3.5 m) coupled to a Macromass ZQ2000 Mass Spectrometer (Manchester, UK). OASIS MCX columns (1cc), used for purification of samples, were purchased from Waters Corporation (Milford, MA). The solid phase extraction system was a vacuum manifold processing station obtained from Agilent Technologies (Palo Alto, CA).

Production of Monoclonal Antibodies

Ractopamine- bovine thyroglobulin (BTG) was used as the antigen for antibody generation in BALB/c mice, which was synthesized as described by Shelver et al. Spleen cells producing high titer antibody were removed and fused with myeloma cells of SP/20 origin. Using a conventional immunization protocol, we generated a stable murine monoclonal antibody toward ractopamine hydrochloride, which had high affinities. The clone was found to be of IgG2a subclass with light chain. An indirect competitive enzyme-linked immunosorbent assay (ELISA) for the determination of ractopamine has been optimized and characterized. The sensitivity, estimated as the IC50 value, was 20.20 ng/mL, with a practical working range between 3.0 and 500 ng/mL. The limit of detection was 1.5 ng/mL, and inter-assay and intra-assay variations less than 10%. In addition, other phenethanolamine -agonists showed low cross-reactivity.

Enzyme immunoassay procedure

The concentrations of coating antigen (0.125, 0.25, 0.5, 1 and 2 μg/mL) and purified polyclonal antibody (serial dilutions from 1:1,000 to 1:128,000, with a dilution factor of 2) were optimized by a checker board procedure. After optimization, a competitive ELISA procedure was used to determine the inhibition concentration (IC50) for ractopamine. Ninety-six well flat bottom ELISA plates were coated with 100 L/well of coating antigen in 0.85 M bicarbonate buffer, pH 9.6, and allowed to incubated at 4℃ overnight or 37℃ for 1h. After washing the plate four times with PBST, excess binding sites in each well were blocked with 125 L/well of 1% gelatin at 37℃ for 1 hour. The plate was washed, primary antibody (1G8), diluted to 1: 5,000, was added (50 L/well) in the presence of competitor (50 L/well) and was incubated for 45 min. Washing wells five times with PBST terminated the reactions. Goat anti-mouse IgG-HRP conjugate, diluted 1: 10,000 (100 L/well) and was incubated for 1 h. An OPD substrate solution was used during color development at room temperature for 20 min, the color development was stopped by adding 50 L/well of 2 N H_2SO_4. The plates were read at 492 nm and reference 570 nm. The data analyzed using a Sigmoidal model for the competitors that produced competition curves. A racemic ractopamine calibration curve constructed by using serial dilutions of free ractopamine as standard was used in every experiment as a quality control.

Results and discussion

ELISA validation results

The indirect competitive ELISA established above, was used to detect ractopamine in spiked feed samples. The calibration curve for free ractopamine ranged from 3.00 to 500 ng/mL (Fig. 1). The selected antibody showed good sensitivity in phosphate buffer with an IC50 of 20.20 ng/mL. Ractopamine spiked feed samples

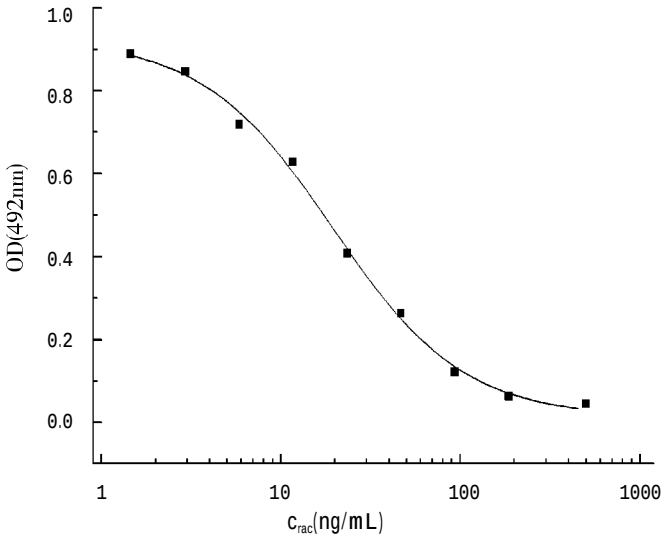

Figure 2. Quantity of crop residues used for animal feed in China during 1990-2006 (Department of Livestock production, 2007)

Table 1. Recovery of ractopamine from the spiked feed samples determined by ELISA and HPLC-MS

Amount added (mg/kg)	ELISA (n=5)			HPLC-MS (n=6)		
	Amount measured (mg/kg)	Recovery (%)	CV (%)	Amount measured (mg/kg)	Recovery (%)	CV (%)
20.0	18.78	93.9	6.08	19.20	96.0	3.41
10.0	9.61	96.1	8.76	9.36	93.6	4.23
2.0	2.16	108.0	5.42	1.83	91.5	5.18
0.2	0.165	82.5	3.65	1.72	86.0	3.29

were treated with aqueous and organic solutions followed by clean-up by solid phase extraction (SPE). The extraction recovery of ractopamine from feed samples spiked with 0.1, 0.2, 1, 2, 10, and 20 mg/kg were measured based on the calibration graph using pure standards. Six replicates for each concentration were determined by ELISA. The statistical data for the quantitation of ractopamine are shown in Table 1, which indicated recoveries ranging from 85%-115% and coefficients of variation less than 10%. Therefore, the direct competitive ELISA developed in this study can be used to accurately determine ractopamine in feed samples, after the extraction and clean-up procedure.

LC-MS validation results

The same test solutions were analyzed by LC-MS using select ion recording mode for identification and quantification purposes. The optimized ionization conditions for mass spectrometric detection were determined using a cone voltage of 25 V, and a capillary voltage 3.0 kV. The ion source and desolvation temperatures were 120℃ and 350℃, respectively. The ionization was tested in ESI positive (ESI+) mode. The results show a peak at about 11.52 min for both the ractopamine standard and the spiked feed sample which is attributed to a pseudo-molecular ion peak of ractopamine. The pseudo-molecularion m/z 302 for ractopamine was run in SIR mode for quantification purposes. The statistical data for the quantitation of ractopamine by LC-MS indicated recoveries ranging from 85%-100% and coefficients of variation less than 5% (Table 1). These results are similar to those obtained by ELISA.

Wuxi Huamu machinery Co., Ltd.

Leadership

in CHINA

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康地恩生物集团
Continent Biotech Group

Everything is Done to Make Life Better

Dedicated to providing green solutions for the livestock industry

Editor's note: Mr. Gang Chen, General Manager of Continent Biotech, graduated from East China University of Technology in 1995.He got a master degree in EMBA at the West Coat University in the US. He assumed the post of General Manager from May,2006 until up to now. The Continent Biotech possesses the most advanced equipment for liquid and solid state fermentation in the world , ranking the top of the large-scale biological preparation and manufacturing enterprise in China. The liquid complex enzyme developed by the researchers of the group,reaches the top both at the domestic and the international level. The platform for research and development with the high-calibered technical talents lays solid foundation for the advancement of business. To provide green solution for the livestock industry, Mr. Gang Chen sat down with FEED INDUSTRY to assess the development and prospect of enzyme preparation enterprises.

Q:Chairman Hu emphasized independent innovation in his report to the 17th National Congress of the CPC. Whether the products of your group are from independent innovation or introduced? I think the Bioengineering Research Institute of your group should be an engine for independent innovation, would you like to introduce the current condition of your research institute and which aspect its future emphases are laid on?

A:Continent Group is on the part of combining introduction and independent innovation. At the initial stage of the development, the group mainly introduced internationally the advanced technology, and made digestion and innovation, according to the actual development condition of animal husbandry in China. Over several years of development, the ability of independent innovation of Continent has improved greatly. So far it has been on the track of independent innovation, especially the Continent micro-ecological product has formed its own feature in the international market.

Continent Bioengineering Research Institute is not only the engine for independent innovation, but also the platform for independent innovation. It positions the function mainly in its connection with the product and technical innovation; transformation of the research achievement and process flow; the platform for sci-tech project application; international and domestic cooperation platform; evaluation of animal metabolism of biological products; nutrition evaluation of new and featured materials; technical support of data marketing. At present, the institute sponsored and undertook many scientific research projects at the national, provincial and ministerial level. The awards involved a Second Prize of Sci-Tech Progress in Shandong Province, a Second Prize of Sci-Tech Progress in Qingdao City, and many patents for invention. Main projects undertaken by Continent Bioengineering Research Institute include: National 863 program - "Research on Making Immune Polysaccharide (Beer Yeast Cell Wall) by Bio-enzymatic Lysis Method", National Support Program for the 11th Five-year Plan Period - "Research and Demonstration on Safety Control Technology of Bacterial Resistance Caused by Antibiotic Residues", Key Sci-Tech Project in Qingdao City - "Research and Demonstration on Precise Use of Antibiotic and Application & Evaluation Technology of Biological Veterinary Drugs", National Support Program for the 11th Five-year Plan Period - "Industrialized Demonstration in Producing Commodity Organic Fertilizer by Dejecta" and so on. In the future continent biological R&D will make key studies and breakthroughs in such fields as genetic engineering technology of feed enzyme, fermentation technology of micro-ecological preparation and preparation ways and so on.

Q:At present, there is high temperature resistance phytase produced by using genetic engineering technology in the market. What advantage does post-spraying of the liquid phytase have compared with extrusion pelleting?

A:As an active protein, enzyme is very sensitive to environment. The most optimum temperature for common enzyme activity is 30-60℃ , the enzyme will get denatured easily and lose activity when the temperature exceeds 60 ℃ . The temperature can reach up to 80-150℃ during pelleting and expansion process in the feed factory. During the process of feed pelleting, extrusion and expansion, most functions and effects of enzyme preparation will lose under ex-

treme effect of temperature, pressure and moisture. How to keep the enzyme activity in feed products becomes a problem to be solved urgently in current feed industry.

Continent takes the lead in developing the post-spraying equipment KDN-MPPM for liquid enzyme in China, makes spraying on liquid phytase, xylanase and complex enzyme, and brings it into industrialized production and application. The liquid feed enzyme is liquid preparation under microbial strain screening and stabilized treatment, suitable for feed storage and functional environment of alimentary canal. The advantage of liquid phytase post-spraying technology lies in its avoidance of high temperature during pelleting process, the liquid enzyme is sprayed onto the surface of cooled finished pellet feed, so as to keep enzyme activity completely. Meanwhile, in view of mixing principle, spray mixing has higher equality and efficiency than stirred mixing.

Q:Your group advocates "providing green solution for clients", how do you treat waste water and waste liquor etc. made in the process of production? How much does it increase cost to your factory? How does your company solve the bottleneck of environmental protection and production?

A:The waster water and waste liquor etc. made in the course of production of our company have been treated and discharged, strictly conforming to relate stipulations of national environmental protection. Meanwhile, we make use of our own R&D and technical advantage, make technical improvement and innovation, maximize the recycling of resources, and reduce the cost of pollution treatment, so as to effectively solve the bottleneck of environmental protection and production.

Q:There is fiercer competition among enzyme preparation enterprises in China. Fortunately export trend of phytase is very good this year, otherwise various enterprises will lay great emphasis on marketing, or even engage in price war. What's your own opinion on price war?

A:The enzyme preparation industry in China is developing from disorder to order and from non-standardization to standardization, the sharp competition among enzyme preparation enterprises is the certain tendency of market development. Each promising enterprise will pay greatly attention to marketing, no matter what the export trend of phytase is. As the final result of market development is global integration, the competition has no borders in the end and it is only temporary that the export trend is good. The price war is an action frequently arising from marketing, and is inevitable. The price war is a double-edged sword. Sometimes it can promote competition and purify the industry, but it may also lead to malignant competition. What we can do is to actively deal with it. On the premise of guaranteeing product quality, we will keep constant in the innovation of the product and technology, minimize the production and marketing cost, and try to let Continent products competitive in both quality and price.

Q:Is it very hard to popularize the technology of the liquid enzyme post-spraying? How do we make the clients accept it?

A:The liquid enzyme post-spraying technology is advanced in terms of the concept as well as technology. There is no doubt that it will meet various difficulties in popularization, which Continent also has forecasted in this aspect. However, Continent Group has an obligation to make efforts and contributions to the technical improvement of the whole industry. In order to let consumers accept this new technology, we firstly carry out the instruction of the concept and training, meanwhile, it is lots of convincing test data of Continent R&D Department that makes consumers realize the value and performance/price ratio brought by new technology, so as to provide support for the popularization. The perfect technical service during popularization and application provides a powerful guarantee. It is inevitable for the consumers to finally accept Continent post-spraying technology.

Q:There are so many enterprises in this field, both the foreign brand and the domestic brand are your rivals, how do you evaluate them? What's the advantage of your company's product?

A:The competition will promote the development and progress of the industry. We don't regard domestic and foreign counterparts as "rivals" but partners in the industry. Our way is to learn from them modestly and improves ourselves constantly, meanwhile, we make technical exchange with the same trade without reservation. Our aim is to make efforts together and push forward the industry development. The single enterprise will develop only after the whole industry develops. Continent products place emphasis on cutting-edged technology, take the market trend as a guide. We are strict with quality control in the course of production, that's why we can achieve excellent quality and reasonable prices, and realize the maximum product performance/price ratio. This is also the advantage of Continent products.

Q:In your opinion what's the most important factor besides excellent product quality to succeed in the domestic market?

A:At present, Continent has paid equal attention to both domestic market and the international market. Excellent product quality is only one of the most basic conditions for tapping the domestic and foreign market. Besides that, excellent product performance/price ratio and perfect technical service are more important.

Q:How to create a win-win situation in sales and quality in the enzyme preparation market at the age of meager profit?

A:The industry should maximize the im-

provement of the technology, enlarge the production scale, reduce cost, implement strict quality management system, ensure product quality, so as to realize win-win of sales and quality in the end.

Q:What's your expectation regarding the domestic enzyme preparation industry in 2008?

A:The enzyme preparation industry is not an independent industry, but it serves the feed industry as a whole. The large-scale feed factories expanded obviously in 2007, the scale and output of feed enterprises are becoming larger, therefore they have higher demand on product quality, supporting service etc. of enzyme preparation manufacturers. The lack of feed resource will increasingly become the factors that constrain the development of feed industry and breeding industry in China, so the use of enzyme preparation will increase the use rate and improve the effect of unconventional raw material, but meanwhile it'll also put forward the higher request for R&D, production and service ability of enzyme preparation manufacturers. The enzyme preparation manufacturers will form a partnership with the feed enterprises, design differential and pertinent products according to those factors as different material composition etc. of feed factory, and carry out one-to-one marketing and service. The main enzyme preparation manufacturers will become less and less in 2008.

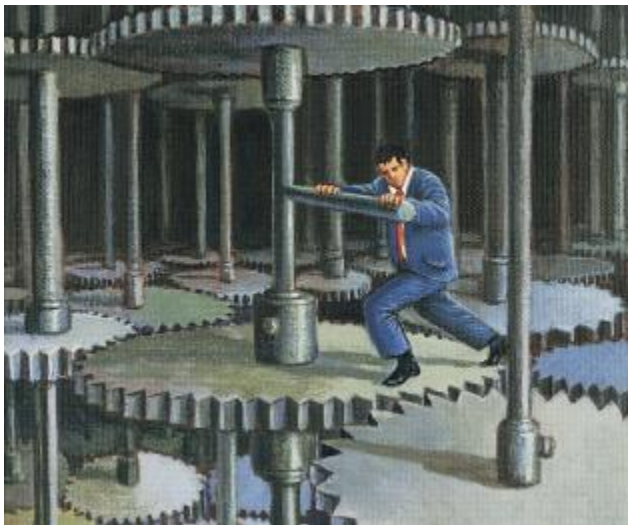
In a word, thanks to its own feature, the enzyme preparation will not only bring considerable economic benefit to feed industry, but also have positive influence on green livestock and poultry products, ecological agriculture and environmental protection. Therefore, feed enzyme preparation will have a broad prospect for development.

Q:What's your opinion on feed market in the Asia-Pacific region? Have you ever thought of developing in the foreign market?

A:The typical feature for Asia-Pacific region lies in the great numbers of countries with a varity of characteristic. Among 21 countries and regions, there are the largest developed country and developing country in the world, highly developed urban countries and regions, and economically backward tiny island countries. Its unique regional feature and economic development status provide good basis and broad space for feed market and the feed additive market. The large population and strong development trend of animal husbandry in Asia-Pacific region are two advantages of feed development as well. It is predicted that Asia-Pacific region will become the focus of global animal husbandry in the future, while Asia, especially Southeast Asia, East Asia and South Asian will become the core of this focus. Because of its own economic and political advantage in Asia-Pacific region, China has been widely concerned and favored by the whole world, especially by the Asia-Pacific countries and regions. Through extensive exchange and cooperation with the international enterprises and experts, Continent has organized company personnel to go abroad for visiting and exchanging for many times, actively participating in foreign professional exhibitions. It has greatly promoted the brand impact of Continent on the international market, and its own sales network has been formed.

Q:What's your deepest feeling when you recall the experience in the past ten years?

A:When I recall the development course of micro-ecological and enzyme preparation in the past ten years, I have to mention three points as below. Firstly, the additive market develops from incognizance to general acceptance and from the operation concept to actual application towards these green feed additives. Secondly, domestic micro-ecological and enzyme preparation manufacturers develop rapidly from small to be large scale out of nothing. The situation that the foreign manufactures predominated the market at first has been broken, the performance/price ratio in some variety even exceeds foreign famous brand. Domestic manufactures have improved the production quality constantly, and the price tends to be rational and reasonable. Thirdly, the rapid development of biotechnological level in China lays solid foundation for the development of feed micro-ecological and enzyme preparation. As the manufactures, so long as we insist on an opening and cooperative attitude, closely cooperate with upstream universities & colleges and scientific research institutes, and exert our own advantage of market and applied R&D, we'll constantly improve the technological content and quality of the products, achieve excellent quality with low price, so as to make active contribution to rapid and better development of agriculture and animal husbandry in China as well as in the Asia-Pacific region.



VICTAM Knows Better

The Victam International B V, one of the largest trade show organizers in the Netherlands, is active in Europe, Asia and Africa, promoting the international feed industry in general and bringing together feed producers, scientists and suppliers to the feed industry.

On 19th Dec. 2007 the press conference for VICTAM 2008 & FIAAP was held in the Landmark Hotel, Bangkok, Thailand. At the conference the former general manager of VICTAM International BV, Mr Henk van de Bunt introduced the information about the exihibition of VICTAM 2008 & FIAAP, being held at the Queen Sirikit National Convention Center on March 5 -7 2008. Some exhibitors made presentation, too. At the end of the conference, Henk talked to Feed Industry about the history and the organization's objective going forward.

Q: It's my real pleasure to sit down and talk to you. Have you ever been interviewed by a Chinese media?

A: Yes, I think so. In my last Victam.

Q: Your excellent company, the Victam International B V, was established in 1964. Over forty years have passed, what were the important ways you have witnessed the changes of the industry?

A: Well, we were founded in the Netherlands, where we have witnessed the feed industry developing very rapidly in the country. It was not only feed industry, but many suppliers of the feed industry. That's why the first exhibition was held in Netherlands. So later in the 70s or so in Europe, there was enormous development in feed. And now we see this development in China as well as in Asia.

Q: How many changes have you made in your business to meet the changes of the industry?

A: Well, of course the exhibition in Netherlands became much more international. At the beginning, it was a Dutch exhibition, it was also European exhibition. And now it's global one. The same situation in the exhibitors. For example, I think the first Chinese exhibitor in Utrecht came, I am not very sure, in 2001. And also in Bangkok, Victam Asia, I think maybe a little bit longer, that was maybe in 1996 or 1999. And now we have many Chinese exhibitors. That's the development of business.

Q: This is the second time for VICTAM to be held in Thailand. Why do you locate it here?

A: The geographical scope of the research presented comprises Malaysia, Thailand, Indonesia, the Philippines and Vietnam. These five countries share a number of similarities but also many differences. One of the factors they have in common is that both poultry and swine sectors are driving the growth in the livestock industry. The major difference is that Thailand, as the only country in Asia Pacific exporting poultry in large quantities to the European Union. It is most affected by EU regulations for the livestock industry and animal feed. It means it shares many common interests with its own characteristic which makes it ideal for holding the event.

Q: Who will attend the VICTAM 2008, compared with that of 2006, any new features of that?

A: A variety of stakeholders will be represented including industries as diverse as livestock, aquaculture, integrators, starch, feed grain brokerage, fish farming equipment manufacturers, biomass producers, commodity brokers, rendering plants and academic institutions. Supported by a series of industry-related seminars and workshops, Victam Asia 2008 serves as a net-

Mr. Henk vande Bunt is giving lecture at the press conference for VICTAM 2008 & FIAAP

working platform for executives from the feed and grain processing industries throughout South-east Asia and beyond. The sessions will include a pet food forum, an aquafeed workshop and a presentation by Thailand's Ministry of Agriculture.

Q: In 2008, the FIAAP will be held together with VICTAM2008. How does this idea come into your mind?

A: First of all, strict regulation by the European Union, threat of diseases, limited awareness about feed additives and cheap generic products are challenges facing the feed additives market in Asia Pacific. Secondly the animal feed additives market has always been on the highlight in this region. At last but not in the least, amino acid, particularly methionine, lysine and tryptophan; feed acidifiers, and feed enzymes (non-starch polysaccharides and phytase) is the main areas of focus based on their current levels of significance in animal feed production in the region. So it is so typical and of significance here which makes us consider to bring it forward and have all the expertise together. And we will keep on doing that.

Q: As the development of the feed industry and the related business, more and more exhibitions are held around the world. The same situation in China. There are nearly twenty to thirty trade shows in China annually, including those at the national, the provincial and the regional level. Do you think that will affect on your business?

A: No, we are not afraid of this. It is not easy for any companies to host the feed industry exhibitions because it's a very specialized sector. Well, in some countries like China, it's not just the feed industry, in general, there are many exhibitions, trade shows. But you'll see it's not only in China, but in many countries it will come down and there will be few high quality exhibitions remained. So for the feed business, I think that in Europe and here in Southeast Asia, we have established a reputation, a name that no one will start any competition in this field. That doesn't make sense to do that. As you know for forty years of existence, then you will have certain reputation or certain name that people know what they can expect. But of course in some areas, people will try to organize feed shows, but they'll find that it's not easy to do with good quality. But anyway, in China, it's a very interesting market. Maybe in the end there will be one good show in China.

Q: That's what I want to ask you. If there is the possibility to hold the show in China. Maybe we can meet one day in China.

A: Yes, we would. I'd like to cooperate. We're open to cooperation with any organizations in China. We are very open to ideas and suggestions.

Q: Today the technology is so advanced, there are many ways for people to know the world, e.g. the webinars, the icasts, etc., by which people can see the video or the audio files to know the news or ideas. Do you think that will be a potential challenge for you?

A: No, twenty years ago, some people predicted the possibility. Yeah, we've got the internet. Two things in the end, people would like to meet or to see each other. Certainly when it's expensive to buy materials or the projectors. You'll buy on the internet, your will subscribe to the magazine or book a flight. And you have to talk, meet or contact face to face. You'd like to see, feel the quality of the machine and see the people. So the exhibitions can never be replaced, however the internet can help us. It can help the exhibitions because it's easier to inform the news of the exhibition. For people to retrace of the exhibition.

Q: what's your fondest hope or wish for the industry, for the exhibition sector?

A: Well, my wish is, first of all, there is always a platform or place for people from all countries to meet in a peaceful environment, and also to a large extent, we also hope to be a little bit helpful that people from many countries can get together, just like us, you're from China, I'm from Holland and we meet in Bangkok by which we can understand each other better. And my talking to you helps me to understand China and China Feed Industry and I hope talking to me can help you have a better idea of European feed industry. So I think that's very important. Between China and Europe we know each other already much better in last ten years. But there is still lots for both parties to know about. By the exhibition we can learn from Chinese exhibitors, they tell me how they work, how they operate, that's fascinating for me.

Exihibitors attended at the press conference

Popular in China, Beneficial to Asia

The largest aquatic feed producer and the primary one for poultry and livestock products in China

On July 19th, 2007, Yawei Guan, President of Tongwei Co., Ltd., China's leading enterprise in aquatic feed field, signed a land- lease agreement in the Tan Huong Industrial Area, Tien Giang Province, Vietnam with the Vietnamnese counterpart Shigui Ruan, General Manager of Nhut ThanhTan, Co., Ltd. to build a large modern aquatic feed factory. It marks that the Vietnam Tongwei Feed Co., Ltd. project has settled down in Vietnam. The project is exclusively-invested by Tongwei Co., Ltd., which set up the Vietnam Yue-Hua Aquatic Feed Joint Venture Company with Hengxing Co., Ltd. (a large-scale aquaculture and aquatic feed production enterprise in China's Guangdong Province) in April this year.

The pollution-free aquaculture production base for Tongwei Fish

It is such a brilliant achievement that Tongwei Group, a private company started out with only 500 RMB, has become the biggest enterprise in the production of aquatic feed, poultry feed etc. in just 15 years. Many fields that Tongwei has participated in, such as chemical, IT, pet food, construction, property, etc, are developing vigorously and rationally and a sound and promising situation has been formed that the feed industry is leading the development and various fields are following synchronously.

In recent years, the end market of China's feed industry has been remaining depressed, the act barriers to small and medium feed enterprises are still relatively low and the market mechanism is not sound enough. Facing up to such series of adverse situation of the whole industry, Tongwei initiated the "Sunshine Program" and "Thousands of National Main Customers Develop Hand in Hand" all over the country. With the strong sense of social responsibility of a national leading enterprise for agricultural industrialization, they promptly adjusted the company's managing strategy, TongWei made great efforts to breeding sector and gave more profits to operators. Under the prerequisite of keeping the competitive edge, the group strongly promoted lean management by controlling the operating costs, implementing the differentiation strategy and successfully realizing the growth of the output and profit. Tongwei Group made a continuously huge investment in setting up subsidiaries and expanding with a pace of four or five new subsidiaries every year. Up to now, the number of subsidiary is over fifty and the annual output capability of feed is more than 5 million tons. Even under the circumstances of the fiercer competition, the oversupply of the end products and the increasing product prices, it can realize 30% increase in both of the output and the profit. Facing the new century, Tongwei has established its great strategic objectives: keep the leading position in aquatic feed R&D , in production and marketing, build a "Aquatic Kingdom" of their own as the biggest aquatic products supplier.

Currently, Tongwei Group is changing from a single feed-production enterprise to an integral strategic business and is establishing an industry chain formed by seed breeding, aquiculture, research and development of technology and deep processing. At the same time, they are actively involved in improving the genetic engineering research and environmentally-friendly fish production chain. By these efforts, the group will gradually set up a complete industrial system with high added-value and therefore promote the process of China's aquaculture modernization. As an important link of the industry chain, Pollution-free Tongwei Fish has gone into the

market in Chengdu, Beijing, Shanghai, Guangzhou, Wuhan, Suzhou and other cities successively and caused widespread attention in society with significant social & economic performance and it will satisfy the end-customers' requirements for healthy life and environmentally-friendly food. It will also bring more benefits to operators and other groups related to the links in this industry chain.

All the Tongwei Fish are from ecological-healthy aquiculture base and feeding with Tongwei feed which is made up of several agriculture by-products, such as fish meal, soybean meal, rapeseed meal, flour etc. No hormones, no antibiotics and no prohibited drugs at all. Tongwei Fish is a kind of safety and healthy one which has a whole process of quality control, including water environment, fish fry, input products as well as the detection method and marketing process. The significant features of Tongwei Fish are environmentally-friendly and safe to eat. It is of significance that the existing Tongwei Fish a new consumption concept as "Safety, Healthy and Environment-friendly", improves and enriches the dietary pattern of people today. The Tongwei Fish has big potential and broad prospect and it is a measure of strategic significance to expand and strengthen the aquaculture industry. Tongwei Fish is so popular in China that it has set up thousands of exclusive selling agencies which cover the supermarkets and agricultural fairs in major cities over the country. In order to accelerate the promotion and the overall operation process, Tongwei Group set up several Tongwei Fish Companies specializing in production and sale of Tongwei Fish. The fish companies work closely with aquiculture operators who are customers of feed companies and an operation system containing production, management and marketing has been established. At the same time, the further processing project of Tongwei aquatic product has entered the stage of implementation. Several aquatic product processing bases have set up in Sichuan, Hainan, Hunan, and other major cities around China, mainly engaging in further processing and marketing of aquatic products as shrimp, crabs and so on.

The biggest Aquatic Science and Technology Park with investment of 300 million RMB by Tongwei Group has entered the final stage. Experts pointed out that the combination of various features of the park, containing research, promotion, demonstration and propagation of aquatic knowledge, determind that it would play an important role in promoting the development of aquatic science and technology in Sichuan, China and even in the world as a whole. Nowadays, Tongwei Aquatic Science and Technology Park undertakes and has made substantive achievements in the national Fish Genetic Engineering Research Project, "948 Program".

The export products of Tongwei Fish

Tongwei Group, with the aim of "Pursuit of excellence and dedication to society", insists the management concept of "Honest, Credibility, and Integrity", and it strictly conforms to the national standards for pharmaceuticals and hygiene. It has already initiated the feed safety declaration in China's feed sector. Tongwei Brand series of feed products were awarded the honorary titles of China's Famous Trademark, Quality-inspection-free products, China's Famous Trademark, Symbolic Brand of China's Feed Sector and Stable and Quality Products after Quality Inspection by several Ministries and Commissions of the State Council State such as Administration for Industry and Commerce, Ministry of Agriculture, The State Administration of Quality Supervision, China Feed Industry Association and so forth. In 1996, Tongwei Co., Ltd. became the first enterprise passing though ISO 9001 Quality System Certification and using the certification mark of conformity of product quality in China's feed sector. At present, over 85% of the branches and subsidiary companies of Tongwei Group has passed through accreditation for ISO9000 quality system and set up a complete quality management system. In order to ensure the safety of the whole food chain, Tongwei Co., Ltd. is the first enterprise in China's feed sector which passed the HACCP. All of the branches and subsidiaries in Tianjin, Shaoxing, Sichuan, Huai'an, Chongqing, Wuhan, Deyang, Ronglai, Fuling, Hefei and Guangdong have got the HACCP certification and Certificate of feed product certification. There are seven more branches and subsidiaries preparing for getting the certification which is another insurance to ensure the safety and quality of products. At the same time, ten branches and subsidiaries, i.e. Sichuan-Tongwei, Wuhan-Tongwei, Shashi-Tongwei, Nanchang-Tongwei and Changchu-Tongwei and so on, first got

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Company Name	Page No.	Phone No.	Web Address
Continent Biotech Group	01	86.532.88966607	www.continent.com.cn
Naite Electromechanical	02	86.510.85342300	www.naite-china.com
BFI Innovations	08	86.21.57687881	www.bfi-innovations.com
Sunhy Biology	09	86.27.87537736	www.sunhy.cn
King Techina Feed	11	86.571.88234535	www.kdqchem.com
Yuda machinery	14	86.519.87909688	www.yd-js.com
Wellhope Bio-tech	19	86.24.88082666	www.wellhope-ag.com
Gold-Tide Biotechnology	23	86.10.82356101	www.gold-tide.com.cn
Huaming Machinery	26	86.510.83791888	www.jshm.com
Liangyou Agro Machinery	31	86.519.88309988	www.jsliangyou.com
Hongxing Machinery	34	86.794.4382462	www.jx-hongxing.com
Huamu machinery	35	86.510.83791318	www.china-huamu.com
Hermes Brand Contrive	45	86.411.39760833	www.hermesdeslgn.com
Sun Shine Enzyme	47	86.455.7703217	www.polyenzyme.com
Habio Bioengineering	48	86.28.66853107	www.www.habio.net

the certificate of environmentally-friendly product certification in China's feed sector.

Tongwei Group put the quality awareness into practice and carried out "6S" management, strictly conforming to the standard "militarization management" on production floor. At the same time, the group set up a "2 Million Award Fund for Quality Management" to encourage employees and leaders who made great contribution to quality management. For the significant contributions to ISO9000 quality system, Tongwei was awarded the honorary title of "Quality Management Innovation award" by International Quality Certification Net (IQ Net)in September, 2004 at the 13th Annual Convention. Tongwei is the only enterprise which was granted the honor in China's feed sector.

Tongwei's achievements in aquatic field received great care and support from China's state leaders at all levels. Many central government leaders have visited it. As a leading enterprise in China's aquatic industry, Tongwei has paid its attention to the international market and worked out a detailed marine development strategy to dominate the overseas feed and aquaculture markets. Presidents of Venezuela and Indonesia had visited Tongwei Group and signed a series of agreements about staff training, good species introduction and feed export with the group. Many heads of government and powerful figures in business from Japan, the United States, South Africa, Ethiopia, Bangladesh and several other countries and regions have visited Tongwei Group and made high comment to the tremendous achievements that China's aquatic industry have made in 20 years. As a leader in aquatic industry, Tongwei Group is delivering information to the whole world through its rapid development and it has attracted the world's attention. Tongwei Group was fully prepared for investing Vietnam after making a special inspection trip by the end of 2002. In April 2007, Tongwei Group set up the Vietnam Yuehua Aquatic Feed Co., Ltd. in Quang Nam Province, it sounds clarion call for attacking the Southeast Asia market; in 2007, Tongwei Group set up Vietnam Tongwei Feed Co., Ltd. in Tien Giang province of Vietnam, of which, the annual output of aquatic feed for single plant will reach 500,000 tons. Upon completion, Vietnam Tongwei Feed Co., Ltd. will be the biggest aquatic feed production base in the whole Asia. Tongwei will drive the development of aquaculture industry further and bring greater and more opportunities and benefits for local Vietnam aquaculture operators.

Calendar

International event 2008

March 5

Victam Asia 2008 & Feed Ingredients & Additives Asia Pacific (FIAAP) 2008
Queen Sirikit National Convention Center, Bangkok, Thailand
TEL:+66 2 203-4200; FAX:+66 2 203-4250-1
www.victam.com

April 8

AGRAme 2008
Dubai International Exhibition Centre, Dubai, UAE
TEL:+971 4 3365161; FAX:+971 4 3350673
www.agramiddleeast.com

April 20

24th Alltech International Feed Industry Symposium
Lexington, Kentucky, United States
TEL:+1 859 887 3328; FAX:+1 859 887 3256
www.alltech.com

April 25

ILDEX Vietnam 2008
Ho Chi Minh City, Vietnam
TEL:+66 2 203 4243; FAX:+66 2 203 42501
www.ildex.com

May 27

VIV Europe 2008/Moscow Edition
Moscow, Russia
www.viv.net

August 22

ILDEX India 2008
New Delhi, India
TEL:+66 2 203 4243; FAX:+66 2 203 42501
www.ildex.com

December 4

Vietstock 2008 Expo & Forum
VAFEC, Hanoi, Vietnam
TEL:+603 40454993; FAX:+603 40454989

Domestic event 2008

May 25-28

The International Animal Husbandry and Feedstuff Industry Exhibition(West China)
TEL:(028)87317432 87322302; FAX:(028)87317433

May 18-20

2008 China Animal Husbandry and Feed Industry Expo
Xi'an
TEL: 010-64194586; FAX:010-58677829
www.chinafeed.org.cn; www.caaa.com.cn

May 25-29

The 8th Xinjiang International Animal Husbandry Fair
Xinjiang International Exposition Center(43 North Youhao RD, Urumchi)
TEL:(0991)2321006 2321606-8043; FAX:(0991)2321006
www.chinazhenwei.com.cn

September 20-24

The Seventh Symposium of World's Chinese Scientists on Nutrition and Feeding of Finfish and Shellfish
Beijing
TEL:010-68919753; FAX:010-68976855
www.aquanutrition.net

October 20-22

2008 VIV China
Beijing
TEL:010-64988370; FAX:010-64950374
www.China-av.net

November 25

The First Forum on Technological Innovation of Feed Enterprises
TEL:010-68919753; FAX:010-68976855
www.aquanutrition.net

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1.Job Function (Please check one)

☐ General Administrative
☐ Marketing & Sales
☐ Mill/Plant Operations
☐ Vets, QC, Nutritionists
☐ Other: (Please specify)

2.FEED INDUSTRY: Please check primary operation of your business: (Check only one)

☐ Feed Manufacturer Selling to Others
☐ Pre-Mix Manufacturer Selling to Others
☐ Feed Dealer
☐ Feed Mixer
☐ Elevator
☐ Livestock/Poultry Producer Mixing Feed for own use
☐ Veterinarian
☐ Nutritionist

Manufacturers/Distributors/Brokers of:

☐ Feed Additives
☐ Feed Ingredients
☐ Animal Health
☐ Equipment/Machinery

3.If you checked any of the above, please indicate your average weekly tonnage: (Check only one)

☐ 500 or more tons ☐ 50-99 tons
☐ 200-499 tons ☐ Less than 50 tons
☐ 100-199 tons

4.Types of feed manufactured or sold at this location: (Check all that apply)

☐ Beef Cattle ☐ Turkey ☐ Dairy
☐ Horse ☐ Pig ☐ Dog/Cat
☐ Broiler ☐ Fish ☐ Layer/Pullet
☐ Other

5.ALLIED INDUSTRIES: Please check primary operation of your business: (Check only one)

☐ Importer/Exporter
☐ Consultant
☐ Extension/College ☐ Other

6.In which way can you get the China Feed Industry Magazine?

_____

7.Have you ever considered to invest or export your products to China? If you desire to enter Chinese market, what would you like to consider in your feasibilily research report?

_____

8.For China feed industry, what part would you like to pay attention on and what do you want to know the most?

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9.What's your wish and hope for this magazine?

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