

### III-2.1 Feed industry

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Most producers add methionine in formula feed, while some premix feed producers, wishing to gain more for adding more value in their feed, add some methionine in premix feed, with quantity varied. For both cases, the producers have to adjust adding volume of methionine every time a different batch of feed is produced, because of the situation mentioned above.

Other factors that drive feed manufacturers to adjust their methionine adding content are the fish meal's price and its supply. When the price of fish meal is low and supply is sufficient, they choose to more fish meal, which means less methionine is needed.

Feed producers add little methionine in their feeds for ruminants, because on the one hand there's no governmental requirement on the adding volume of methionine in ruminants feed, and on the other hand, the profit margin of ruminant feed is small, making the feed producers reluctant to invest more in such feeds.

In aquatic products feed, producers also add little methionine, also because methionine is not a must in aquatic products feed required by the government. Another reason is that fish meal, another raw material for such feed, contains enough amino acids, including methionine that is needed.

Little MHA is used by feed producers in the north of China, as MHA becomes solidified when it is cold.

#### → **Comparison of DLM and MHA**

Most feed companies choose DLM rather than MHA as

- There is not a uniform opinion about the potency of MHA: how much MHA is equivalent to a tonne DLM, though most people think the potency of MHA is 76% or 84% of DLM;
- MHA needs a spray machine which is not easily available, that's why some users prefer DLM to MHA, and also the reason why some group companies in charge of purchase of all their factories, usually choose DLM, though some of their factories may have spray machines, because for those factories without spray machines, they will face difficulties, if their group companies choose MHA for them.
- MHA is not easy to be mixed evenly.
- MHA becomes solidified when it is cold.

The marketing of MHA is hard in China. Sumitomo Chemical Co., Ltd. did such work in China many years ago and it proved to be hard, since MHA's color, odor is much different from DLM and it is hard to measure the purity of MHA. When Sumitomo, Adisseo and Novus promoted MHA in China, they installed the spray machine for users for free. Now they do not do that any more. But many domestic manufacturers will choose to add MHA if it is cheap enough by

installing the spray machine by themselves, which is about USD14,663 (RMB100,000) per set.

Table III-2.1-3 Comparison of DLM and MHA

Specification	DLM	MHA
Price	■	■
Rumen bypass	■	■
Acidifier	■	■
Release of nitrogen	■	■
Heat stress response	■	■
Dust	■	■
Machine	■	■
Effective components	■	■
Smell	■	■
Organic acid	■	■
Solidification	■	■

Source: CCM

#### — Consumers in feed industry

Table III-2.1-4 Methionine consumption in some feed companies in 2007

Feed company	Main products	Consumption
Shandong Liuhe Group Co., Ltd.	Premixed feed, formula feed	■
China Animal Husbandry Industry CO.,LTD	Premixed feed, formula feed	■
China Grains & Oils Group Feed Co., Ltd	Premixed feed, formula feed	■
Chia Tai (China) Investment Co., Ltd	Premixed feed, formula feed	■
Hunan Zhenghong Science and Technology	Premixed feed, formula feed	■
Guangdong Wens Foodstuffs Group Co.,Ltd	Premixed feed, formula feed	■
Sichuan Province Xuke Feed Co., Ltd.	Premixed feed, formula feed	■

Source: CCM

Detailed methionine consumption situation in different feed companies in 2007 is shown as follows:

### III-2.2 Food and pharmaceutical

The DLM consumption in food and pharmaceutical industry grew quickly in 2005 and 2006, but the growth rate slowed down in 2007 with only 2.53%. The major reason that the output of food and pharmaceutical methionine slowed down in 2007 is the supply shortage of DLM, caused by traders' stocking up products for large profit.

There are two kinds of food and pharmaceutical methionine in China: DL- and L-

Table III-2.2-1 DLM consumption in food and pharmaceutical industry in 2007

Year	DL	Share	L	Share	Total	Growth rate of total consumption
2005	█	█	█	█	█	█
2006	█	█	█	█	█	█
2007	█	█	█	█	█	█

Source: CCM

█ tonnes of DLM were refined into food and pharmaceutical methionine in 2007 in China. The details are shown as follows:

Table III-2.2-2 DLM end users in food and pharmaceutical industry in 2007 (tonne)

Company name	DL- Output	L- Output	Consumption
Guangxi Degussa Rexim (Nanning) Pharmaceutical Co., Ltd.	█	█	█
Jiangsu Zhangjiagang Huachang Pharmaceutical Co.,Ltd.	█	█	█
Beijing Jianli Pharmaceutical Co., Ltd.	█	█	█
Jiangsu Wuxi Benniu Bio-technology Co.,Ltd.	█	█	█
Hubei Provincial Bafeng Pharmaceuticals & Chemicals Share Co., Ltd.	█	█	█
Hebei HuaYang Chemical Co., Ltd.	█	█	█
Zhejiang Ningbo Zhenhai Haide Amino Acid Company	█	█	█
Sichuan Chengdu Baishixing Technology Co.,Ltd.	█	█	█
Jilin Xiuzheng Pharmaceutical Group Liuhe Pharmaceutical Co., Ltd.	█	█	█
Jiangsu Zhangjiagang Shuguang Biochemical Factory	█	█	█
Others	█	█	█
<b>Total</b>	█	█	█

Source: CCM

The total consumption volume of food grade and pharmaceutical grade methionine in 2007 is █ tonnes, and its average annual growth rate was █ from 2001 to 2007. The fast growth rate is attributed to the continuously increasing demand of pharmaceutical, especially the demand from compound amino acid injections.

Food grade and pharmaceutical grade methionine is mainly consumed in pharmaceuticals and flavor.

In 2007, █ of food grade and pharmaceutical grade methionine is used in the production of pharmaceuticals, especially the compound amino acid injections. This field has always been the major consumption field of food grade and pharmaceutical grade methionine. And this situation will not change in next few years because most people's belief that methionine is a kind of pharmaceutical that can provide nutrition for body will not change in a short time.

Flavor is the second largest consumption field, which only accounts for █ of the total consumption. The volume consumed in this field is small because of the small unit usage.

Healthcare food is a potential market, but it needs much time and investment to exploit it.