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### I-3 Development characteristics of Chinese enzyme industry in the past

Apart from the rapidly increasing output and rich breeds, China's enzyme industry also presented some other characters in the past, e.g. technology level kept being improved; application developed to extend and depth; meanwhile, some obvious disadvantages existed.

#### ➤ Technology level improved much

China's enzyme industry has improved its production technologies such as air isolation filtration technology, fermentation automatization technology, ultrafiltration membrane post-processing technology, asepsis technology, conservation technology in past thirty years. By increasing investments in technology innovation, China's enzyme industry has gradually made the following achievements:

- ✓ Varieties and specification of enzyme products have turned to be diversiform;

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## II Overview of enzyme preparations markets in China

China is one the most important enzyme suppliers and consumers around the world. Sales value of enzyme in China has reached to USD ■■■ billion, showing a big increase from USD ■■■ billion in ■■■. Total output of Chinese enzyme has increased to ■■■ tonnes in ■■■ from ■■■ tonnes in ■■■.

It is obvious that increasing use of enzymes in industrial sectors can bring a lot of benefits, including social, environmental and economical benefits around the world.

However, given the volatile and vulnerable economic situation resulting from global economic slowdown since H2 ■■■, Chinese enzyme industry experienced unstable and downward development in ■■■ with the market uncertainty still unfolding currently.

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### III-1.6 Non-starch polysaccharides enzymes (NSP enzymes)

NSP enzymes mainly includes: xylanase,  $\beta$ -glucanase, cellulase, etc. Its main effect is to hydrolyze NSP, which enwraps the nutrition and inhibits the absorption by animal. NSP enzymes are generally compound enzymes. The main kinds include:

- ✓ Enzymes with main components of acidic protease and  $\alpha$ -amylase;
- ✓ Enzymes with main components of xylanase and  $\beta$ -glucannase;
- ✓ Enzymes with main components of cellulase and pectinase;
- ✓ Enzymes with main components of some enzymes mentioned above;

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## **V-2 Research situation of technologies in China (in the past, current progress)**

Research institute with government's strong financial support plays the most important role in development of cutting-edge technologies in Chinese enzyme preparation market. The National High-tech R&D Program (863 Program), has been carried out since ■■■, is the most important research program for enzyme industry. Issuance of 863 Program by China's policy makers is mainly attributed to following factors:

- To meet global challenges from new technology revolution and competition;
- To develop key technologies for construction of China's information infrastructure;

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## **VI-1 Comparison between Chinese and foreign/foreign funded enterprises in China**

More than ■■■ enzyme producers are engaged in enzyme business in China and foreign investors have been playing a more and more important role in Chinese enzyme market. With first joint venture named Jiangyin BSDZYME Bio-engineering Co., Ltd. established in ■■■ in Jiangsu Province, around ■■■ foreign investors have entered into Chinese enzyme industry.

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## **VII-2.2 Market forecast: enzymes in major segments, 2010-2020**

Market forecast on enzymes is made in ■■■ major consumption segments to 2020. Based on these demand forecasts, the total demand of Chinese enzymes to 2020 is obtained. In the low, expected and high growth scenarios, the corresponding CAGR (2010-2014) of enzyme demand for these three scenarios is ■■■ %, ■■■ % and ■■■ % separately, and the corresponding CAGR (2010-2020) of enzyme demand is ■■■ %, ■■■ % and ■■■ % separately.

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