

Consumerism of Probiotics in China

W.L. Hung

Contents

1	Introduction	184
2	Macroeconomic Landscape of China	188
3	China Probiotics Market Overview	193
4	Application and Prospect of Probiotics in China	198
4.1	The General Situation of the Development of Probiotic Products	198
4.2	Health Function and Application of Probiotics Products	198
4.3	The Problem of Probiotics in Food Application	199
5	Conclusion	200
	References	200

Abstract Probiotics continue to attract considerable interest in both the business and scientific communities. However, the manufacture and applications of probiotics ingredients remain a niche market. Companies with the proprietary probiotic strains, appropriate process technologies, and distribution networks dominate the industry. New information about the genome of existing and emerging probiotics strains provides solid basis for successful commercial applications in a growing range of dietary supplements and food products. Gradually, probiotic-enhanced products are moving further into the mainstream in China. This chapter will be a resource with an interest in the growing popularity of probiotics and presents an informative balance of the scientific and market factors that are critical in the probiotics industry in China.

W.L. Hung (✉)

Department of Biotechnology, Research & Development, Want-Want China Holding Limited,
No. 1088, East Hong Son Road, Shanghai 201103, China
e-mail: Hong_WeiLian@want-want.com

1 Introduction

The United Nation's Food and Agriculture Organization (FAO) defines probiotics as "live microorganisms," which when administered in adequate amounts confer a health benefit on the host. These benefits include the prevention and cure of disorders such as lactose intolerance and inflammatory bowel disease. The major factors driving the growth of probiotics include growing health consciousness and the availability of probiotics in the form of dietary supplements. As shown in Fig. 1, probiotics have an extremely versatile application base. The most important feature of probiotics is their ability to promote the health of the user by strengthening their immune system either directly or indirectly by improving the condition of the gut, digestive process, nutritional value, and others. Using various types of probiotic bacteria, it is also possible to produce tailor-made probiotics according to the applications needed for the end user. Due to such favorable characteristics, probiotics have become part of our daily life and continue to make significant progress around the world in terms of both development and revenues.

Global sales of probiotic ingredients amounted to an estimated US \$704 million in 2012. Probiotics of the lactobacillus genus accounted for the largest share, representing an estimated 60.5 % of total sales in 2012. Total global sales of



Fig. 1 Purported health benefits of probiotics and prebiotics: scientific research platforms. *Source:* Euromonitor (2014)

probiotic ingredients are projected to increase at a compound annual growth rate (CAGR) of 6.7 % between 2013 and 2018 (BBC Research 2014).

Probiotics are used in the manufacture of dietary supplements that are sold in the form of capsules, tablets, powders, topical pastes, and gels for human use as well as in animal feed for pets and farm animals. Global sales of probiotic supplements amounted to approximately US \$1.0 billion in 2012, with probiotic supplements in capsule form accounting for the largest share of sales (66.3 %). Total global sales of probiotic supplements are projected to reach US \$2.1 billion in 2018, representing a CAGR of 11.5 % between 2013 and 2018 (BBC Research 2014).

Food applications for probiotics include dairy-based and nondairy-based products. The main dairy-based categories are yoghurts, cultured drinks, kefir, and cheeses. Other food applications include probiotic-enhanced infant nutrition (formula and cereal), nonalcoholic beverages, breakfast cereal, and snack foods. Global sales of probiotic foods amounted to an estimated US \$21.3 billion in 2012. Spoonable yoghurt accounted for the largest share of sales, representing an estimated 34.5 %. Total global sales of probiotic foods are projected to grow at a CAGR of 6 % between 2013 and 2018, to reach \$33.5 billion US in 2018 (BBC Research 2014).

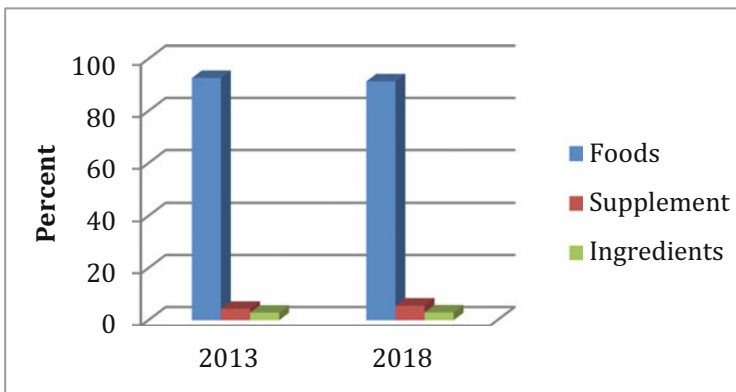
Collectively, global sales of probiotic ingredients, supplements, and foods amounted to approximately US \$23.1 billion in 2012, with probiotic foods representing an estimated 92.4 % of total sales. Global sales of probiotic ingredients, supplements, and foods are projected to reach US \$36.6 billion in 2018, representing a CAGR of 6.2 % between 2013 and 2018 (BBC Research 2014). The following Table 1 and Fig. 2 summarize recent and projected global sales of probiotic ingredients, supplements, and foods through 2018. The market for overall probiotic products was US \$26,125.9 million in 2012 and is estimated to grow at a healthy CAGR of 6 % from 2014 to 2019 (Markets and Markets Analysis 2013). One of the key factors contributing to this market growth is the increasing awareness about probiotic products. The Global Probiotics market has also been witnessing the increase in R&D activities. However, government regulation could pose a challenge to the growth of this market.

In terms of regional distribution (Fig. 3), Asia-Pacific accounted for an estimated 38 %, Europe accounted for 32 %, and North America accounted for 15.1 % of global sales of probiotic ingredients, supplements, and foods in 2013. The ROW

Table 1 Global sales of probiotic ingredients, supplements, and foods, through 2018 (US \$ Millions)

Probiotics	2012	2013	2018	CAGR% (2013–2018)
Foods	21,313.9	25,090.0	33,505.9	6.0
Supplements	1038.4	1190.1	2051.2	11.5
Ingredients	704.0	798.0	1104.4	6.7
Total	23,056.3	27,078.1	36,661.5	6.2

Source: BBC Research (2014)



Probiotics	2013	2018
Foods	92.7	91.4
Supplements	4.4	5.6
Ingredients	2.9	3.0
Total	100	100

Fig. 2 Projected shares of global sales of probiotic ingredients, supplements, and foods, 2013 and 2018 (%). *Source:* BBC Research (2014)

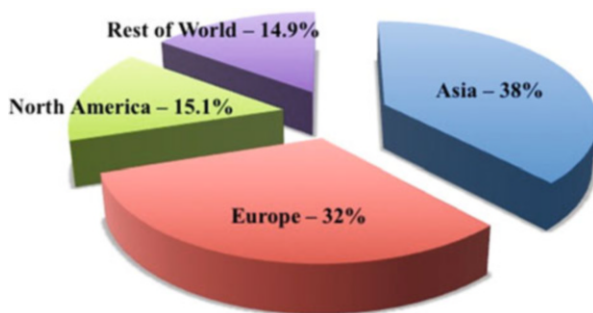


Fig. 3 Global probiotics market value, by Geography, 2013. *Source:* BBC Research (2014), Transparency Market Research (2013)

accounted for the remaining 14.9 % of total global sales in 2013 (Transparency Market Research 2013).

Growing consumption of yoghurt and increasing concerns over digestive and gut health are major driving forces behind probiotic consumption growth. The probiotics market is concentrated in Japan, the USA, and Western Europe, where traditionally probiotic demand has been always strong (BBC Research 2014). In Asia-Pacific, with economic conditions improving at a rapid pace, consumer purchasing power has also gone up multifold (Transparency Market Research 2013).

This has resulted in a sharp rise in revenues for the probiotics industry in the region. Growing demand for probiotics products across the world has translated into increased R&D spending and new product developments over the last 3 years.

The probiotic ingredient market consists of various stakeholders such as suppliers, ingredient processors, research institutes, food and beverage companies, traders, distributors, and consumers. The companies enjoying substantial market share are Yakult Honsha (Japan), Danone (France), Nestle S.A. (Switzerland), etc. At present, Asia-Pacific and Europe dominate the global probiotic consumption. Together, they accounted for over 70 % of the global market in terms of revenue. With over 38 % share in total revenue generated by the global market, Asia-Pacific is the leading market for probiotics (BBC Research 2014).

Asia-Pacific, owing to its high awareness of the benefits of probiotic yoghurts and fermented milk, is the largest market for probiotics, followed by Europe. However, the market is growing rapidly in the USA as well; the general affinity of the US population toward probiotic dietary supplements and the concept of preventive health care (Rephrased from RD) are expected to drive the probiotic ingredient market in future due to which the sales of probiotics yoghurt are already on the rise (Transparency Market Research 2013).

The greatest disadvantage facing the industry is the low level of awareness among consumers about the benefits of probiotics. Moreover, various alternative probiotic strains are available in the market having similar properties of enhancing the immune system and improving gut health, thus creating greater consumer misunderstanding. One of the biggest drawbacks for probiotics is the lack of any kind of insurance cover for probiotic usage.

The probiotics market is currently being driven by the rising popularity of probiotic functional foods and beverages (F&B) among consumers. Age, stress, poor diet, etc., are some of the reasons responsible for digestive ailments, bloating, reduced resistance to infections, etc.; consumption of probiotic-enhanced products helps to alleviate these widespread conditions. These products contain live microorganisms (probiotics) that confer positive health effect on the host (Caselli et al. 2013). Companies such as Yakult Honsha (Japan) and Chr. Hansen (Denmark) have developed patented strains of microorganisms claiming to affect specific health benefits. There has been a proliferation of probiotic ingredient suppliers who develop tailored strains of microorganisms for integrating with a diverse set of products. Awareness, faith on their efficacy, and safety are some of the deciding factors for the success of probiotic products.

Women buyers are the key drivers for the probiotics market. With the probiotic strains becoming a common factor among the manufacturers, taste and convenience continue to be the most important factors to secure the market share. Overall, there is now a flourishing market for functional F&B suppliers and manufacturers, where product innovation will be the key factor to increase the market share.

The issue of counterfeit products making unsubstantiated health claims in the market has diluted the image of the authentic products by making potential consumers wary about making the choice of consuming probiotic products. This is restraining the growth of the probiotic ingredient market. Moreover, the market

faces stiff competition from other categories of functional and good-for-health foodstuffs that have significant market share as well as goodwill among consumers, such as products with lesser carbohydrates, or fortified with omega-3, vitamins, etc.

The early movers in the industry are likely to benefit in terms of market share; however, it is important that they focus on innovating probiotic strains that are more efficient in terms of stability and survivability in harsh conditions and are supported by competitively priced production technologies. Extensive research is required to develop cost-efficient manufacturing processes for probiotics. Companies are hence aiming to invest in R&D for the same reasons. In addition, manufacturers have ensured extensive communication with the consumers in terms of legitimate assertions for the health benefits of these products. Such communications, substantiated with scientific publications, are bound to help consumers' faith and in turn gain profits in the market.

2 Macroeconomic Landscape of China

Despite weak and uncertain global conditions, IMF predicated that the Gross Domestic Product (GDP) for China's economic growth (Fig. 4) would slow down to 7.4 % in 2014 and 7.1 % in 2015 (IMF Public Report 2014). And the World Bank trimmed its own 2014 forecast to reflect "the bumpy start to the year," predicting China's GDP to grow 7.6 % this year, with its 2015 figure unchanged at 7.5 % (The World Bank 2014). In China, GDP is divided by three sectors: Primary, Secondary, and Tertiary. The Primary Industry includes farming, forestry, animal husbandry, and fishery and accounts for around 9 % of GDP. The Secondary sector, which includes industry (40 % of GDP) and construction (9 % of GDP), is the most important. The Tertiary sector accounts for the remaining 44 % of total output and consists of wholesale and retail trades; transport, storage, and post; financial

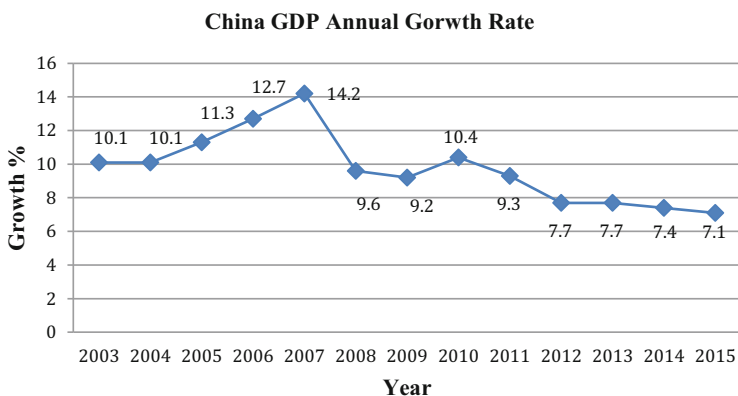


Fig. 4 China GDP annual growth rate data. *Source:* IMF Public Report (2014)

intermediation; real estate; hotel and catering services; and others (Trading Economics 2014).

The GDP in China expanded 7.30 % in the third quarter of 2014 over the same quarter of the previous year. GDP Annual Growth Rate in China averaged 9.10 % from 1989 until 2014, reaching an all-time high of 14.20 % in the fourth quarter of 1992 and a record low of 3.80 % in the fourth quarter of 1990 (The National Bureau of Statistics of China 2014). The National Bureau of Statistics of China (2014) reports GDP Annual Growth Rate of China. In the third quarter of 2014, China’s GDP expanded 7.3 % year-on-year, slumping to a 5-year low. The slowdown was driven by lower property investment, dwindling credit growth, and weakening industrial production. But China will launch major investment projects in information networks, environmental protection, and infrastructure and water conservancy. Fiscal and monetary policies would be kept flexible and appropriate targeted adjustments made when needed to support the real economy. In September 2014, China’s central bank relaxed lending rules for home buyers and allowed banks to offer a maximum 30 % discount to first-time homebuyers (XinHuaNet 2014). The bank also injected 500 billion CNY (US \$81 billion) into five largest banks via a 3-month standing lending facility operation, a move aiming to support credit and growth (Trading Economics 2014).

Figure 5 indicated that consumer confidence index (CPI) in China is kept at 111, and the CPI fell 0.1 substantially by comparing each quarter with the previous quarter, and fast moving consumer goods (FMCG) growth rate% is kept around on average 6.5 % (Nielsen Research 2014). This means that Chinese people on the economic prospect are still full of confidence; therefore, the market also is optimistic about China’s employment market, and will be advantageous to help keep the RMB exchange rate. When a country’s CPI rose, indicating that the country’s inflation rate rose, which means the monetary purchasing power abatement, according to the theory of purchasing power parity, the country’s currency should be weakened. On the contrary, when a country’s CPI fell, indicating that the country’s inflation rate to drop, which means the monetary purchasing power rise,

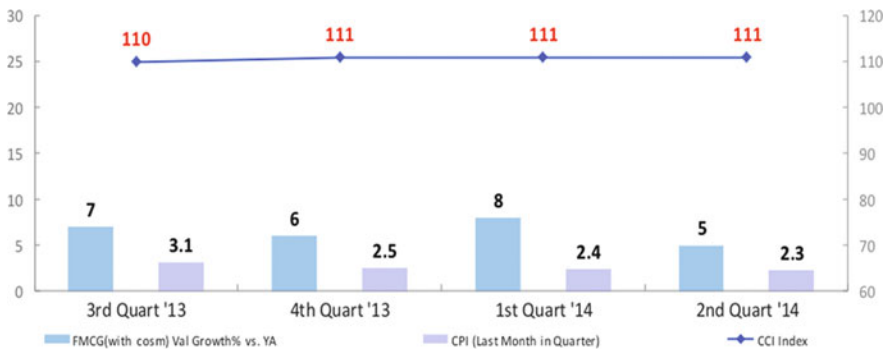


Fig. 5 China consumer confidence index, price index, and fast moving consumer goods growth rate%. *Source:* Nielsen Research (2014)



Fig. 6 Chinese city/rural introduction. *Source:* The National Bureau of Statistics of China (2014)

according to the theory of purchasing power parity, the country’s currency should be stronger.

Figure 6 shows the Chinese city/rural structure; it is divided into 5 different levels, tier 1, tier 2, tier 3, tier 4, and rural. The new first-tier cities will emerge from the tremendous growth potential of the tier 2 and tier 3 city (Figs. 7 and 8) in the future. The new first-tier cities will bring a new situation in the future consumption mode, because the total population of new first-tier cities will become more than the total population of the original number of first-tier cities, and consumption capacity will also show great strength (The National Bureau of Statistics of China 2014). At the same time, “China Consumer Confidence Survey” study found that (Figs. 9 and 10), the consumers who live in tier 2, 3, and 4 cities are most concerned about the health issue from the amounts factors of health, income, children’s education and welfare, health care, job security, parents’ welfare and happiness, increasing food prices, personal career, increasing real estate price, environmental protection, and many other issues (China Consumer Confidence Survey 2014). It is said that “health issue” will quickly sweep the Chinese in the future, and related health products will also become the hottest product.



Fig. 7 Potential tier 2 and 3 cities will become the future tier 1 city. Source: The National Bureau of Statistics of China (2014)

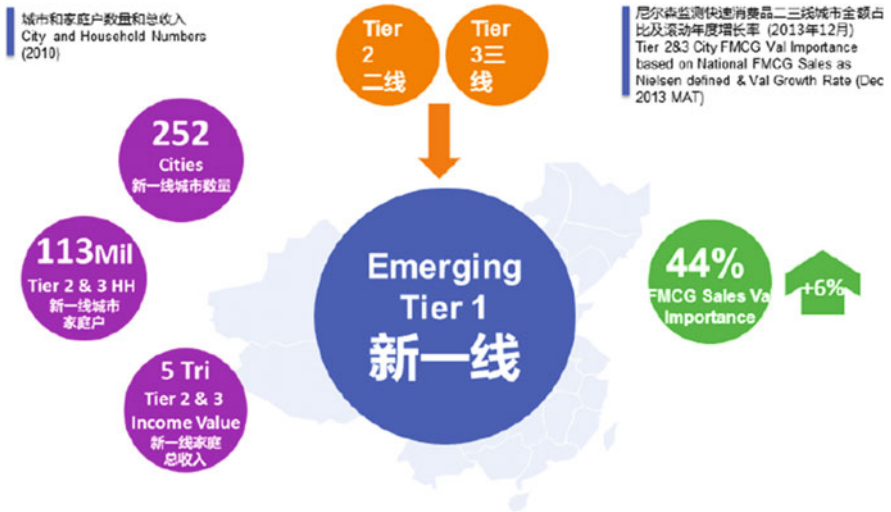


Fig. 8 The future new tier 1 city will be the important new engine in China. Source: The National Bureau of Statistics of China (2014)



Fig. 9 Health is the most important issue in China. Source: China Consumer Confidence Survey (2014)

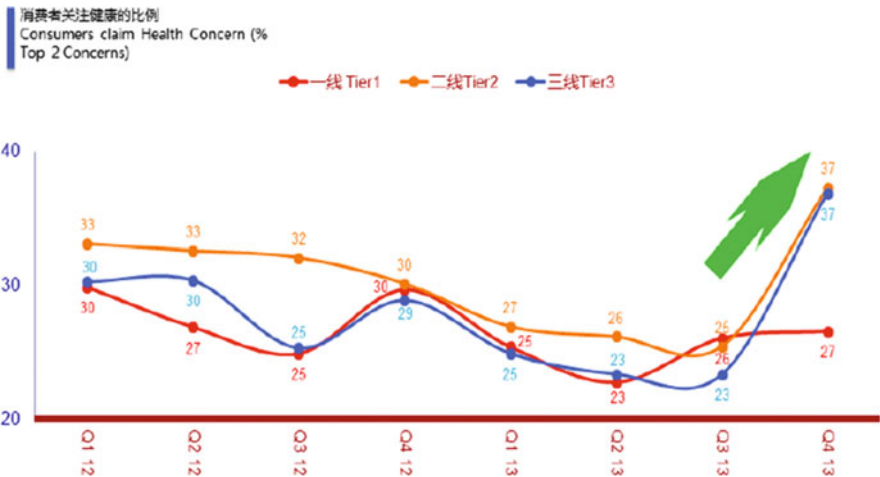


Fig. 10 Consumers claim health concern (%). Source: China Consumer Confidence Survey (2014)

3 China Probiotics Market Overview

How to create a successful probiotics market? It is of important experience to learn from the market of European and the USA how they promote the probiotic industry for many years, and the following 5 key points should be considered (Fig. 11): (1) Consumer awareness about the benefits of probiotics. (2) Difference between the buying behavior of consumers in developed and developing nations. (3) Weak immune system of children born from cesarean operations. (4) Women as traditional Food and Beverage buyers. (5) Aging baby boomer population are primary potential consumers. Chinese market will be facing the same situation, and it would be critical to think about these key factors in marketing planning if we were to build a successful probiotic market in China.

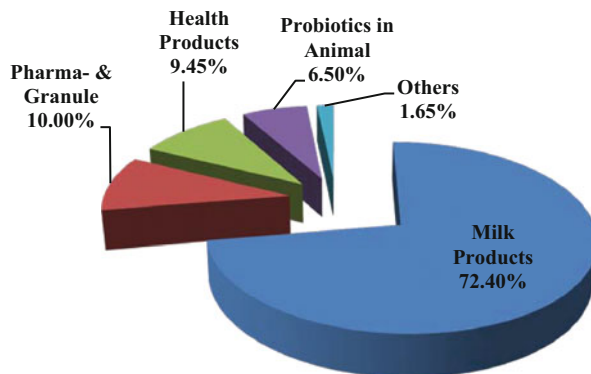
Chinese industry information network (2013) pointed out that, along with the deepening research in probiotics, probiotics are increasingly widely applied. In dairy products, it is mainly used in yoghurt, cheese, butter, cheese, and probiotics production. And in the probiotic product market share in China, milk products are 72.4 % and Pharma- & Granule are 10 % (Fig. 12).

The development of traditional probiotics application fields is achieved with innovation. The traditional production of yoghurt fermentation strains by *Lactobacillus bulgaricus* and *Streptococcus thermophilus* was the best combination, but with the development of the manufacturing technology, the “traditional” sense of the yoghurt has a broader connotation, such as dried yoghurt, frozen yoghurt, and yoghurt sterilization. A “new” variety of yoghurt and fermented milk products is constantly emerging (Mugambi et al. 2014). For example, Finland, Norway,

Fig. 11 The keys of booming probiotic market.
Source: Markets and Markets Analysis (2014)



Fig. 12 Probiotics market structure in China. *Source:* Chinese industry information network (2013)



Holland, and other countries have listed new functional yoghurt: *Lactobacillus casei* yoghurt has been listed for sale, Bifidobacterium yoghurt, *Lactobacillus acidophilus* yoghurt has been accepted by consumers. Ymer (Denmark), Nordic ropy milk, and other products; condensed milk (Middle East), Chakka (India) and other types of yoghurt products; Kefir (kephir); Koumiss (cream) yeast fermentation product is becoming a development key point. The annual number of new probiotic dairy products increased 5 times in as short as of 5 years.

At present, the domestic dairy enterprises selected probiotic strains is monopolized by foreign companies; the proportion is about 90 %. Companies such as Danish Hansen Ltd., Danisco, the Holland, and the United States probiotics production enterprises are the main supplier of domestic dairy enterprises of probiotics.

Enterprises have two kinds of choices in their selection of the strain, developing their own or purchasing ready-made bacteria strains; whether it is domestic or foreign isolates strains, they are extracted either from the separation of human body or from nature. If one must say which is “better,” from a genetic perspective, it may be only suitable for the population from a group of host’s isolated populations of the endemic probiotic species, specific need rigorous determination, and clinical observation. At present, all edible lactic acid bacteria are beneficial to human body, but there must be individual differences in the uptake of probiotics as each intestinal colonies of each person is not identical and individual drinking habits are different (Mugambi et al. 2014).

Chinese government announced the legitimate list of species for infant food (2011) and for normal food usage (2012) (Tables 2 and 3). Only six species that are with substantial clinic research references worldwide could be used for infant food; for normal food, 24 species are deemed to be safe and could be used (Wang and Luo 2011).

According to the report of the Euromonitor (Table 4), pro/prebiotics used in dairy-based yoghurt, amounted from 10,832 million CNY in 2009 to reach 33,011 million CNY in 2014. Currently, pro/prebiotic drinking yoghurt is still the main consumer market, but pro/prebiotic spoonable yoghurt shows rapid growth, from 2079 million CNY in 2009 which rises to 12,579 million CNY in 2014, nearly a

Table 2 The legitimate use of species for infant food in China (2011)

Species name	Strain name
<i>Lactobacillus acidophilus</i>	NCFM
<i>Bifidobacterium animalis</i>	BB-12
<i>Bifidobacterium lactis</i>	HN019
	Bi-07
<i>Lactobacillus rhamnosus</i>	LGG
	HN001

Table 3 The legitimate use of species for food (2012)

Species name	Species name
Bifidobacterium	Lactobacillus
<i>Bifidobacterium adolescentis</i>	<i>Lactobacillus acidophilus</i>
<i>Bifidobacterium animalis</i>	<i>Lactobacillus casei</i>
<i>Bifidobacterium lactis</i>	<i>Lactobacillus crispatus</i>
<i>Bifidobacterium bifidum</i>	<i>Lactobacillus delbrueckii</i> subsp. <i>Bulgaricus</i>
<i>Bifidobacterium breve</i>	<i>Lactobacillus delbrueckii</i> subsp. <i>Lactis</i>
<i>Bifidobacterium infantis</i>	<i>Lactobacillus fermentum</i>
<i>Bifidobacterium longum</i>	<i>Lactobacillus gasseri</i>
	<i>Lactobacillus helveticus</i>
Streptococcus	<i>Lactobacillus johnsonii</i>
<i>Streptococcus thermophilus</i>	<i>Lactobacillus paracasei</i>
Leuconostoc	<i>Lactobacillus plantarum</i>
<i>Leuconostoc mesenteroides</i> subsp. <i>mesenteroides</i>	<i>Lactobacillus reuteri</i>
Propionibacterium	<i>Lactobacillus rhamnosus</i>
<i>Propionibacterium freudenreichii</i> subsp. <i>Shermanii</i>	<i>Lactobacillus salivarius</i>

Table 4 The market of pro/pre biotic yoghurt between 2009 and 2014

	2009 ▼	2010 ▼	2011 ▼	2012 ▼	2013 ▼	2014 ▼
Pro/Pre Biotic Drinking Yoghurt—CNY mn	8753.4	10,302.2	12,648.7	14,544.9	17,063.5	20,432.3
Pro/Pre Biotic Spoonable Yoghurt—CNY mn	2079.3	2888.1	4227.8	5856.9	8775.1	12,579.2
Pro/Pre Biotic Flavored Spoonable Yoghurt—CNY mn	236.0	340.3	465.3	597.8	769.8	971.8
Pro/Pre Biotic Fruited Spoonable Yoghurt—CNY mn	422.1	594.2	929.8	1236.6	1619.9	2080.7
Pro/Pre Biotic Plain Spoonable Yoghurt—CNY mn	1421.2	1953.6	2832.8	4022.5	6385.4	9526.6

Source: Euromonitor (2014)

6 times growth. In terms of CAGR% between 2013 and 2014 of pro/prebiotic drinking yoghurt, the sales volume is increasing by 12 % and the sales value is increasing by 19.7 % (Fig. 13). However, the retail value RSP (retail sales price) of probiotic supplements is just starting to growth, from 196 million CNY in 2009 to 358 million CNY in 2014, and is estimated to reach 553 million CNY in 2018 (Fig. 14).

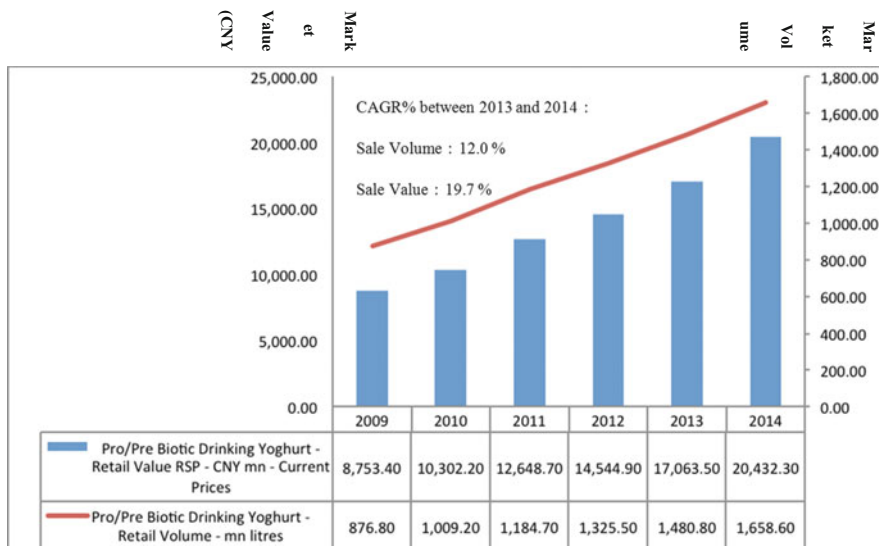


Fig. 13 Pro/pre biotic drinking yoghurt retail value and volume between 2009 and 2014 in China. *Source: Euromonitor (2014)*

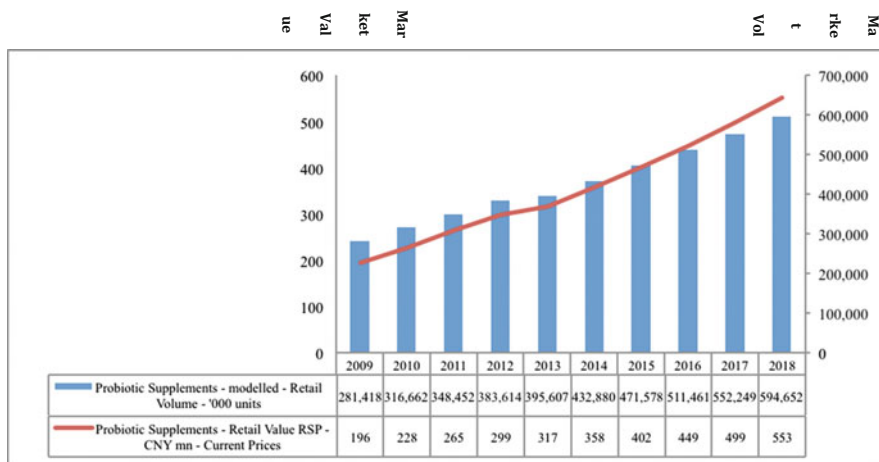


Fig. 14 Probiotic supplements market value and volume in China. *Source: Euromonitor (2014)*

Table 5 Probiotic yoghurt product companies markets share in China

Companies	2009	2010	2011	2012	2013
Hangzhou Wahaha Group Co. Ltd.	45.90	46.40	43.60	38.90	33.70
China Mengniu Dairy Co. Ltd.	5.50	12.50	14.70	16.70	17.90
Yakult Honsha Co. Ltd.	10.00	11.90	13.10	14.90	17.20
Inner Mongolia Yili Industrial Group Co. Ltd.	8.20	9.50	10.90	11.70	12.70
Bright Food (Group) Co. Ltd.	8.40	9.00	8.30	8.90	10.30
Wei Chuan (BVI)	1.70	1.70	1.60	1.60	1.60
Guangzhou Zhujiang Meileduo Beverage (HK) Co. Ltd.	2.10	2.10	1.90	1.70	1.50
Wonder Sun Dairy Co. Ltd.	1.20	1.20	1.10	1.10	1.00
Sichuan New Hope Agribusiness Co. Ltd.	0.90	1.00	0.90	1.00	0.90
Guangzhou Yantang Dairy Co. Ltd.	0.70	0.70	0.80	0.80	0.80
Green's Bioengineering (Shenzhen) Co. Ltd.	0.60	0.60	0.50	0.50	0.50
Others	8.30	3.40	2.70	2.30	2.00
Total	100.00	100.00	100.00	100.00	100.00

Source: Euromonitor (2014)

Table 6 Sales comparison of Yoghurt and Yoghurt drink in China

China market	Annual sales	2010 and 2006 sales comparison	2013 and 2006 sales comparison
Yoghurt	+19.1 %	+2.2 times	+3.5 times
Yoghurt drink	+37.1 %	+2.5 times	+9 times

Source: Neilsen Research (2014)

Table 5 shows that market sharing of Probiotic yoghurt product companies in China from 2009 to 2013, the Hangzhou Wahaha group Co. Ltd. stays ahead for many years, China Mengniu Dairy Co. Ltd. is now No. 2, and Yakult Honsha Co. Ltd. No. is No. 3. China's yoghurt market is constantly changing and growing. According to the Neilsen Research Report (2014), the annual sales of Yoghurt in China increased 19.1 %, and Yoghurt drink increased 37.1 % (Table 6). If 2010 and 2006 sales are compared, yoghurt part increased 2.2 times and yoghurt drinks increased 2.5 times, but if 2013 and 2006 sales are compared, yoghurt part increased 3.5 times and yoghurt drinks increased 9 times.

4 Application and Prospect of Probiotics in China

4.1 *The General Situation of the Development of Probiotic Products*

Probiotics market of China started late, along with China's consumer eating habits changing to finer health-oriented foods! Probiotic products' market is currently mainly in the food and dietary supplements on foreign markets. A healthy probiotic with continuous development of new technology and new products to meet consumer tastes and ideas and to combine with dietary fiber, oligosaccharide dairy products, and healthcare products, etc., will further expand market share.

The main product types are liquid milk and yoghurt with probiotic. Normally, dietary supplement products contain probiotics in the form of a capsule, powder, oral liquid, or tablet added with other ingredients such as milk, non-dairy, sheep milk powder, cranberry extract carrier, fructo-oligosaccharides (FOS), immunoglobulin, fermentation by-products, and other biologically active substances (Mugambi et al. 2014; Wang et al. 2013; Fen et al. 2010). Probiotic product is either a single strain or combined multiple strains, including lactobacillus, Bifidobacterium, and less use of Enterococcus, bacillus, *Escherichia coli*, and yeast. Dietary supplements are primarily a health food or natural salt crystal. In the past few years, the probiotics market has grown steadily with the growth of overall natural products' market. Study on the physiological effects of daily intake of 1×10^9 CFU~ 1×10^{10} CFU of probiotics (such as the treatment of diarrhea, lactose intolerance, increased fecal enzyme activity test research) proved effective. Now the dietary supplement with active probiotics is easy to reach this effective level (Wang and Luo 2011; Yuan et al. 2010).

4.2 *Health Function and Application of Probiotics Products*

Probiotics, the new healthcare doctor, has clinical value and wide application prospect. With in-depth research, one starts to understand the relationship between probiotics and intestinal microflora. It promotes health by improving immunity and balancing host and intestinal microbial. Enterprises endeavors to increase the rate of utilization and expand the space for probiotics development. Probiotics could adjust the imbalance of intestinal flora and improve micro-ecological environment, thus providing the effective results of prevention and treatment on the various causes of acute/chronic diarrhea, constipation, and other digestive diseases (Wang et al. 2013). Probiotics also have the antitumor effect which is mainly reflected in the optimal combination of metabolism products of intestinal flora to enhance the immune function of organism (Caselli et al. 2013; Yuan et al. 2010). At the same time, anticancer probiotics could eliminate the degradation of carcinogenic

nitrosamines. In addition, probiotics could promote intestinal peristalsis and help to flush the harmful bacteria out of the body.

Probiotics is mainly used in the food industry in China, and 90 % of them are used in dairy products that are mostly in yoghurt, milk drinks, yoghurt drinks, infant milk powder, milk, and the activity of neutral flavored milk products. Especially in fermented milk, the development and utilization effect of probiotics is more significant, and has become a hot selling product. The global annual production of fresh yoghurt reached 1600 million tons. The yoghurt production of China is nearly 310 thousand tons in 2001, which increased to 1620 thousand tons in 2005. It has increased more than 4 times during 5 years. Yoghurt drinks beverage is more than 140 thousand tons in 2001 and increased to nearly 1080 thousand tons in 2005; this has increased more than 6 times. Fermented dairy products have become a new growth point in the dairy industry (Yun 2013; Yuan et al. 2010).

Recently, functional food of probiotics has become a hot research and development topic, including functional yoghurt in improving lactose intolerance, lowering cholesterol, preventing cancer, reducing diarrhea, and playing a very important role in improving the immunity. Common method for production of functional yoghurt is to add probiotics after yoghurt fermentation is completed, to complete the subsequent fermentation. Chang et al. (2006) have reported the beneficial effect on the basis of this, according to their experimental results; xylitol could completely replace the sucrose and the used low fat skim milk. So functional yoghurt would be produced and could help diabetic patients and older consumers' consumption.

At present, Probiotics is not only used in dairy products, such as yoghurt, yoghurt drink, and infant milk powder, etc., but also gradually being used for the development of various functional foods, such as infant food, beverage, candy, baked goods, and snack foods (Yun 2013). With the development of science and technology: micro-capsule technology in recent years, which greatly improves the resistance to storage and the processing resistance to a large extent, the technical advance has been applied in the processing of probiotics for probiotics products and developing enhanced function of probiotics (Wang et al. 2013).

4.3 The Problem of Probiotics in Food Application

At present, every country is vigorously developing probiotic foods to expand the scope of application of probiotics. But many probiotic food problems still need to be addressed urgently in China. First, the application of probiotics in dairy products is very common, but compared with foreign countries, China's consumption of dairy products is still relatively low. Second, application of probiotics in food is not suitable for Chinese taste, so we should work hard on strain breeding as soon as possible, through screening and cultivating the excellent probiotics to develop suitable products for Chinese consumers' tastes. Third, application of probiotics should use multiple methods to add into food; probiotics also should be diversified to be suitable for all kinds of people. Therefore, scientific researchers need to try

high-tech biotechnology to develop the application of probiotics in food (Wang et al. 2013; Yun 2013).

When probiotics are widely used in the food industry and medicine fields in China, only few studies have been conducted to evaluate the actual microbial amounts and species in probiotic products, which may conflict with the labels and mislead consumers to choose inappropriate foods or medicines. The combination of culture-dependent and culture-independent methods was proven to quickly and conveniently detect the microbial diversity in probiotic products, and more effort is required to regulate the probiotic market in China (Chen et al. 2014).

In order to promote the health of the human body and the improvement of living standard, we should increase the investment on the existing basis, expand the range of application of probiotics in food and other industries, to develop new products, and give full focus to the function of health care of probiotics.

5 Conclusion

With the continuous improvement of people's living standards and growing health awareness, people pay more and more attention to probiotic products containing probiotic foods. Nowadays, healthy and beneficial microorganisms were found in many different types of food like traditional foods, folk foods, and strong regional features foods, and probiotic products of industrial scales have been formed in China where the market changes rapidly. The natural probiotics existence and current application within our familiar foods signify the safety of the probiotics, which fit perfectly for our daily consumption to keep the body health. Deep understanding of the value of probiotics and impelling the probiotics foods consumption during our daily life is our main target.

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