

# **Market Research of Pea Protein Industry in China**

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## Executive summary

Pea protein industry in China, started in 2008 by Yantai Shuangta Food Co., Ltd., a former bean vermicelli company, is still expanding fast. China's capacity of pea protein increased from less than 100,000 t/a before 2019 to over 200,000 t/a since 2021, as pea protein producers have been active in expanding their capacity. Besides, some new entrants joined the market seeing rising demand. As of Feb. 2023, there have been 14 pea protein producers (12 active producers) with total capacity of 223,401 t/a in China, most of which are located in Shandong Province.

The output of pea protein was on an upward trend before 2022, up from 70,300 tonnes in 2019 to 94,770 tonnes in 2021. However, the output decreased to 80,010 tonnes in 2022, mainly caused by decreased overseas demand, decreased import volume of dry peas and rising price of dry peas in 2021–2022.

Domestic pea protein producers' total grind capability of dry peas reached 1,248,600 t/a in 2022. Most of these producers use non-GMO peas from North America, especially from Canada, as the raw material in production. The import volume of dry peas increased from slightly over 2 million tonnes in 2018 to over 2.9 million tonnes in 2020, but it fell to less than 2.2 million tonnes in 2021 and declined further to about 1.6 million tonnes in 2022, mainly because of Canada's production decrease and sharply rising price.

From 2020 to 2022, the ex-works prices of pea protein isolate (PPI) continued to rise. In 2022, annual average ex-works prices of PPI (72%, 75%) and PPI ( $\geq 80\%$ ) reached USD1,829/t (RMB12,250/t) and USD3,921/t (RMB26,260/t), respectively, both hitting a new high in nearly eight years.

In recent years, the consumption of pea protein in China has shown an overall growth trend, but the growth of domestic consumption of pea protein slowed down in 2020–2021, and turned negative in 2022. In 2020–2022, yearly consumption volume of pea protein in China was 4,900 tonnes, 5,050 tonnes and 4,860 tonnes, respectively. Most of the pea protein consumed in China is PPI in health-care food.

## **Methodology, source and definition**

### **Research scope and targets**

This research aims to study the production and market of China's pea protein industry, as well as forecasts for the coming three years.

Region scope: Mainland China

Time scope: primarily 2020 to 2022 unless otherwise stated

### **Methodology and sources**

This report is based on data collected with diverse methods, which are listed as follows:

#### **◆ Desk research**

This includes access to government, industry and customs statistics, association seminars as well as information from the Internet. A lot of work has gone into the compilation and analysis of the obtained information. When necessary, information has been checked with pea protein industry participants and specialists regarding to pea protein production, industrial data, production method, market price, industrial development trend, downstream industry applications and policies. Data collected and compiled are variously sourced from:

- CCM's database
- Third-party database
- Statistics from governments and international institutes
- Customs statistics
- Comments from industrial experts on various platforms
- Information from the Internet

#### **◆ Telephone interview targets**

- Key producers
- Key end users
- Key traders
- Industrial experts

#### **◆ Data compilation and crosscheck**

Data obtained from various sources have been combined and cross-checked to ensure that this report is as accurate and methodologically sound as possible.

### **Units**

tonne: equals to metric tonne in this report

t/a: tonne per year, tonne/annum

kg: kilogram

ha: hectare

CNY: Chinese Yuan

RMB: Ren Min Bi, name of Chinese currency

USD: United States Dollar

### **Abbreviations**

CAGR: compound annual growth rate

EIA: Environment impact assessment

FAOSTAT: Statistics Division of Food and Agriculture Organization of the United Nations

FDA: Food and Drug Administration of the United States

GMO: Genetically modified organism

PPC: Pea protein concentrate

PPI: Pea protein isolate

The EU: the European Union

The US: the United States of America

The UK: the United Kingdom

Table Exchange rate USD/CNY, Jan. 2019–Dec. 2022

Year	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
2019	6.8482	6.7081	6.6957	6.7193	6.7344	6.8896	6.8716	6.8938	7.0883	7.0726	7.0437	7.0262	6.8826
2020	6.9614	6.9249	6.9811	7.0771	7.0690	7.1315	7.0710	6.9980	6.8498	6.7796	6.7050	6.5921	6.9284
2021	6.5408	6.4623	6.4754	6.5584	6.4895	6.3572	6.4709	6.4660	6.4680	6.4604	6.4192	6.3693	6.4615
2022	6.3794	6.3580	6.3014	6.3509	6.5672	6.6651	6.6863	6.7467	6.8821	7.0992	7.2081	7.1225	6.6972

Source: The People's Bank of China

## **1 Overview of plant protein industry in China**

Plant proteins are proteins purified from grains, legumes, and nuts, etc. In recent years, cholesterol-free and low-fat plant proteins have become increasingly popular among customers.

Currently, soy protein is still the dominant plant protein in China, occupying about half of the market share, followed by wheat protein with about 25%. Commonly used plant proteins in China also include rice protein, corn protein and pea protein, altogether taking up about 24% of the market share. Other plant proteins used in China include oat protein, coconut protein, walnut protein, almond protein, peanut protein, etc., which are mostly applied in plant protein drinks.

### **- Soy protein**

Soybean is one of China's main crops, with a protein content of over 38%, four to five times higher than that of cereals such as wheat and rice. Most of soybean used for soy protein production is non-GMO soybean with protein content of around 43%.

Containing a complete set of essential amino acids, soy protein is widely used in processed meat, bread, candy, beverages, animal feed, etc. Soy protein products include soy flour, soy protein concentrate, soy protein isolate (SPI) and textured soy protein, among which SPI is the main variety processed by domestic soybean protein producers.

Soy protein production in China was first started in the 1980s. Before 1995, there were only a few soy protein producers in China, with the accumulative capacity of less than 10,000 t/a. In the early 2000s, the capacity in China grew rapidly thanks to booming downstream sectors, especially meat products. However, under the influence of environmental protection policies, some domestic soy protein producers were forced to stop production and some have survived through transformation and upgrading since 2008.

At present, there are around 20 active producers with a capacity of around 600,000 t/a and annual output of over 400,000 tonnes in China, and about 80% of the capacity is distributed in Shandong Province. Top four players are Shandong Yuwang Industrial Co., Ltd., Linyi Shansong Biological Products Co., Ltd., Shandong Yuxin Bio-Tech Co., Ltd., and Shandong Sinoglory Health Food Co., Ltd.

### **- Wheat protein**

Wheat protein, also known as wheat gluten, is extracted from wheat flour. It is comprised of two insoluble proteins, namely gliadin and glutenin. Wheat protein can create elastic texture to achieve high level of dough strength, so it is widely used for bread and noodle making as a dough improver. In addition, it is also used in meat products as a water-retaining agent and in high-grade aquatic feed as a basic raw material.

At present, the capacity of wheat protein in China is around 480,000 t/a, most of which is located in major wheat producing areas such as Henan Province and Shandong Province. Domestic wheat protein producers include Shandong Qufeng Food Technology Co., Ltd. (40,000 t/a), Lotus Health Group Co., Ltd. (40,000 t/a), Dongguan Yihai Kerry Starch Co., Ltd. (40,000 t/a), Shaanxi Fengcangyuan Grain Industry Development Co., Ltd. (40,000 t/a), Weihui Kangdi Flour Co., Ltd. (30,000 t/a).

### **- Rice protein**

Rice protein is derived from rice, which is rich in amino acids and has balanced amino acid composition. It has the highest biological value and net protein utilization among all grain proteins. In rice, protein content is about 8%, mainly composed of albumin, globulin, glutenin and prolamin, among which water-insoluble glutenin and prolamin account for more than 80%. Therefore, the content and quality of rice protein is greatly affected by processing methods.

Rice protein is commonly applied in infant or baby food for its balanced nutrition structure and hypoallergenic property. It is also found in pet food, feed, meat products, flavorings, protein drinks,

and foaming powder as a functional additive. Annual supply of rice protein in China is around 20,000 tonnes currently.

**- Corn protein**

Corn protein, also known as corn gluten meal, is the by-product in corn starch or corn ethanol production. Commonly used corn protein includes medical corn protein, with the protein content of over 60%; and zein, with the protein content of around 20%. Corn protein is commonly used as feed additive and pharmaceutical aid in China. In recent years, some corn protein producers have extracted zeaxanthin and zein from corn protein powder to develop functional food, which has greatly increased its added value.

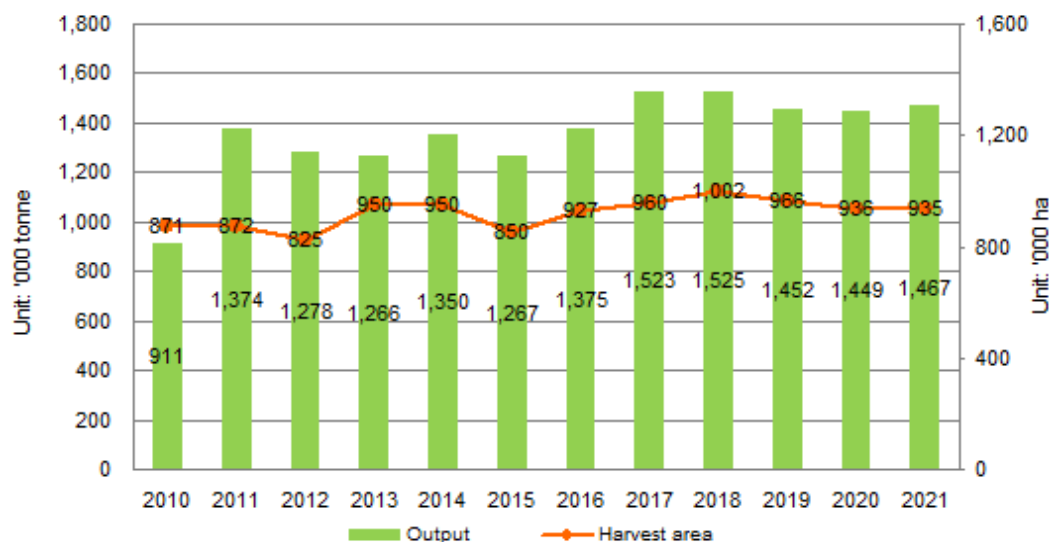


## 2 Production of pea protein, 2020–2022

### 2.1 Supply of pea in China

China is the third-largest pea-producing country, and its harvest reached about 1.47 million tonnes in 2021. Despite this big size of planting, China's production cannot meet the growing domestic demand, and the country remains the world's leading importer of dry peas.

Figure 2.1-1 Output and harvest area of dry peas in China, 2010–2021

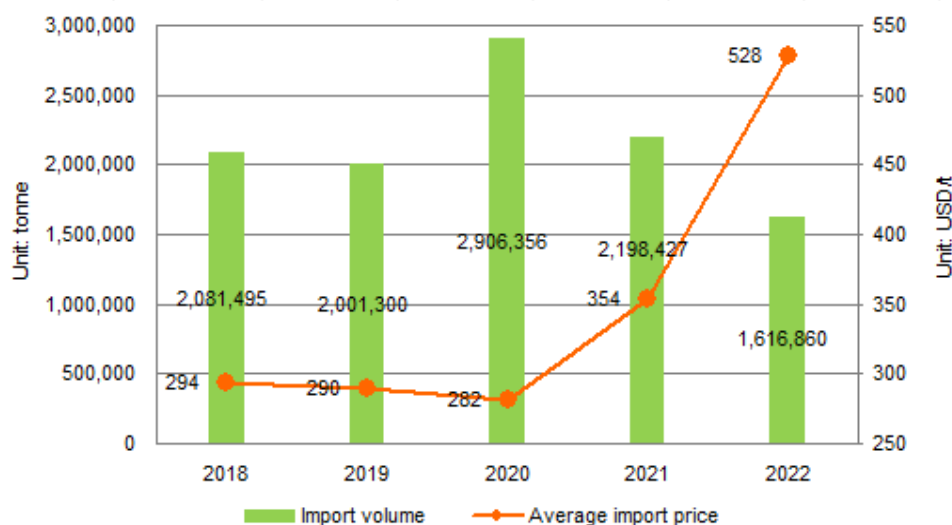


Source: FAOSTAT

China's imports of dry peas peaked in 2020, with import volume surging to 2,906,356 tonnes and witnessing 45.2% year-on-year growth.

However, the import of dry peas decreased a lot both in 2021 and 2022, seeing -24.4% and -26.5% yearly growth respectively, while the import price rose rapidly with yearly increase of 25.6% and 49.3% respectively, mainly influenced by Canada's slashed production in 2021. Canada is the second largest production country of dry peas in the world, only next to Russia.

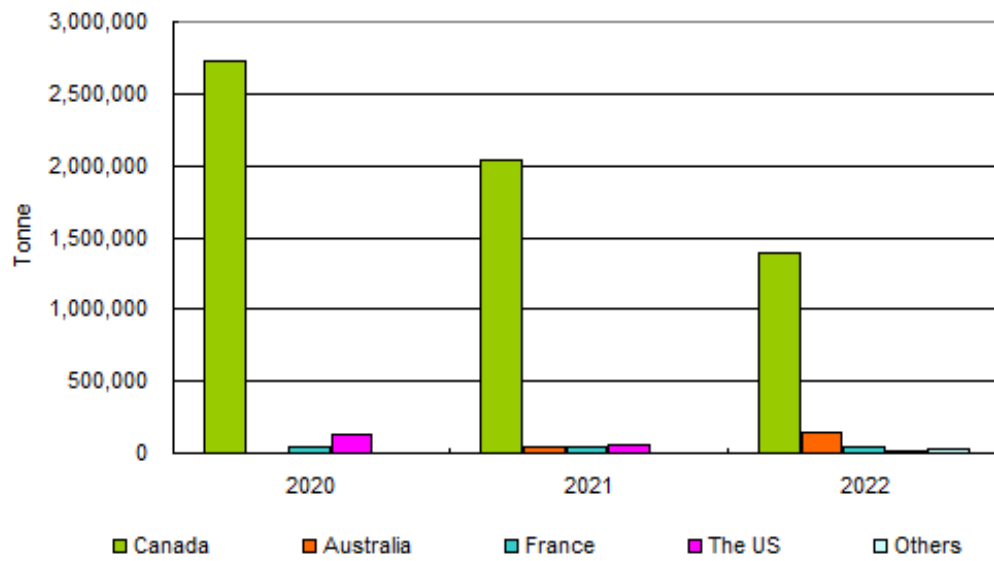
Figure 2.1-2 China's imports of dry peas, 2018–2022



Source: China Customs

Canada is the largest supplier of dry peas to China, and its share to China's total import volume in 2020–2022 was 93.9%, 93.0% and 86.4% respectively.

Figure 2.1-3 Key import origins of dry peas to China, 2020–2022



Source: China Customs, CCM

## 2.2 Production of pea protein and pea starch

Most of domestic pea processing companies are former vermicelli (bean vermicelli) companies. Pea protein and pea starch are produced in the same production line in these companies, and bean vermicelli is produced in a separated unit using pea starch. Some of the pea processing companies also produce pea fiber as a by-product.

China's capacity of pea protein witnessed an upward trend in the past few years, as major producers, seeing rising demand, expanded their capacity. The capacity of pea protein in China reached 223,401 t/a in 2022, growing by more than double that in 2018.

The output of pea protein kept increasing before 2022, and it grew from 70,300 tonnes in 2019 to 94,770 tonnes in 2021, at a CAGR of 16.1%. However, the output in 2022 decreased to 80,010 tonnes, mainly caused by decreased overseas demand, decreased import volume of dry peas and rising prices of dry peas in 2021–2022.

The product structure has changed gradually in China, along with market changes and improvement of production technology. High-quality (with  $\geq 65\%$  protein content, and  $\geq 80\%$  mainly) pea protein has occupied more and more market share.

Table 2.2-1 Capacity and output of pea protein producers in China, 2020–2022

Year	Capacity, t/a			Output, tonne		
	Protein	Starch	Fiber	Protein	Starch	Fiber
2020	172,761	333,148	104,379	89,120	126,100	43,360
2021	212,361	389,348	154,579	94,770	139,580	48,670
2022	223,401	423,736	168,899	80,010	121,600	45,010

Note: Capacity and output of pea protein producers in this table are of their pea protein-starch-fiber production lines. Capacity and output of their vermicelli units are not included, in which they also produce pea starch.

Source: CCM

Table 2.2-2 Output of pea protein by product grade in China, 2020–2022, tonne

Year	Crude protein (50%, 55%, 60%)	PPI (72%, 75%)	PPI ( $\geq 80\%$ )
2020	3,520	15,940	69,660
2021	800	8,300	85,670
2022	260	6,520	73,230

Source: CCM

### - Potential capacity

As of Feb. 2023, there are four new or expansion projects concerning pea protein, proposed pea grind capability totalling 480,000 t/a.

- ✓ Two projects under construction: Expected to be put into production in 2023.
- ✓ One project: Groundbreaking ceremony was held on 29 January, 2023.
- ✓ One project: No further information was disclosed after the record-filing in March 2022.

Table 2.2-3 Expansion projects and new projects of pea protein in China, as of Feb. 2023

Company	Pea grind capability, t/a	Capacity, t/a			Process
		Protein	Starch	Fiber	
Seawin Food & Ingredient (Luzhou) Co., Ltd.	100,000	20,000	54,000	10,000	Under construction
Shandong Furun Biotech Co., Ltd.	20,000	3,000	9,600	4,600	Under construction
Shandong TTCA Co., Ltd.	300,000	N/A	N/A	N/A	Groundbreaking ceremony held
Suzhou Wanshen Flour Products Co., Ltd.	60,000	N/A	N/A	N/A	Filed for record

Source: CCM

## 2.3 Price of pea protein and pea starch, 2020–2022

### - Price of pea protein, 2020–2022

From 2020 to 2022, the ex-works prices of PPI continued rising, mainly accompanying increases in the price of dry peas. In 2022, average annual ex-works prices of PPI (72%, 75%) and PPI (≥80%) reached USD1,829/t (RMB12,250/t) and USD3,921/t (RMB26,260/t), respectively, both hitting a new high in nearly eight years.

### - Price of pea starch, 2020–2022

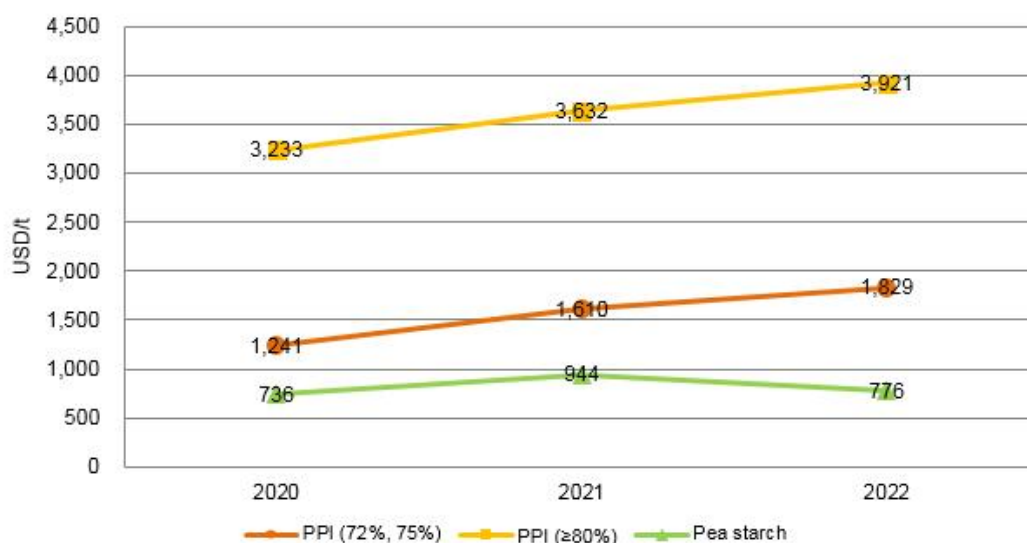
The ex-works price of pea starch usually fluctuates with the changes of import price of dry peas, market demand at home and abroad and prices of other starches as well. From 2020 to 2022, the average annual ex-works price of pea starch rose first and then fell.

Table 2.3-1 Ex-works prices of pea protein and pea starch, 2020–2022

Year	PPI (72%, 75%)		PPI (≥80%)		Pea starch	
	RMB/t	USD/t	RMB/t	USD/t	RMB/t	USD/t
2020	8,600	1,241	22,400	3,233	5,100	736
2021	10,400	1,610	23,470	3,632	6,100	944
2022	12,250	1,829	26,260	3,921	5,200	776

Source: CCM

Picture 2.3-1 Ex-works price of pea protein and pea starch in China, 2020–2022



Source: CCM

Table 2.3-2 Market price range of pea protein by product grade, 2022

Grade	Protein content, g/100g	RMB/kg	USD/t
Crude protein	45.0≤X<65.0	12–20	1,792–2,986
PPI	70.0≤X<80.0	20–34	2,986–5,077
	80.0≤X<90.0	34–80	5,077–11,945
	90	48–90	7,167–13,438
	95.0 and above	50–110	7,466–16,425

Source: CCM

## 2.4 Major pea protein producers

As of 2022, there were 14 pea protein producers with a total capacity of 223,401 t/a in China. Among them, Shuangta Food was the largest producer in terms of capacity, accounting for 31.5% of the national total.

Among all regions in China, Shandong Province took the lead, capturing 78.3% share to the total capacity in 2022.

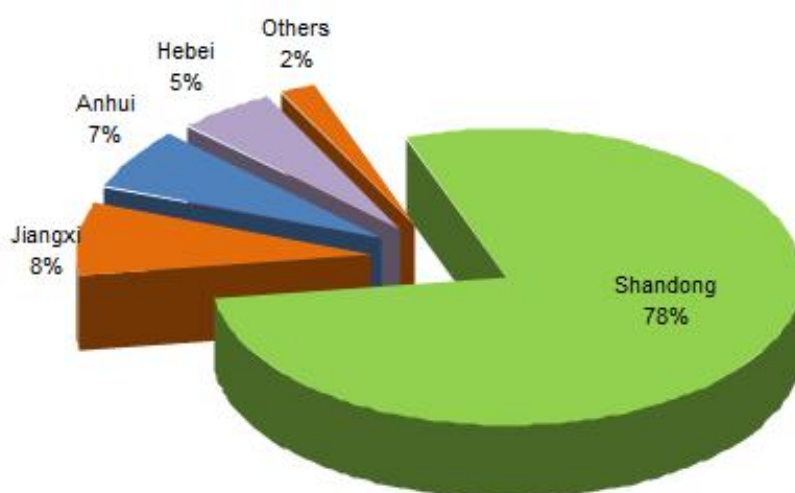
Table 2.4-1 Production capacity of food grade pea protein producers in China, 2022

No.	Company	Abbr.	Location	Status 2022	Capacity 2022, t/a		
					Protein	Starch	Fiber
1	Yantai Shuangta Food Co., Ltd.	Shuangta Food	Shandong	Active	70,350	42,700	49,400
2	Yantai Oriental Protein Tech Co., Ltd.	Oriental Protein	Shandong	Active	27,800	63,140	26,000
	Jiujiang Tiantai Food Co., Ltd.	Jiujiang Tiantai	Jiangxi	Active	17,280	55,296	23,040
3	Shandong Jianyuan Bioengineering Co., Ltd.	Shandong Jianyuan	Shandong	Active	26,000	51,000	18,600
4	Suzhou Wanshen Flour Products Co., Ltd.	Suzhou Wanshen	Anhui	Active	15,000	45,000	3,000
5	Yantai T.Full Biotech Co., Ltd.	Yantai T.Full	Shandong	Active	13,500	40,000	9,000
6	Shandong Jindu Talin Food Co., Ltd.	Jindu Talin	Shandong	Active	7,803	16,400	5,559
7	Yosin Biotechnology (Yantai) Co., Ltd.	Yosin Biotechnology	Shandong	Active	10,800	31,200	9,300
8	Linyi Yuwang Plant Protein Co., Ltd.	Linyi Yuwang	Shandong	Active	10,000	31,000	22,000
9	Shandong Huatai Food Co., Ltd.	Shandong Huatai	Shandong	Active	3,800	12,000	/
10	IDYL Biotech (Yantai) Ltd.	Yantai IDYL	Shandong	Active	4,800	6,000	3,000
11	Danisco Shineway Luohe Food Co., Ltd.	Danisco Shineway	Henan	Active	2,000	/	/
12	Hebei Zhengtong Biotechnonology Co., Ltd.	Hebei Zhengtong	Hebei	Idle	12,000	26,000	/
13	Gansu Tongwei Feitian Food Co., Ltd.	Gansu Feitian	Gansu	Idle	2,268	4,000	/
<b>Total</b>					<b>223,401</b>	<b>423,736</b>	<b>168,899</b>

Note: Danisco Shineway purchases pea protein 55% to make high-content food-grade pea protein.

Source: CCM

Figure 2.4-1 Capacity distribution of pea protein in China, 2022



Source: CCM

### 2.4.1 Yantai Shuangta Food Co., Ltd.

Founded in 1992, Yantai Shuangta Food Co., Ltd. (Shuangta Food) is the national leading producer of vermicelli and pea protein in China. In 2008, the company put the first pea protein unit into production, producing pea protein, pea starch and pea fiber in the same production line. The company was listed on Shenzhen Stock Exchange on 21 Sept., 2010 (stock code: 002481).

Shuangta Food has kept expanding its pea protein capacity in the past few years. Its pea protein capacity increased from 22,350 t/a in 2017 to 29,150 t/a in 2018, 49,750 t/a in 2020 and 70,350 t/a in 2021. Its pea grind capability also expanded, reaching 379,600 t/a in 2021.

Shuangta Food witnessed a loss in 2022, caused by decreased sales volume, increased price of dry peas, etc.

Table 2.4.1-1 Capacity and output of pea products of Shuangta Food, 2019–2022

Year	Capacity, t/a			Output, tonne		
	Pea protein	Pea starch	Pea fiber	Pea protein	Pea starch	Pea fiber
2019	49,750	34,700	36,400	37,150	26,600	17,130
2020	49,750	34,700	36,400	46,400	32,300	21,400
2021	70,350	42,700	49,400	47,800	33,500	23,000
2022	70,350	42,700	49,400	38,800	27,200	18,500

Source: CCM

Table 2.4.1-2 Share of sales revenue of Shuangta Food's products, 2019–H1 2022

Item	2019	2020	2021	H1 2022
Edible protein	25.2%	32.3%	38.3%	32.1%
Vermicelli	23.0%	24.3%	24.7%	18.7%
Pea starch	15.2%	16.7%	14.6%	21.3%
Dietary fiber	5.1%	6.4%	7.3%	5.4%
Others	31.5%	20.3%	15.2%	22.6%

Source: Shuangta Food

Table 2.4.1-3 Brief financial reports of Shuangta Food, 2019–H1 2022, USD

Item	2019	2020	2021	H1 2022
Revenue	308,281,075	291,500,577	335,120,300	177,741,476
Total cost of sales	275,716,656	241,067,591	284,181,367	169,551,683
Operating profit	30,785,166	57,910,268	46,827,413	-1,341,948
Total profit	30,700,821	57,190,245	46,711,062	-1,173,627
Income tax expense	3,551,492	6,298,685	5,348,379	509,966
Net profit	27,149,329	50,891,560	41,362,683	-1,683,593

Source: Shuangta Food

### 2.4.2 Yantai Oriental Protein Tech Co., Ltd. & Jiujiang Tiantai Food Co., Ltd.

Yantai Oriental Protein Co., Ltd. (Oriental Protein) was founded in 2008 with total registered capital of RMB20.56 million.

Currently, the company has two pea protein plants in Yantai City.

- ✧ 1<sup>st</sup> plant:
  - ✓ 40,000 t/a pea processing project (divided into two phases) was completely finished in 2014.
  - ✓ 35,000 t/a pea processing expansion project was put into production in 2021.
  - ✓ Beans processing (grind capability: 14,000 t/a pea, and 6,000 t/a Mung bean) expansion project was built up in 2022.
- ✧ 2<sup>nd</sup> plant: 40,000 t/a pea processing project passed acceptance check in Oct. 2018.

Jiujiang Tiantai Food Co., Ltd., established in 2014 with registered capital of RMB62.50 million, is a brother company of Oriental Protein.

- ✧ 1<sup>st</sup> phase of 120,000 t/a pea comprehensive utilization project (60,000 t/a pea grind capability) was built up at the end of 2019.
- ✧ 2<sup>nd</sup> phase 120,000 t/a pea comprehensive utilization project (60,000 t/a pea grind capability) was put into production in 2022.

As of Feb. 2023, Oriental Protein's pea grind capability is 129,000 t/a, and that of Jiujiang Tiantai is 120,000 t/a.

Table 2.4.2-1 Capacity and output of pea products of Oriental Protein, 2019–2022

Year	Capacity, t/a			Output, tonne		
	Pea protein	Pea starch	Pea fiber	Pea protein	Pea starch	Pea fiber
2019	18,400	39,200	8,000	14,200	30,100	7,000
2020	18,400	39,200	8,000	13,000	27,600	6,400
2021	25,400	56,400	23,200	13,200	27,700	6,400
2022	27,800	63,140	26,000	9,600	20,300	5,000

Source: CCM

Table 2.4.2-2 Capacity and output of pea products of Jiujiang Tiantai, 2019–2022

Year	Capacity, t/a			Output, tonne		
	Pea protein	Pea starch	Pea fiber	Pea protein	Pea starch	Pea fiber
2019	8,640	27,648	11,520	/	/	/
2020	8,640	27,648	11,520	3,000	9,600	4,000
2021	8,640	27,648	11,520	5,000	16,000	6,600
2022	17,280	55,296	23,040	5,210	16,600	6,900

Source: CCM

### 2.4.3 Shandong Jianyuan Bioengineering Co., Ltd.

Founded on 13 June, 2003, Shandong Jianyuan Bioengineering Co., Ltd. (Shandong Jianyuan) launched its first pea protein unit in 2009.

In April 2017, Shandong Jianyuan started construction of 120,000 t/a pea deep processing and expansion project, which was built up in Oct. 2018 and put into trial operation in Nov. 2019.

Table 2.4.3-1 Capacity and output of pea products of Shandong Jianyuan, 2019–2022

Year	Capacity, t/a			Output, tonne		
	Pea protein	Pea starch	Pea fiber	Pea protein	Pea starch	Pea fiber
2019	26,000	51,000	18,600	4,700	5,200	1,800
2020	26,000	51,000	18,600	10,000	11,100	3,800
2021	26,000	51,000	18,600	11,700	12,900	4,500
2022	26,000	51,000	18,600	10,300	11,300	3,900

Source: CCM

#### 2.4.4 Suzhou Wanshen Flour Products Co., Ltd.

Suzhou Wanshen Flour Products Co., Ltd. (Suzhou Wanshen), founded in 2003, is a grain processing company and a subsidiary of Suzhou Hengfeng Real Estate Development Co., Ltd. Suzhou Wanshen is the first grain processing company that engaged itself in pea protein production besides the existing vermicelli companies.

Suzhou Wanshen set up its pea processing project in 2015, which was put into production in 2017. As of Feb. 2023, its pea grind capability is 100,000 t/a.

The company wanted to expand its pea protein capacity, and thus filed the record for a 60,000 t/a high-quality (food grade) pea protein project in March 2022.

Table 2.4.4-1 Capacity and output of pea products of Suzhou Wanshen, 2019–2022

Year	Capacity, t/a			Output, tonne		
	Pea protein	Pea starch	Pea fiber	Pea protein	Pea starch	Pea fiber
2019	15,000	45,000	3,000	8,000	24,600	1,500
2020	15,000	45,000	3,000	8,300	24,900	1,700
2021	15,000	45,000	3,000	8,000	24,600	1,600
2022	15,000	45,000	3,000	6,300	19,600	1,200

Source: CCM

#### 2.4.5 Yantai T.Full Biotech Co., Ltd.

Yantai T.Full Biotech Co., Ltd. (Yantai T.Full) was founded in 2011 with a registered capital of RMB12 million. Major products of Yantai T.Full include protein and starch (made of pea, broad bean, Mung bean, or Chickpea), and pea fiber. As of Feb. 2023, its pea grind capability is 90,000 t/a.

About half of the company's pea protein was crude pea protein in 2017. It started to adjust pea protein production from 2017, and the protein produced since 2019 was mainly PPI.

Seawin Food & Ingredient (Luzhou) Co., Ltd., invested by Yantai T.Full, is now building a beans (pea, broad bean, Mung bean) deep processing and vermicelli production project, which is expected to be built up and put into production in Sept. 2023. According to the plan, 100,000 t/a beans (mainly pea) grind capability, 20,000 t/a protein, 54,000 t/a starch and 10,000 t/a dietary fiber production capacity will be formed.

Table 2.4.5-1 Capacity and output of pea products of Yantai T.Full, 2019–2022

Year	Capacity, t/a			Output, tonne		
	Protein	Starch	Fiber	Protein	Starch	Fiber
2019	13,500	40,000	9,000	5,800	12,800	4,300
2020	13,500	40,000	9,000	6,800	15,000	5,000
2021	13,500	40,000	9,000	5,500	12,700	4,100
2022	13,500	40,000	9,000	5,000	12,100	4,000

Source: CCM

#### 2.4.6 Shandong Jindu Talin Food Co., Ltd.

Shandong Jindu Talin Food Co., Ltd. (Jindu Talin), founded in 2003 with registered capital of RMB5 million, is a pea processing and vermicelli producing company. Major products of Jindu Talin include pea protein, pea starch, pea fiber, and vermicelli. The company's pea processing project was finished in Aug. 2014. However, Jindu Talin was penalized by the Environmental Protection Bureau of Zhaoyuan City since it started project construction without government approval. The company went through EIA procedures in Jan. 2016, and passed the environmental monitoring in Dec. 2016.

The company started commercial production of pea protein in Feb. 2017. In 2017, it ran the production at a high operating rate, for its pea protein was approved by the Food and Drug



Administration (FDA) of the US and most of its pea products were exported to the US. However, due to gradual declines in foreign sales of pea protein, Jindu Talin's pea protein operating rates in the last four years were much lowered compared with its previous prime.

Table 2.4.6-1 Capacity and output of pea products of Jindu Talin, 2019–2022

Year	Capacity, t/a			Output, tonne		
	Pea protein	Pea starch	Pea fiber	Pea protein	Pea starch	Pea fiber
2019	7,803	16,400	5,559	200	800	150
2020	7,803	16,400	5,559	400	1,500	300
2021	7,803	16,400	5,559	700	2,800	500
2022	7,803	16,400	5,559	600	2,400	450

Source: CCM

#### 2.4.7 Yosin Biotechnology (Yantai) Co., Ltd.

Yosin Biotechnology (Yantai) Co., Ltd. (Yosin Biotechnology) was established in Aug. 2013 with registered capital of RMB20 million. As of Feb. 2023, its pea grind capability is 60,000 t/a.

In June 2018, Yosin Biotechnology started construction of a 60,000 t/a pea comprehensive utilization project. The facilities were built up in Nov. 2019 and put into commercial production in 2020.

Table 2.4.7-1 Capacity and output of pea products of Yosin Biotechnology, 2020–2022

Year	Capacity, t/a			Output, tonne		
	Pea protein	Pea starch	Pea fiber	Pea protein	Pea starch	Pea fiber
2020	10,800	31,200	9,300	800	2,300	690
2021	10,800	31,200	9,300	2,150	6,200	1,850
2022	10,800	31,200	9,300	2,460	7,100	2,100

Source: CCM

#### 2.4.8 Linyi Yuwang Plant Protein Co., Ltd.

Linyi Yuwang Plant Protein Co., Ltd. (Linyi Yuwang) was established in 2004 with registered capital of RMB30 million.

In May 2020, Linyi Yuwang started construction of 60,000 t/a pea deep processing (10,000 t/a pea protein, 31,000 t/a pea starch, 22,000 t/a pea fiber) & production transformation project (original 8,000 t/a soy protein isolate line to be dismantled), which was finished in Aug. 2021. Yet influenced by COVID-19, this project stayed in a long period of rectification, and it was put into commercial production till H2 2022.

#### 2.4.9 Shandong Huatai Food Co., Ltd.

Shandong Huatai Food Co., Ltd. (Shandong Huatai) was founded in 1995, with a registered capital of RMB10 million. Major products of Shandong Huatai are vermicelli, feed grade pea protein, pea protein isolates and pea wet starch.

As of Feb. 2023, its pea grind capability is 25,000 t/a.

Table 2.4.9-1 Capacity and output of pea products of Shandong Huatai, 2019–2022

Year	Capacity, t/a		Output, tonne	
	Pea protein	Pea starch	Pea protein	Pea starch
2019	3,800	12,000	100	500
2020	3,800	12,000	300	1,300
2021	3,800	12,000	550	2,500
2022	3,800	12,000	50	200

Source: CCM

#### 2.4.10 IDYL Biotech (Yantai) Ltd.

IDYL Biotech (Yantai) Ltd. (Yantai IDYL) was established in Jan. 2015 with registered capital of RMB 10 million.

As of Feb. 2023, its pea grind capability is 20,000 t/a.

Table 2.4.10-1 Capacity and output of pea products of Yantai IDYL, 2019–2022

Year	Capacity, t/a			Output, tonne		
	Pea protein	Pea starch	Pea fiber	Pea protein	Pea starch	Pea fiber
2019	4,800	6,000	3,000	100	400	70
2020	4,800	6,000	3,000	100	400	70
2021	4,800	6,000	3,000	170	680	120
2022	4,800	6,000	3,000	200	800	160

Source: CCM

### 3 Export analysis of pea protein from China to the US, 2022

The US is an important export destination of China's pea protein. Incomplete statistics show that in 2022, China's total export volume of pea protein to the US was 25,254 tonnes, and the volume exported in H2 was significantly lower than that in H1.

Table 3-1 Export volume of pea protein from China to the US, 2022

Month	Export volume, tonne
January	3,282.47
February	3,270.94
March	2,887.68
April	3,287.15
May	2,797.75
June	2,828.31
July	1,232.85
August	755.057
September	954.436
October	1,109.65
November	1,585.79
December	1,261.89
<b>Total</b>	<b>25,253.96</b>

Source: China Customs

Table 3-2 Exporters of pea protein from China to the US, 2022

No.	Exporter	Export volume, tonne
1	Zhaoyuan Junbang Trading Co., Ltd.	1,902.52
2	Yantai T.Full Biotech Co., Ltd.	1,526.11
3	Hainan Zhongxin Chemical Co., Ltd.	561.85
4	Jianyuan International Co., Ltd.	437.109
5	Yantai Shuangta Food Co., Ltd.	355.05
6	Yantai Oriental Protein Tech Co., Ltd.	246.055
7	Solae Trading (Shanghai) Co., Ltd.	243.34
8	Shanghai Elim Organic Food Co., Ltd.	238.08
9	Fenchem Biotek Ltd.	161.389
10	Royal Ingredients Group B.V.	129.28
11	Yantai Yiyuan Bioengineering Co., Ltd.	90.4
12	Healthy Essentials Inc.	69.8
13	Shanghai Freeman Lifescience Co., Ltd.	66.285
14	Anhui Star International Freight Co., Ltd.	63
15	Forenutri (Wuhan) Co., Ltd.	58.895
16	Anhui Fengtai Holding Group Co., Ltd.	42.9
17	Linyi Yuwang Plant Protein Co., Ltd.	40.4
18	Qingdao Topway International Trading Co., Ltd.	39.9
19	Sideways (Qingdao) Trade Co., Ltd.	39.68
20	Bioway Organic Group Limited	39.68
21	The Fenchem Co., Ltd.	39.14
22	Yantai Zhongzhen Trading Co., Ltd.	33.2
23	Yantai Wanpy International Trade Co., Ltd.	31.515
24	Nutracean Co., Ltd.	25

No.	Exporter	Export volume, tonne
25	Hangzhou Natur Foods Co., Ltd.	21.28
26	Echemi Global Co., Ltd.	21.233
27	Kcl International Co., Ltd.	21.2
28	Shandong Jianyuan Bioengineering Co., Ltd.	20.67
29	Du-Hope International Group	20.64
30	Gab Foods Co., Ltd.	20.15
31	Yosin Biotechnology (Yantai) Co., Ltd.	19.47
32	Changzhou Foreign Trade Co., Ltd.	18.812
33	Shandong Yuwang Ecological Food Industry Co., Ltd.	18.38
34	Lianyungang Justus International Trading Co., Ltd.	15.38
35	Pudong Prime International Logistics Inc.	13
36	Nutritech Asia Group Qingdao Ltd.	10.654
37	Sugarbush Shenzhen Biotechnology Co., Ltd.	3.052
38	Sanmik Group Limited	2.1
39	Reifon Biotech Co., Ltd.	1.53
	Others	18,545.84
	<b>Total</b>	<b>25,253.96</b>

Source: China Customs

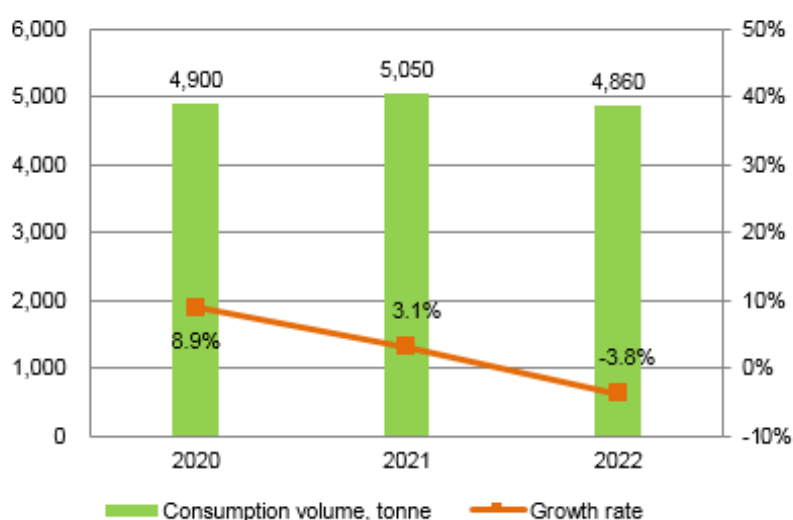
## 4 Consumption of pea protein, 2020–2022

### 4.1 Consumption of pea protein

In recent years, the consumption of pea protein in China has shown an overall growth trend. For one thing, booming pea protein market in western countries has kindled the desire for the product in domestic customers. For another thing, with growing health awareness, more and more people purchase healthcare products containing pea protein. Pea protein isolates have been the main products consumed in China.

However, the growth of domestic consumption of pea protein slowed down in 2020–2021, and turned negative in 2022. Such changes are mainly the result of the sharp increase in raw material prices in 2021–2022, as well as reduction of health-care food sales through offline channels and the downturn in the catering industry under the impact of COVID-19.

Figure 4.1-1 Consumption of pea protein and its growth rate in China, 2020–2022



Source: CCM

Table 4.1-1 Consumption of pea protein in China by product grade, 2020–2022, tonne

Year	Crude protein (50%, 55%, 60%)	PPI (72%, 75%)	PPI (≥80%)	Total
2020	570	1,130	3,200	<b>4,900</b>
2021	450	1,200	3,400	<b>5,050</b>
2022	250	1,180	3,430	<b>4,860</b>

Source: CCM

### 4.2 Application fields of pea protein

Unlike EU and the US, pea protein applications in China are limited. Most of pea proteins consumed in China are pea protein isolates in health-care food, accounting for over 80%, which usually applies with other plant proteins.

At present, the application of pea protein in meat products is still at the preliminary stage in China. In 2020, Ningbo Sulian Food Co., Ltd., a domestic artificial meat producer, launched vegetarian steaks made from pea protein in cooperation with Shuangta Food. Shuangta Food has also carried out cooperation with other domestic artificial meat producers such as Plant Meat (Hangzhou) Health Technology Co., Ltd. and Zhenmeat (Beijing) Food Technology Co., Ltd.

Besides, there have been new developments on the usage of pea protein in plant protein drinks. In Aug. 2021, WOW Foods (Beijing) Nutrition Technology Co., Ltd. launched China's first pea milk; in Oct. 2022, Bright Dairy & Food Co., Ltd. launched a brown rice milk containing pea protein and chickpea protein.

Table 4.2-1 List of major end users of pea protein in China

No.	Producer	Product	Industry
1	Amway (China) Co., Ltd.	Nutrilite All Plant Protein Powder	Health-care food
2	BY-HEALTH Co., Ltd.	By-health Plant Protein Powder	Health-care food
3	Angel Yeast Co., Ltd.	Angel Nutritech Yeast Protein Powder	Health-care food
4	Guangzhou Baiyunshan Jingxiutang Pharmaceutical Co., Ltd.	Multi-vitamin Protein Powder, Compound Amino Acids Protein Powder	Health-care food
5	Yantai Shuangta Food Co., Ltd.	Cared Pea Protein Powder, Cared Pea Protein Solid Beverages	Health-care food
6	Yantai Oriental Protein Tech Co., Ltd.	Jinguanrui Pea Protein Powder	Health-care food
7	Shenyang Meisheng Pharmaceutical Research Institute	Papaya Pea Protein Powder, Pea Protein Powder	Health-care food
8	IVC Nutrition Corporation	Henderson Protein Powder	Health-care food
9	Shanghai Swelling Biology Technic Co.Ltd	Plant-based Protein Powder	Health-care food
10	Weihai Baihe Biology Technological Co., Ltd.	Pea Protein Powder	Health-care food
11	Guangzhou Shanyuantang Medical Technology Co.,Ltd.	Pea Protein Powder	Health-care food
12	Yantai Shuangta Food Co., Ltd.	Pea Protein Vegetarian Meat	Artificial meat
13	Ningbo Sulian Food Co., Ltd.	Vegan Meat	Artificial meat
14	WOW Foods (Beijing) Nutrition Technology Co., Ltd.	Pea Milk	Plant protein drinks
15	Bright Dairy & Food Co., Ltd.	Brown Rice Milk	Plant protein drinks

Source: CCM

## 5 Current role of government in China's pea protein industry

In the past few years, government policies on pea protein industry were mainly on food safety standard of pea protein and environmental monitoring of pea protein production. There is little guidance for the industrial development and no official rules on pea protein application yet.

### - Government guidance

There is not much guidance for the development of plant protein industry. The Notice of the General Office of the State Council on the Issuance of the National Nutrition Plan (2017–2030) mentioned the needs of more efforts in basic research on plant protein and innovation in processing technology. In May 2022, the National Development and Reform Commission (NDRC) issued the Plan for Bioeconomy Development during the 14th Five-Year Development Plan Period (2021–2025), which proposed to promote technological development of synthetic biology, explore and actively participate in R&D of artificial protein foods, which will further promote the development of plant protein industry.

### - Association Standard for Edible Pea Protein

On 9 Oct., 2019, China Association for Quality Inspection published the Association Standard for Edible Pea Protein T/CAQI 91-2019, regulating the physical and chemical properties of edible pea protein. The standard came into effect on 27 Dec., 2019.

Table 5-1 Main indicators from Association Standard for Edible Pea Protein T/CAQI 91-2019

Item	Index		
	Crude protein	Protein concentrate*	Protein isolate
Protein (at dry basis), g/100g	45.0≤X<65.0	65.0≤X<80.0	X≥80.0
Moisture, g/100g	≤10.0		
Total ash (at dry basis), g/100g	≤8.0		
Fat (at dry basis), g/100g	≤12.0		

*Note: Protein concentrate is made by extraction, concentration, separation and other processes to remove or partially remove non-protein components (water, fat, carbohydrates, etc.) from peas.*

*Source: Association Standard for Edible Pea Protein T/CAQI 91-2019*

### - Environmental monitoring of pea protein production

The Environmental Protection Bureau of Zhaoyuan City has been tightening waste emission control on pea processing companies. Pea protein producers located in Zhaoyuan City, Shandong Province have been on the key monitoring list of waste emission since 2017. Before 2020, most of them had been panelized under strict environmental regulations, primarily due to substandard waste emission. In the past three years, with strict environmental monitoring, these producers have better complied with the regulations.

Table 5-2 Penalties for environmental damage on pea protein producers in Zhaoyuan City, 2017–Aug. 2019

<b>Penalty decision date</b>	<b>Company</b>	<b>Infraction</b>	<b>Penalty</b>
28 Feb., 2017	Yantai IDYL Biotech Co., Ltd.	Discharging substandard waste water during pea protein pilot production	RMB24,610 fine
5 April, 2017	Yantai Oriental Protein Tech Co., Ltd.	Substandard waste gas emission	RMB100,000 fine
27 May, 2017	Shandong Jindu Talin Foods Co., Ltd.	Discharging substandard waste water	RMB12,904 fine
14 June, 2017	Shandong Huatai Food Co., Ltd.	Discharging substandard waste water via concealed conduits	RMB100,000 fine and administrative detention
2 Aug., 2017	Shandong Jianyuan Bioengineering Co., Ltd.	Discharging substandard waste water via concealed conduits	RMB100,000 fine and administrative detention
27 Aug., 2017	Shandong Jindu Talin Foods Co., Ltd.	Substandard waste gas emission	RMB1,200,000 fine and administrative detention
7 Aug., 2019	Shandong Jindu Talin Foods Co., Ltd.	Not taking corresponding preventive measures for treatment of industrial solid waste	RMB30,000 fine

Source: Zhaoyuan Branch of Yantai Municipal Bureau of Ecology and Environment



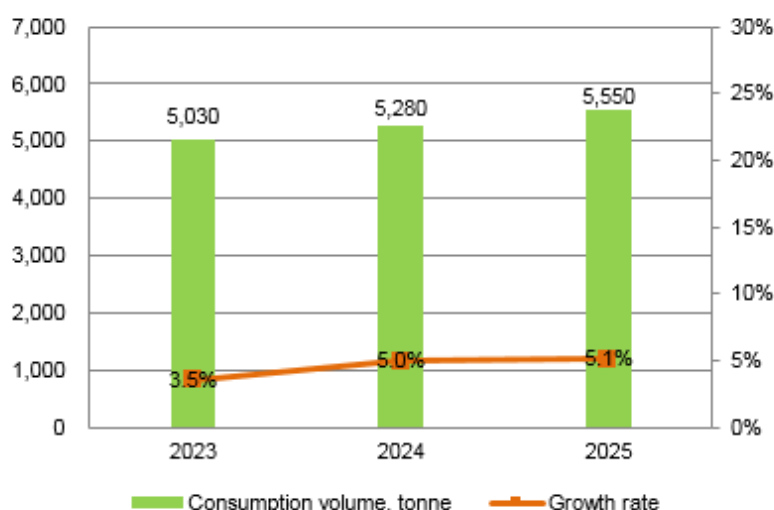
## 6 Forecast on pea protein industry, 2023–2025

Pea protein demand: Overseas market will remain to be the major driver for the growth of pea protein industry in China. The domestic consumption will gradually recover as the impact of COVID-19 diminishes—the consumption volume of pea protein is expected to increase at a CAGR of 5.0% in 2023–2025. As the Chinese government has been encouraging the development of functional proteins, it is expected that research and development on pea protein-based products will be accelerated.

Pea protein production: As the global supply of dry peas recovers, the price of dry pea will stabilize or decrease, boosting manufacturers' production enthusiasm. On the other hand, increase in domestic and foreign demand will also lead to the expansion of production. China's capacity of pea protein is expected to reach 255,401 t/a by the end of 2025. Pea protein output in China is expected to increase at a CAGR of 7.3% in 2023–2025.

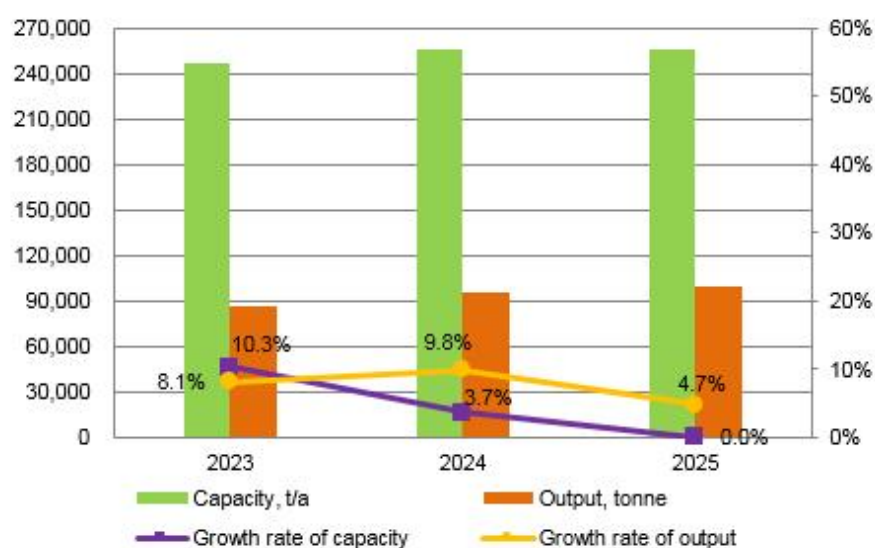
Pea supply: Non-GMO dry peas imported from North America will remain to be domestic pea protein producers' first choice of raw material for pea protein production. The import volume of dry peas is expected to increase along with continuous expansion of pea protein production in the coming years.

Figure 6-1 Forecast on consumption of pea protein in China, 2023–2025



Source: CCM

Figure 6-2 Forecast on China's pea protein capacity and output, 2023–2025



Source: CCM

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