

# Market Research of Acesulfame Potassium in China

The Fourth Edition

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## **Introduction and scope of study**

### **➤ Introduction**

Aiming to disclose the latest production and analyse the price and market of China's acesulfame potassium industry, this report mainly focuses on China's acesulfame potassium industry from 2019 to 2022, as well as forecasts its development trend in the future.

This report is based on a detailed interviewing program, supported by extensive desk research including comprehensive searches of CCM's database, a wide variety of publications and Internet sites worldwide. Wherever possible, information obtained has been incorporated into the report.

### **➤ Scope of study**

Region scope: China

Time scope: primarily 2019 to 2022 unless otherwise stated

## **Methodology and source**

### **- Telephone interview**

The purposes of conducting telephone interviews are:

- To find out the latest updated information and accurate status of each producer in China.
- To gather information not available in published sources.
- To ensure information used in the report is based on real data.

The interviewees include producers, research institutes & researchers and end users.

### **- Desk research**

The sources of desk research are various, including published magazines, journals, patent documentation, industrial statistics, customs statistics, as well as information from the Internet. A lot of work went into compiling and analysing the information obtained. Some crosschecks were also made with Chinese suppliers of acesulfame potassium regarding market information such as production, consumption and price.

### **- Data processing and presentation**

The data collected and compiled was variously sourced from:

- CCM's database
- Third party
- Statistics from governments and international institutes
- Telephone interviews with domestic producers, service suppliers and government agencies

- Customs statistics
- Information from the Internet

The data has been combined and cross-checked to ensure that this report is as accurate and methodologically sound as possible. Throughout the process, a series of discussions were held within CCM to systematically analyse the data and draw appropriate conclusions.

#### - Units

USD: currency unit in the US, also called US dollar

RMB: currency unit in China, also called Yuan

t: tonne, equals to metric tonne in this report

t/a: tonne per year, tonne per annual

/t: per tonne

/d: per day

#### - Abbreviations

HFCS: high fructose corn syrup

The US: the United States of America

The UK: the United Kingdom

ADI: acceptable daily intake

COVID-19: Corona Virus Disease 2019

HIS: High intensity sweetener

Table Exchange rate USD/CNY, Jan. 2019–June 2023

| Year | Jan.   | Feb.   | March  | April  | 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  |
| 2023 | 6.9475 | 6.7492 | 6.9400 | 6.8805 | 6.9054 | 7.0965 |        |        |        |        |        |        |         |

Source: The People's Bank of China

## 1 Introduction of acesulfame potassium in China

### 1.1 Historical development of acesulfame potassium industry

Table 1.1-1 Industry classification of sweeteners

| Classification           |                       | Product   |
|--------------------------|-----------------------|---|
| Sugar sweeteners         |                       | Sucrose, glucose, fructose, maltose, lactose                              |
| Sugar alcohol sweeteners |                       | Sorbitol, xylitol, maltitol, mannitol, erythritol                         |
| Functional sweeteners    | Artificial sweeteners | Saccharin, cyclamate, aspartame, acesulfame potassium, sucralose, neotame |
|                          | Natural extractives   | Stevia sweetener, monk fruit sweetener                                    |

Artificial sweeteners with high sweetness have gone through six generations: saccharin, cyclamate, aspartame, acesulfame potassium, sucralose and neotame. The first three generations (saccharin, cyclamate and aspartame) are regarded as traditional sweeteners, while the later ones are treated as new sweeteners. Broad development prospects of new artificial sweeteners come from rapid growth of low-sugar demand on one hand, and the replacement of traditional sweeteners on the other hand.

Synthesized by Hoechst AG in 1967, acesulfame potassium was first approved in the UK in 1983 and then used widely as a food additive around the globe since 2000. In May 1992, the Chinese government approved its application in food and beverage. Currently, it is used in some 4,000 products (in food, beverages, oral hygiene products, cosmetics and pharmaceuticals) in over 100 countries.

The fourth-generation artificial sweetener acesulfame potassium has sweetness 200 times over that of sucrose. Considered to be one of the most stable sweeteners, acesulfame potassium has a good taste with no calories. It is safe for people, and will not be metabolized or accumulated in the human body. Thanks to its safeness, reasonable price, and better overall performance compared with traditional sweeteners, acesulfame potassium has witnessed increasing demand in recent years.

Using acesulfame potassium in combination with other sweeteners can produce a strong synergistic effect. For example, when one part acesulfame potassium is mixed with one part aspartame or five parts of cyclamate, 20%–40% more sweetness can be achieved and production costs be saved.

Table 1.1-2 Comparison between artificial sweeteners of different generations

| Item  | 1st Generation  | 2nd Generation  | 3rd Generation  | 4th Generation  | 5th Generation   | 6th Generation   |
|---|---|---|---|---|--|--|
|   | Saccharin   | Cyclamate   | Aspartame   | Acesulfame potassium  | Sucralose  | Neotame  |
| Sweetness   | 450   | 40-60   | 200   | 200   | 600  | 8,000  |
| ADI value (mg/kg-d)                               | 0-5   | 0-1   | 0-40  | 0-15  | 0-15   | 0-15   |
| Equivalent sugar intake of a sixty-kg adult (g/d) | 240   | 150   | 480   | 180   | 540  | 540  |
| Domestic approval time                            | N/A   | 1996  | 1986  | 1992  | 1997   | 2003   |
| Main limitations                                  | <ul style="list-style-type: none"> <li>- With a strong post-bitter taste</li> <li>- Difficult to mix</li> <li>- Risk of cancer</li> <li>- Banned in some countries</li> </ul> | <ul style="list-style-type: none"> <li>- Risk of multiple diseases</li> <li>- Banned in some countries</li> </ul> | <ul style="list-style-type: none"> <li>- Unfit for patients with phenylketonuria</li> <li>- Unstable in an alkaline environment or in heat</li> </ul> | <ul style="list-style-type: none"> <li>With strong metallic flavor</li> </ul> | <ul style="list-style-type: none"> <li>- Relatively high cost</li> <li>- Application constrained by price</li> </ul> | <ul style="list-style-type: none"> <li>- High sweetness in small volume makes it difficult to weigh</li> <li>- Application constrained by price</li> </ul> |

Note: The sweetness is a relative value. Usually take sucrose as the reference (generally with 10% or 15% sucrose aqueous solution at 20 °C, the sweetness is 1.0).

Source: CCM

## 1.2 Raw materials of acesulfame potassium

The main raw materials for acesulfame potassium production are diketene, sulfur trioxide, sulfamic acid and triethylamine. Among them, diketene and sulfur trioxide are of greater importance, as the unit cost of these two materials takes the top two places. Their supplies and price fluctuations have a huge impact on acesulfame potassium production.

As over 50% production cost of acesulfame potassium comes from raw material cost, producers with the capacity of upstream materials are expected to avoid the risk of raw material price fluctuation and create a cost advantage.

### ➤ Diketene

Diketene is a dangerous chemical and not suitable for long-distance transportation.

Diketene is mainly produced as the supporting product for its derivatives such as ethyl acetoacetate, methyl acetoacetate and acesulfame potassium. For example, about 90% of Nantong Acetic Acid Chemical Co., Ltd.'s diketene output is consumed by itself to produce ethyl acetoacetate and methyl acetoacetate, and the rest about 10% is sold.

Major acesulfame potassium producers tend to produce it themselves. It can not only ensure a stable supply of this raw material, but also improve profits.

Anhui Jinhe Industrial Co., Ltd. (Anhui Jinhe) has a 10,000 t/a diketene capacity, which not only meets the company's raw material demand for acesulfame potassium production, but also helps to reduce production costs and then improves its competitiveness. Another acesulfame potassium producer Nantong Acetic Acid Chemical Co., Ltd. (Nantong Hongxin Chemical Co., Ltd. is its wholly-owned subsidiary) owns 40,000 t/a diketene capacity.

Table 1.2-1 Key producers of diketene in China, 2022

| No. | Producer   | Capacity 2022, t/a | Remark                                       |
|-----|--|--------------------|--|
| 1   | Ningbo Wanglong Tech Co., Ltd.                   | 70,000             | Less than 28,000 tonnes per year is for sale |
| 2   | Nantong Acetic Acid Chemical Co., Ltd.           | 40,000             | Less than 10% of the output is for sale      |
| 3   | Anhui Tiancheng New Materials Co., Ltd.          | 36,000             | About 9,000 tonnes per year is for sale      |
| 4   | Qingdao Haiwan Specialty Chemicals Co., Ltd.     | 35,000             | Less than 40% of the output is for sale      |
| 5   | Xinhua Pharmaceutical (Shouguang) Co., Ltd.      | 30,000             | All for sale                                 |
| 6   | Shandong Kunda Biotechnology Co., Ltd.           | 20,000             | Less than 5,000 tonnes per year is for sale  |
| 7   | Anhui Jinhe Industrial Co., Ltd.                 | 10,000             | About 2,000 tonnes per year is for sale      |
| 8   | Guangxi Jinyuan Biochemical Industrial Co., Ltd. | 10,000             | For self-use only                            |
| 9   | Shandong Yabang Chemical Technology Co., Ltd.    | 5,000              | For self-use only                            |

Source: CCM

Since 2016, some diketene producers have shut down or suspended production due to

environmental protection and safety issues. In April 2016, Jiangsu Tiancheng Biochemical Products Co., Ltd. stopped production for rectification due to environmental protection failure. In July 2016, Ningbo Wanglong Tech Co., Ltd. suspended production due to pipeline leakage. Thus the supply of diketene tightened in 2016, and the yearly market price increased to USD2,258/t from the previous year of USD1,265/t. Affected by the rising raw material price, the average market price of acesulfame potassium in 2016 increased to USD6,172/t from USD5,892/t in 2015.

The price of diketene increased significantly in 2017, which pushed the price of acesulfame potassium further up. And production contraction of diketene was made due contributions to a relatively high market price of acesulfame potassium in 2019. The price decreased a little in 2020, so the price of acesulfame potassium reduced correspondingly.

The price of diketene rose sharply in 2021; it peaked in April at USD2,897/t (RMB19,000/t), and the annual average in 2021 was over 30% higher than that in 2020. The price of acesulfame potassium also increased rapidly in 2021.

In 2022, the price of diketene fell back, and the annual average price was USD1,909/t (RMB12,782/t). The decrease in raw material price narrowed the increase in the price of acesulfame potassium in 2022.

#### ➤ **Sulfur trioxide**

There are many sulfur trioxide producers in China. Generally, the market price of sulfur trioxide was relatively stable in 2017–2019, which was between USD110/t–USD180/t. The price rose greatly in 2021, up about 50% year on year, affected by rising commodity prices, and it peaked at USD269/t (RMB1,800/t) in 2022.

Since sulfur trioxide is a hazardous chemical and the cost of long-distance transportation is high, acesulfame potassium producers usually purchase sulfur trioxide nearby. Of course, some existing acesulfame potassium producers choose to produce the raw material by themselves. For instance, Anhui Jinhe produces sulfur trioxide from sulfur (outsourced).



### 1.3 Governmental policies and market dynamics

#### - Governmental policies

The national standard GB25540-2010 on food additive acesulfame potassium has rules on the quality and specification of the product. In addition, the national standard *General Principles for the Label of Prepackaged Food (GB7718-2011)* rules that as long as acesulfame potassium is used in food (including mixed use with other sweeteners), it must be identified on the food label.

In June 2017, the General Office of the State Council issued the *National Nutrition Plan (2017–2030)*, which mentioned the concept of sugar reduction. More and more Chinese people are aware of the importance of reducing sugar intake and there is increasing use of sweeteners in food and beverages to replace sucrose and other added sugars

In July 2019, the State Council issued the *Healthy China Program (2019–2030)*, which takes balanced diet as one of the 15 major initiatives. It defines the scope of "Three Reductions" (reduction of salt, oil and sugar). The National Health Commission encourages people to reduce sucrose intake and prompts urban dwellers with high sugar intake to choose drinks and desserts with natural sweet substances and sweeteners instead of those with sucrose.

The Healthy China Program also urges to speed up the revision of *General Principles for the Label of Prepackaged Food*, imposes compulsory labelling of sweeteners, and encourages enterprises to claim "low sugar" or "sugar-free" and adopt the use of front-of-package (FOP) labelling. Thus consumers can quickly pick out healthy foods, and related administrators can strengthen the supervision and management of nutrition labelling in prepackaged foods.

In Sept. 2019, China's State Administration for Market Regulation issued the *Guidance on Standardizing the Use of Food Additives (Guidance)*. It requires that food producers should try their best to reduce the use of food additives or stop using them to reduce salt, oil and sugar contents. It also advocates a proper decrease in the volume of sucrose in processed foods and the replacement of sucrose with natural sweet substances and sweeteners allowed in food safety standards.

The Guidance clearly states that local market regulatory departments shall urge food producers and traders to follow the requirements set out in this Guidance, as well as the principles, allowed varieties, use scope, maximum dosage or residue stipulated in the *Standard for the Use of Food Additives (GB2760-2014)*. These departments shall also strengthen supervision and sample testing, focusing on product standards or producing formula, procurement management and feeding modes of raw materials and food additives, quality control results and labelling, etc. Entities using food additives beyond the scope and maximum amount prescribed will be punished in accordance with the rules and regulations.

In June 2022, the National Development and Reform Commission issued a plan to promote

national health during the 14-Five-Year period (2021–2025), which put forward a number of actions including the movement called China Healthy Lifestyle for All and the promotion of three reductions and three healthy conditions—reduction of salt, oil and sugar and healthy mouth, weight and bones, advocated the implementation of the *National Nutrition Plan* and *Rational Diet Action* and called for the building of awareness to love food and developing the habit of a balanced diet.

In Aug. 2022, the National Health Commission published the *14th Five-Year Plan for Food Safety Standard, Monitoring and Evaluation*. This plan mentioned that the promotion of three reductions and the development of new healthy foods need to run in parallel, so as to improve consumers' understanding of food and promote balanced diets.

#### **- Market dynamics**

With increasing health awareness and rising demand for low-sugar and low-calorie foods, the sweetener industry will see great growth. China's sweetener market is expected to grow faster, prompted by policy advocacy for sweeteners over sucrose and traditional sweeteners.

## 2 Supply and demand of acesulfame potassium in China in 2022

### 2.1 Overview of production of acesulfame potassium in China

At present, the capacity of acesulfame potassium in China is concentrated in a few producers. The industry is in sound development, and a basically balanced supply and demand relation can be seen. In general, some 80% of China's acesulfame potassium output is for export.

In 2022, China's acesulfame potassium capacity was 36,000 t/a, an increase of over 70% compared to 2021.

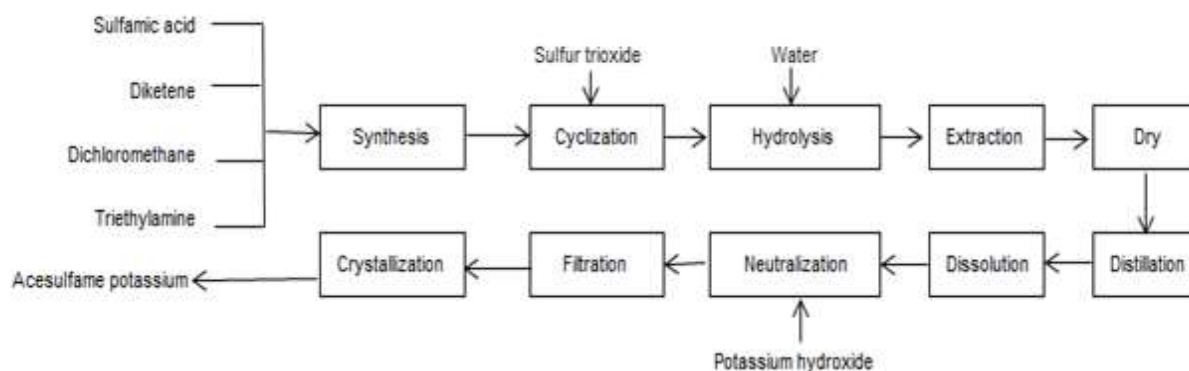
The operating rate of domestic producers was elevated in 2020 and 2021, reaching 78% and 82%, respectively. But the figure fell below 55% in 2022, primarily due to the new domestic production capacity. In 2022, Nantong Hongxin Chemical Co., Ltd. (Nantong Hongxin) completed its 15,000 t/a acesulfame potassium project, but this project was in the trial run during the year. Anhui Jinhe had been the largest domestic producers of acesulfame potassium before 2022 in terms of capacity and annual output, with a capacity of 12,000 t/a since 2016. But now Nantong Hongxin's capacity overtakes that of Anhui Jinhe.

### 2.2 Production cost

Chinese acesulfame potassium producers adopt the reduction method (synthesis of diketene and sulfur trioxide). In the production process, sulfamic acid, triethylamine, diketene and sulfur trioxide are used as the main raw materials, and acesulfame potassium is obtained through cyclization, hydrolysis and neutralization.

The production costs mainly consist of the costs of raw materials, and diketene is the most important raw material. In terms of share of the raw material costs, diketene and sulfur trioxide take the lead. Fluctuations in the prices of diketene and sulfur trioxide will have a great impact on the price of acesulfame potassium.

Figure 2.2-1 Flowchart of processes involved in acesulfame potassium production



Source: CCM

Table 2.2-1 Raw material cost for acesulfame potassium production in China, 2022

| Item                    | Unit consumption, t/t | Price, USD/t | Unit cost, USD/t |
|-------------------------|-----------------------|--------------|------------------|
| Sulfamic acid 99.5%     | 0.71                  | 881          | 626              |
| Diketene 97%            | 0.59                  | 1,940        | 1,137            |
| Triethylamine 99.5%     | 0.19                  | 2,657        | 505              |
| Sulphur trioxide 99.9%  | 3.45                  | 269          | 927              |
| Potassium hydroxide 40% | 0.32                  | 687          | 221              |
| Dichloromethane 99.5%   | 0.01                  | 622          | 4                |
| Others                  | /                     | /            | 26               |
| <b>Total</b>            | <b>/</b>              | <b>/</b>     | <b>3,445</b>     |

Note: The unit price is based on not only the ordinary market price but also the degree of economic scale, operating rate and backward integration of acesulfame potassium manufacturers.

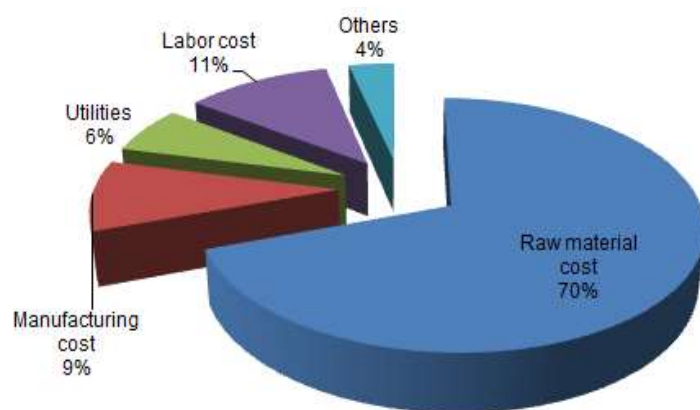
Source: CCM

Table 2.2-2 General production costs for acesulfame potassium in China, 2022

| Item               | Unit cost, USD/t | Share       |
|--------------------|------------------|-------------|
| Raw material cost  | 3,445            | 70%         |
| Manufacturing cost | 460              | 9%          |
| Utilities          | 312              | 6%          |
| Labor cost         | 560              | 11%         |
| Others             | 175              | 4%          |
| <b>Total</b>       | <b>4,952</b>     | <b>100%</b> |

Source: CCM

Figure 2.2-2 Cost structure of acesulfame potassium in China, 2022



Source: CCM

## 2.3 Key manufacturers

As of June 2023, there were three active acesulfame potassium producers in China.

Anhui Jinhe is the largest producer and it plays a dominant role in the industry. Its acesulfame potassium in capacity has maintained at 12,000 t/a since 2016, accounting for over 30% of the national total. In addition, the environmental impact report of its acesulfame potassium expansion project was published in 2022, and the acesulfame potassium production capacity will reach 15,000 t/a once this project was put into production.

Shandong Yabang's 5,000 t/a acesulfame potassium project was completed and put into commercial production in 2019.

Nantong Hongxin Chemical Co., Ltd.'s 15,000 t/a acesulfame potassium project is still undergoing trial operation now.

Table 2.3-1 Situation of major acesulfame potassium producers in China, 2022

| No. | Producer                                      | Abbreviation    | Plant location | Launch time | Company type                |
|-----|---|-----------------|----------------|-------------|-----------------------------|
| 1   | Anhui Jinhe Industrial Co., Ltd.              | Anhui Jinhe     | Anhui          | 2007        | Listed (stock code: 002597) |
| 2   | Shandong Yabang Chemical Technology Co., Ltd. | Shandong Yabang | Shandong       | 2019        | Private                     |
| 3   | VitaSweet Co., Ltd.                           | VitaSweet       | Anhui          | 2007        | Private                     |
| 4   | Nantong Hongxin Chemical Co., Ltd.            | Nantong Hongxin | Jiangsu        | 2022        | Private                     |
| 5   | Hangzhou Sanhe Food Co., Ltd.                 | Hangzhou Sanhe  | Zhejiang       | 2009        | Private                     |

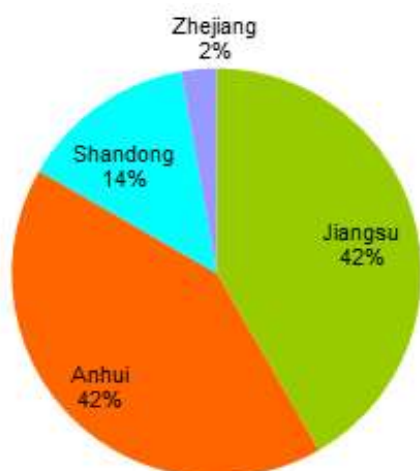
Source: CCM

Table 2.3-2 Capacity and output of acesulfame potassium by producer in China, 2020–2022

| No.          | Producer        | Status 2022 | Capacity 2022, t/a | Output, tonne |               |               |
|--------------|-----------------|-------------|--------------------|---------------|---------------|---------------|
|              |                 |             |                    | 2022          | 2021          | 2020          |
| 1            | Anhui Jinhe     | Active      | 12,000             | 11,900        | 11,700        | 11,600        |
| 2            | Shandong Yabang | Active      | 5,000              | 3,300         | 2,700         | 2,000         |
| 3            | VitaSweet       | Active      | 3,000              | 2,900         | 2,900         | 2,800         |
| 4            | Nantong Hongxin | Trial run   | 15,000             | 1,400         | 0             | 0             |
| 5            | Hangzhou Sanhe  | Idle        | 1,000              | 0             | 0             | 0             |
| <b>Total</b> |                 | /           | <b>36,000</b>      | <b>19,500</b> | <b>17,300</b> | <b>16,400</b> |

Source: CCM

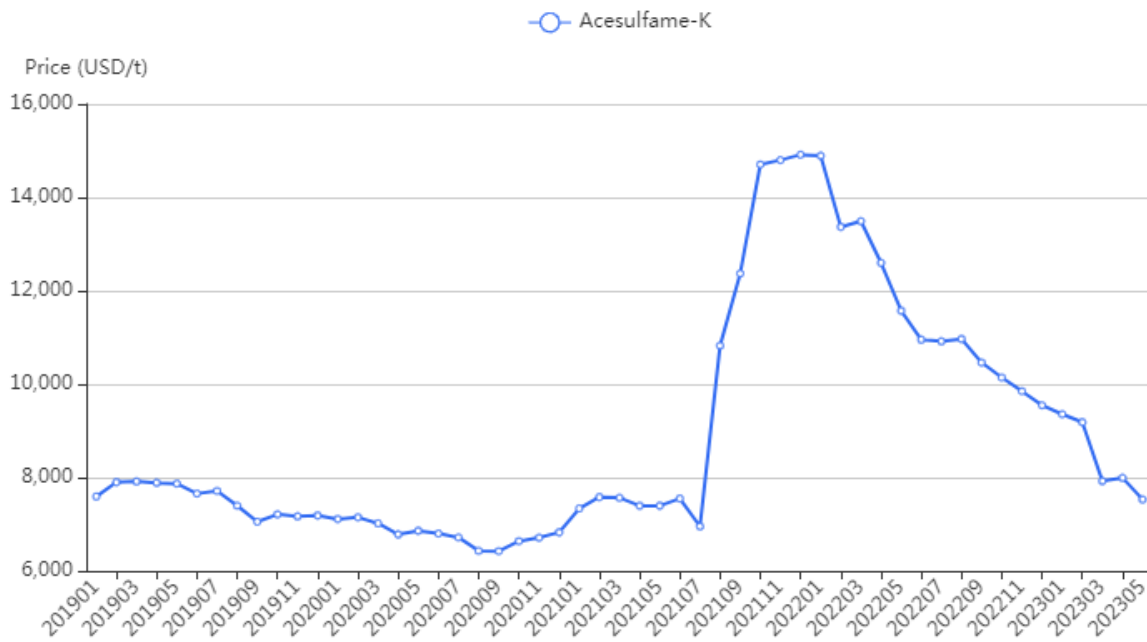
Figure 2.3-1 Capacity distribution of acesulfame potassium in China, 2022



Source: CCM

## 2.4 Price 2019–2022

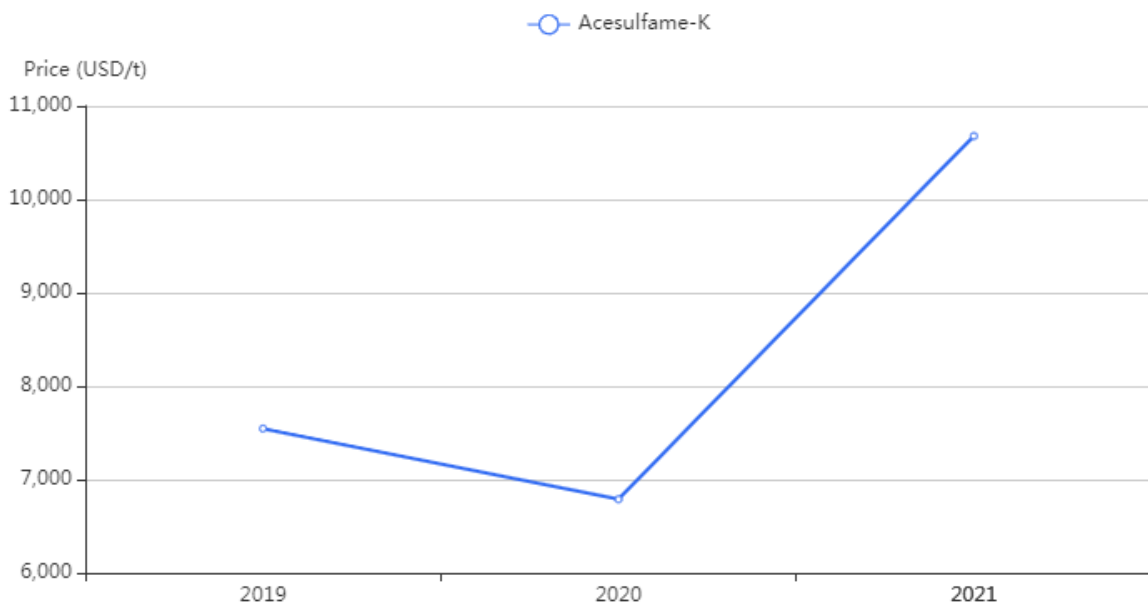
Figure 2.4-1 Monthly average ex-works prices of acesulfame potassium in China, Jan. 2019–Jun. 2023



Note: Acesulfame K is an abbreviation for acesulfame potassium.

Source: CCM

Figure 2.4-2 Annual ex-works price of acesulfame potassium in China, 2019–2022



Note: Acesulfame K is an abbreviation for acesulfame potassium.

Source: CCM

Generally speaking, since 2016, China's acesulfame potassium has been in an oligopoly market, which is dominated by Anhui Jinhe. But in 2022, Nantong Hongxin Chemical Co., Ltd. (Nantong Hongxin) completed its 15,000 t/a acesulfame potassium project which had been in the trial run as of the end of 2022. In the future, the domestic market is likely to be dominated by Anhui Jinhe and Nantong Hongxin.

In 2019, due to the relatively concentrated production capacity of acesulfame potassium and the relatively stable price of raw materials, the ex-works price of acesulfame potassium was stable with slight fluctuation, which was between USD7,054/t (RMB50,000/t) and USD7,916/t (RMB53,000/t).

The ex-works price of acesulfame potassium decreased to USD6,424/t (RMB44,000/t) –USD7,148/t (RMB49,500/t) in 2020, mainly influenced by the COVID-19 outbreak and subsequent price fall in most chemicals including some basic chemicals such as caustic soda, sulfuric acid, acetic acid, etc.

The prices recovered in H1 2021 and skyrocketed in Aug.–Oct. as a result of rising raw material costs and "dual control" on energy consumption and energy intensity. It maintained at RMB95,000/t from Oct. 2021 to Jan. 2022. Main contributors to the jumping price are:

- Firstly, the US and other countries adopted a stimulative monetary policy to fight against economic recession caused by the coronavirus pandemic, which pushed up inflation around the world. Consequently, many manufacturers raised the product price to reduce their pressures since prices of raw materials and commodity goods kept surging.
- Secondly, the "dual control" policy was implemented in H2 2021. Essentials for production, steam and electricity, had witnessed soaring prices. Manufacturers had to raise the price because of high production costs.
- Thirdly, the combination of elevated raw material prices, strong demand and the price increase of other sweeteners sent the price of acesulfame potassium higher.

In 2022, the price of acesulfame potassium started to decline, but it still remained at an all-time high level throughout the year on the whole and the average price of acesulfame in 2022 increased about 12% YoY. The price decrease during the year was primarily linked to the decline in the prices of main raw materials including diketene. Although producers had been reluctant to reduce price since Q3, the price only climbed slightly in Sept. due to the weak demand and Nantong Hongxin's 15,000 t/a acesulfame potassium project about to start production. Later, with the arrival of the off-season, the price trended downward in Q4.

The downtrend of the acesulfame potassium price in 2022 carried into the first six months of 2023:

- Most of the acesulfame potassium producers maintained normal production. Moreover, the new entrant Nantong Hongxin with a large capacity started to market its product, significantly pulling down the price.
- Downstream manufacturers generally made their purchases according to their basic demand as there was no obvious sign of recovery in the beverage industry. In addition, the overseas



demand was insipid. The exports in the first four months of 2023 roughly decreased by 15% compared to the same period in 2022.

- Production costs were lower as prices of raw materials and energy dropped, which to some extent helped companies maintain production.

At present, the acesulfame potassium price has moved back to the level where the industry is able to make normal profits. It is projected that the acesulfame potassium price may see a further decline in the short term due to a combination of weak consumption, no signs of improvement in demand and new production capacity putting downward pressure on the price.

## 2.5 Consumption

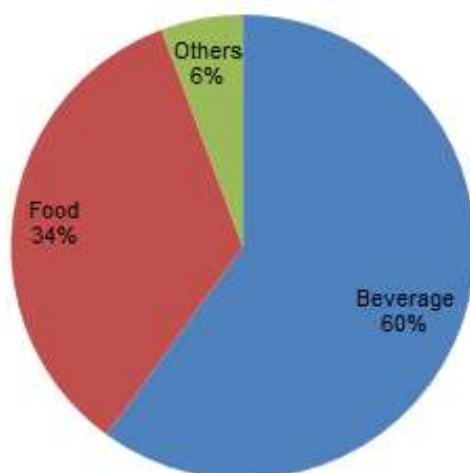
### - Consumption situation

China, as a major sweetener producer in the world, has achieved stable growth in artificial sweetener production since 2010, thanks to the increasing demand for artificial sweeteners. With ever-growing consumption preference for low-sugar and low-calorie products, the artificial sweetener market will see great development. Stability and safety are two pursuits in artificial sweetener development.

### - Consumption pattern

Acesulfame potassium is mainly used in the beverage and food industries. The consumption of acesulfame potassium in China was 2,900 tonnes in 2021 and 3,100 tonnes in 2022.

Figure 2.5-1 Downstream industry of acesulfame potassium in China, 2022



Source: CCM

Table 2.5-1 Consumption pattern of acesulfame potassium in China, 2022

| Downstream segment |                        | Consumption, tonne | Consumption share |
|--------------------|------------------------|--------------------|-------------------|
| Beverage           | Carbonated beverages   | 1,200              | 38.7%             |
|                    | Milk beverages         | 195                | 9.5%              |
|                    | Vinegar beverages      | 145                | 4.7%              |
|                    | Tea beverages          | 125                | 4.0%              |
|                    | Other beverages        | 95                 | 3.1%              |
| Food               | Roasted seeds and nuts | 440                | 14.2%             |
|                    | Sugar-free chewing gum | 190                | 6.1%              |
|                    | Canned foods           | 210                | 6.8%              |
|                    | Other foods            | 223                | 7.2%              |
| Others             |                        | 177                | 5.7%              |
| <b>Total</b>       |                        | <b>3,100</b>       | <b>100.0%</b>     |

Source: CCM

In 2019–2022, the consumption of acesulfame potassium in China increased steadily. And in

2022, carbonated beverages, roasted seeds and nuts, and milk beverages were the still top three consumption segments of acesulfame potassium in China.

With a growing population of diabetes patients in the world and increasing health awareness among the public, the food and beverage industries have explored ways to reduce sugar while maintaining the taste. Instead of traditional sugar and fructose with high calories, more people have started to choose functional sweeteners. In addition, many countries have levied sugar tax on drinks companies. Therefore, using new sweeteners to produce low-sugar and sugar-free products has become the main development goal for food and beverage industries globally.

**- End user**

Table 2.5-2 Main end users of acesulfame potassium for carbonated beverages, 2022

| No. | Company  | Product  |
|-----|--|--|
| 1   | Coca Cola (China) Beverage Co., Ltd.           | Coke Zero, Coca-Cola Fiber+, Coke Light, Sprite Zero, Sprite Fiber+, Sugar free Sprite |
| 2   | PepsiCo (China) Limited                        | Pepsi-cola Max, Diet Pepsi, 7-UP, Marinda  |
| 3   | Guangdong Jianlibao Group Co., Ltd.            | Jianlibao sports drink   |
| 4   | Jinmailang Beverage Corporate Ltd.             | Jinmailang soda water  |
| 5   | Jiaozuo Mingren Natural Medicine Co., Ltd.     | Mingren soda water   |
| 6   | Hangzhou Wahaha Group Co., Ltd.                | Wahaha soda water  |
| 7   | Danone (China) Food and Beverage Co., Ltd.     | Mizone sugar free sparkling water  |
| 8   | Beijing Spring & Mountains Beverages Co., Ltd. | Qingting soda sparkling water  |
| 9   | Xiamen Yinlu Group Co., Ltd.                   | Soda sparkling water   |

Source: CCM

Table 2.5-3 Main end users of acesulfame potassium for roasted seeds and nuts, 2022

| No. | Company                              | Product   |
|-----|--------------------------------------|---|
| 1   | Hangzhou Haomusi Foodstuff Co., Ltd. | Pistachio nut, pecan nuts, macadamias, watermelon seeds, sunflower seeds, almonds, small white almonds      |
| 2   | Bestore Co., Ltd.                    | Dried horsebeans, pecan nuts, macadamias, watermelon seeds, sunflower seeds, almonds, milk flavored walnuts |
| 3   | Three Squirrels Inc.                 | Dried horsebeans, pistachio nuts, pecan nuts, macadamias, sunflower seeds, multi taste peanuts              |
| 4   | Chacha Food Co., Ltd.                | Melon seeds, peanuts, dried horsebeans, macadamias  |
| 5   | Shanghai Laiyifen Co., Ltd.          | Pecan nuts, macadamias, watermelon seeds, sunflower seeds, pumpkin seeds, almonds                           |

Source: CCM

Table 2.5-4 Main end users of acesulfame potassium for milk beverages, 2022

| No. | Company  | Product   |
|-----|--|---|
| 1   | Inner Mongolia Mengniu Dairy (Group) Co., Ltd. | Formulated milk-containing beverages                          |
| 2   | Inner Mongolia Yili Industrial Group Co., Ltd. | Formulated milk-containing beverages                          |
| 3   | Coca Cola (China) Beverage Co., Ltd.           | Minute Maid Pulpy Super Milky                                 |
| 4   | Hangzhou Wahaha Group Co., Ltd.                | Wahaha AD calcium milk drink, Nutrition Express milk beverage |
| 5   | Hebei Yangyuan Zhihui Beverage Co., Ltd.       | Sugar free walnut milk beverage                               |

Source: CCM

The consumption of acesulfame potassium in beverages has increased stably in recent years due to the following reasons:

- Firstly, with changes in people's diet structure and lifestyle, demand for functional sugar substitutes in beverages has increased rapidly since such substitutes contain no calories and will not go through metabolism. After adding acesulfame potassium, or the mixture of acesulfame potassium with other sweeteners in beverages, a strong sweetening effect can be produced and the calories be kept at a low level. Take Coke as an example, which has the largest share in the beverage market. In recent years, the output of conventional sweet Coke has declined at a rate of nearly 3% per year, while the output of low-sugar Coke has increased significantly. Particularly, sugar-free soda water/sparkling water containing erythritol, sucralose, or acesulfame potassium is accepted by more and more people, and its output increased rapidly in China.

- Secondly, the share of acesulfame potassium price to the cost of downstream products is very small, about 0.1%. Therefore, the beverage industry is less sensitive to the price fluctuation of acesulfame potassium, so the demand has grown steadily. For instance, in non-alcoholic beverages, the maximum addition of acesulfame potassium is 350mg/L. If the price of acesulfame potassium increases by RMB10,000/t, the cost will climb by well below RMB0.01/L.

- Thirdly, compared to other artificially synthesized food sweeteners, acesulfame potassium is more stable when exposed to heat.

Table 2.5-5 Main end users of acesulfame potassium for other applications, 2022

| No. | Company                                 | Product                 |
|-----|---|-------------------------|
| 1   | Wrigley Chewing Gum Company Limited     | Wrigley sugarless gum   |
| 2   | Chongqing Fuling Zhacai Group Co., Ltd. | Wujiang pickled mustard |
| 3   | Jinguan (China) Food Co., Ltd.          | Jelly                   |
| 4   | Hebei Madajie Foodstuff Co., Ltd.       | Jelly                   |
| 5   | Huanlejia Food Group Co., Ltd.          | Canned fruit            |
| 6   | Dalian Zhenxin Canned Food Co., Ltd.    | Canned fruit            |
| 7   | Hangzhou Wahaha Group Co., Ltd.         | Eight-treasure congee   |
| 8   | Dali Foods Group Company Limited        | Eight-treasure congee   |
| 9   | Qianhe Condiment and Food Co., Ltd.     | Soy sauce               |

Source: CCM

### 3 Forecast

#### 3.1 Factors influencing China's acesulfame potassium industry

##### ➤ Drivers

In the next few years, the following factors will drive the development of the acesulfame potassium industry in China.

##### - Trend to replace traditional artificial sweeteners

Capacity expansion and application scope of traditional sweeteners such as saccharin and cyclamate have been restricted by the Chinese government and even around the globe. In contrast, new artificial sweeteners such as acesulfame potassium have better cost performance and see their application scope expand. It is believed that acesulfame potassium will be more favored by the market in future.

##### - Growing health awareness and preference for low-calorie diets

More and more people suffer from obesity and diabetes in China. A growing number of consumers consciously choose non-sugar sweeteners. Acesulfame potassium, a good substitute for sucrose, is expected to occupy more market share and develop at an accelerating pace.

##### - Rising global demand

China is the world's largest producer and supplier of acesulfame potassium. Its export volume of acesulfame potassium is likely to keep growing in the short term as the overseas demand is increasing. At the same time, there is a growing domestic demand for acesulfame potassium as more and more companies launch low-sugar and zero-sugar drinks.

##### - Lower prices of synthetic sweeteners

Synthetic sweeteners, which are prepared by chemical methods, represent a big part of the sweetener market in China. They are cheaper but sweeter than natural sweeteners and sugar alcohol sweeteners.

##### ➤ Barriers

##### - Relatively high entry threshold

The production process of acesulfame potassium is complicated and may take several years to master. In addition, it takes at least one to two years for a new project to be approved and put into operation. To acquire national certification and be accepted by downstream manufacturers, more years would slip away. For new entrants, the time and efforts mean a lot.

Besides, the main raw materials diketene and sulfur trioxide are hazardous chemicals with high transportation costs and storage difficulty. New capacity of diketene and sulfur trioxide is restricted by the government, which makes it difficult for acesulfame potassium producers to

obtain approval to extend to the upstream sectors. Optimization of the industrial chain is essential to reduce production costs and increase profits for new entrants.

- Competition from other new sweeteners

Some other new sweeteners such as sucralose, neotame and erythritol will pose great challenges to acesulfame potassium.

- Development of natural sweeteners

With consumers' increasing buying power and improving knowledge about food ingredients, natural sweeteners, which are calorie-free, safer and healthier, will become more popular

### 3.2 Supply & demand forecast 2023–2025

Influenced by increasing demand for low-sugar diets in recent years, the demand for new sweeteners including acesulfame potassium is predicted to grow in the future, as they gradually replace traditional sweeteners. With advantages in safeness, taste and price, acesulfame potassium sees a bright future.

It is expected that both the domestic output and the production capacity of acesulfame potassium will increase.

- The capacity will see a jump with Anhui Jinhe Industrial Co., Ltd.'s expansion project. The domestic acesulfame potassium production capacity will reach 39,000 t/a once this project is put into production.

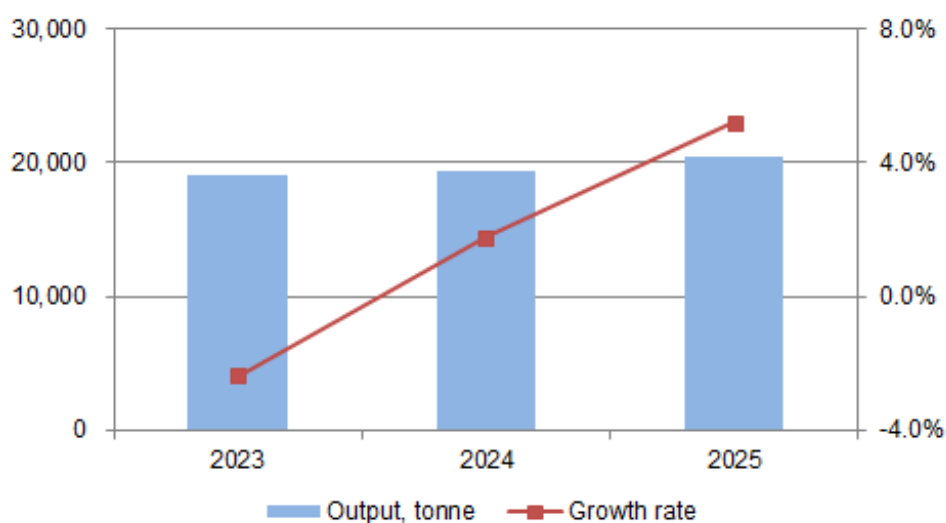
- China's acesulfame potassium exports in 2023 may drop slightly compared to 2022. But then, as overseas production and life gradually get back to normal after the pandemic, the overseas demand is expected to grow, which may boost a further increase in China's acesulfame potassium exports.

Figure 3.2-1 Forecast on demand for acesulfame potassium in China, 2023–2025



Source: CCM

Figure 3.2-2 Forecast on output of acesulfame potassium in China, 2023–2025



Source: CCM

It is estimated that the domestic demand for acesulfame potassium will continue to grow in the future, reaching about 3,600 tonnes in 2025 with a CAGR of 4.5% in 2023–2025. Also, the supply of acesulfame potassium may increase to 20,390 tonnes in 2025 with a CAGR of 3.49% in 2023–2025.



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