



CCM Data & Business
Intelligence

Production of Citric Acid and Sodium Citrate in China

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Basic info of citric acid producers

Chinese name	English name	Abbreviation	Location
潍坊英轩实业有限公司	Weifang Ensign Industry Co., Ltd.	Weifang Ensign	Shandong
日照金禾生化集团股份有限公司	RZBC Group Co., Ltd.	RZBC	Shandong
山东柠檬生化有限公司	Shandong TTCA Co., Ltd.	TTCA	Shandong
江苏国信协联能源有限公司	Jiangsu Guoxin Union Energy Co., Ltd.	Guoxin Union	Jiangsu
中粮生物科技股份有限公司	COFCO Biotechnology Co., Ltd.	COFCO	Anhui, Jilin
莱芜泰禾生化有限公司	Laiwu Taihe Biochemistry Co., Ltd.	Laiwu Taihe	Shandong
七星柠檬科技有限公司	Seven Stars Citric Acid Technology Co., Ltd.	Seven Stars	Shandong

1 Summary of citric acid and sodium citrate production

Table 1-1 Capacity and output of citric acid producers in China, 2019–2021

No.	Producer	Capacity, t/a			Output, tonne			Operating rate 2021	Self-consumption volume, tonne	Sales, tonne
		2019	2020	2021	2019	2020	2021			
1	Weifang Ensign	600,000	600,000	600,000	455,000	450,000	500,000	83%	77,700	422,300
2	RZBC	360,000	370,000	370,000	254,000	265,000	320,000	86%	46,200	273,800
3	TTCA	350,000	350,000	350,000	219,500	224,000	270,000	77%	7,000	263,000
4	Guoxin Union	180,000	180,000	180,000	161,500	162,000	152,000	84%	15,400	136,600
5	COFCO	180,000	180,000	180,000	160,000	140,000	124,000	69%	9,800	114,200
6	Laiwu Taihe	160,000	160,000	160,000	113,000	110,000	110,000	69%	28,000	82,000
7	Seven Stars	100,000	100,000	100,000	10,000	35,000	73,000	73%	4,900	68,100
Total		1,930,000	1,940,000	1,940,000	1,373,000	1,386,000	1,549,000	80%	189,000	1,360,000

Note: 1) The capacity and output of refined citric acid produced from citric acid as starting raw material is excluded.

2) Capacity of citric acid includes that of citrate, same as the output.

Source: CCM

Table 1-2 Capacity and output of sodium citrate producers in China, 2019–2021

No.	Producer	Capacity, t/a			Output, tonne		
		2019	2020	2021	2019	2020	2021
1	Weifang Ensign	100,000	100,000	100,000	84,800	88,000	95,000
2	RZBC	40,000	80,000	80,000	29,000	34,000	50,000
6	TTCA	30,000	30,000	30,000	4,500	5,000	10,000
4	Guoxin Union	36,000	36,000	36,000	21,500	22,500	22,000
5	COFCO	15,000	15,000	15,000	14,500	14,800	14,000
3	Laiwu Taihe	60,000	60,000	60,000	33,000	33,500	36,000
7	Seven Stars	12,000	12,000	12,000	1,000	5,000	7,000
Total		293,000	333,000	333,000	188,300	202,800	234,000

Note: 1) The capacity and output of refined sodium citrate produced from sodium citrate as starting raw material is excluded.

2) The company which does not have citric acid capacity is excluded.

Source: CCM

Influenced by environmental protection policies, the citric acid production lines with backward or low capacity have been continuously eliminated. As a result, capacity of citric acid has become concentrated in large producers, which ultimately led to a high and steady operating rate. There were only seven active citric acid producers as of March 2022.

The industry operating rate of citric acid was relatively high, before 2018. The operating rate decreased to 79% in 2018, 71% in 2019 and 71% in 2020, along with the launch of new projects and expansion projects totaled 275,000 t/a (RZBC and TTCA) in 2018 and 240,000 t/a (Weifang Ensign, Seven Stars) in 2019. The operating rate was about 80% in 2021, driven by rapidly growing demand beyond China.

A citric acid producer is often a producer of sodium citrate. As of March 2022, there were only seven active sodium citrate producers (processors are excluded) in China. The output of sodium citrate increased with CAGR of 8.9% in 2017–2021, driven by the development of the domestic detergent and food industries as well as increasing overseas demand.

2 Key manufacturers' production information

Weifang Ensign has expanded its citric acid capacity from 460,000 t/a to 600,000 t/a in May 2020. Weifang Ensign uses part of its citric acid to make citrates at a maximum of 120,000 t/a, which contains 100,000 t/a sodium citrate.

Weifang Ensign also proposed a green intelligent manufacturing project of 400,000 t/a refined citric acid (400,000 t/a citric acid, 250,000 t/a citrates, etc.), and 140,000 t/a citric acid will be used to manufacture citrates. This project was started up in Sept. 2020, and is estimated to be built up in H1 2022.

Link of expansion project:

http://cji.weifang.gov.cn/xqdt/202009/t20200930_5717158.html

http://www.changle.gov.cn/CLXXXGK/XGTJ/202101/t20210115_579044.html

RZBC (Boyuan) Biochemical Co., Ltd. (RZBC Boyuan) once had a production line only producing citric acid (capacity: 180,000 t/a) and 40,000 t/a sodium citrate production line, in which the 40,000 t/a sodium citrate production line equipped with additional citric acid synthesis device. In 2015, RZBC Group Co., Ltd. (RZBC) made re-arrangement to its subsidiaries, so RZBC (Luxin) Co., Ltd. dismantled the outdated 140,000 t/a citric acid production line that year; a make-up production work was then entrusted to RZBC Boyuan. In 2019, 140,000 t/a citric acid production line in RZBC Boyuan was put into commercial production. RZBC Boyuan started citrate energy-saving technical transformation project (50,000 t/a citric acid was replaced by 60,000 t/a sodium citrate, 40,000 t/a sodium citrate was replaced by 20,000 t/a sodium citrate and 20,000 t/a potassium citrate) at the end of 2019, which was built up in May 2020. RZBC Boyuan also proposes a technical transformation project of 30,000 t/a citrate, and the 1st phase (20,000 t/a calcium citrate, 1,000 t/a magnesium citrate) was built up in October 2021.

Rizhao Goldgrain Biotech Co., Ltd. (Rizhao Goldgrain), a wholly-owned sub-subsidiary of RZBC, is building a refining of 300,000 t/a food grade citric acid project (500,000 t/a imported corn will be consumed), which is planned to be built up in H1 2022.

Link of expansion project:

http://xzspj.rizhao.gov.cn/art/2021/8/13/art_171032_11985.html

TTCA once had a production line only producing citric acid (capacity: 185,000 t/a) and 30,000 t/a sodium citrate production line (equipped with additional citric acid synthesis device). TTCA's 135,000 t/a citric acid expansion project was finished and put into production in 2019.

Guoxin Union had a production line only producing citric acid (capacity: 180,000 t/a) and 30,000 t/a sodium citrate production line (equipped with additional citric acid synthesis device). *The EIA of Jilin Union Biotechnology Co., Ltd. (Jilin Union)'s 150,000 t/a citric acid project (Phase I: a production line for 75,000 t/a citric acid, Phase II: a production line for 75,000 t/a citric acid and citrate) was approved in Feb. 2022.*

Link of expansion project:

http://www.jlzhnlai.gov.cn/ztzl/hjbh/xmqq/202202/t20220225_929000.html

COFCO currently has two production bases in China, namely Ma'anshan City in Anhui Province and Changchun City in Jilin Province. Specifically,

- 1) Production base in Ma'anshan City has a production line only producing citric acid (capacity: 45,000 t/a), but they could use part of it to make sodium citrate at a maximum of 15,000 t/a. This production base started the technical transformation project of 60,000 t/a citric acid (converted to citric acid monohydrate, including 28,000 t/a anhydrous citric acid, 20,000 t/a citric acid monohydrate, and 12,000 t/a sodium citrate), which pass the environmental protection completion acceptance in 2019 (actually, this project was competed several years ago).
- 2) Production base in Changchun City has a production line only producing citric acid (capacity: 120,000 t/a), which was put into production in June 2018.
- 3) Production base in Bengbu City once had a production line only producing citric acid (capacity: 120,000 t/a), part of which can be used to make sodium citrate at a maximum of 60,000 t/a. A planned relocation to the Bengbu Fine Chemical High-tech Industrial Base is still under way. The old plant completely stopped the production of citric acid and sodium citrate in 2019. The relocation project with citric acid capacity of 60,000 t/a in the Bengbu Fine Chemical High-tech Industrial Base had not been built yet as of March 2022.

Link of expansion project: <http://chq.mas.gov.cn/xxfb/xwzx/tzgg/9744647.html>

Table 2-1 Profitability of COFCO Biotechnology Co., Ltd., 2018–2020

Citric acid, citrate and its by-product	2018	2019	2020
Revenue, USD	119,341,052	116,225,539	102,986,535
Cost of sales, USD	108,579,751	112,884,003	93,513,892

Operating profit, USD	10,761,301	3,341,536	9,472,643
Gross profit margin	9%	3%	9%

Note: COFCO Biochemical (Thailand) Co., Ltd. is included.

Source: Annual reports of COFCO Biotechnology Co., Ltd.

Laiwu Taihe has a production line only producing citric acid (capacity: 100,000 t/a) and 60,000 t/a sodium citrate production line. The two production lines share the same production process in the early citric acid synthesis. Laiwu Taihe added a refined sodium citrate production line with 2,000 t/a capacity at the end of 2018, using sodium citrate as material.

Seven Stars, founded on 19 Jan., 2018, planned to build a food additive project (500,000 t/a) at two phases. The Phase I includes 88,000 t/a of citric acid (44,000 t/a of anhydrous citric acid and 44,000 t/a of citric acid monohydrate) and 12,000 t/a of sodium citrate, which started in 2018 and was put into trial production in Sept. 2019. The Phase II includes 352,000 t/a of citric acid (176,000 t/a of anhydrous citric acid and 176,000 t/a of citric acid monohydrate), 48,000 t/a of sodium citrate and 160,000 t/a citric acid gluten feed (by-product), with two stages for the construction.

- ✓ 1st stage of Phase II (200,000 t/a citric acid and citrate): go into operation by the end of June 2022
- ✓ 2nd stage of Phase II (also 200,000 t/a citric acid and citrate): be up and running by the end of Dec. 2023

Seven Stars takes mother liquor of citric acid monohydrate to produce sodium citrate.

Link of expansion project:

<http://www.yishui.gov.cn/info/1084/168996.htm>

3 Forecast on citric acid and sodium citrate production in China

Domestic capacity ranking of citric acid and sodium citrate unchanged in 2021.

A total capacity of about 1,250,000 t/a citric acid will be built up and released in 2022–2025, if all these potential projects are processing well as expected.

Qiqihar Longjiang Fufeng Biotechnology Co., Ltd., founded on 3 March, 2017, planned to build a corn deep processing project (capacity: 3 million t/a) which was divided into three phases. Only the 3rd phase involves the construction of a 500,000 t/a citric acid production line. The first and second phases have been completed as of December 2020, and the 3rd phase is still in the preparation of feasibility study.

Inner Mongolia Meca Biotechnology Co., Ltd., established in Sept., 2019, planned to build a 2,000,000 t/a corn deep processing industrial park with a construction period from 2019 to 2023, which was divided into two phases. Only the 2nd phase involves the construction of 300,000 t/a citric acid and citrates (100,000 t/a anhydrous citric acid, 150,000 t/a monohydrate

citric and 50,000 t/a sodium citrate). The 1st phase construction of 600,000 t/a fuel ethanol is estimated to be built up in 2022, and there is no progress of the 2nd phase (the product may be adjusted from citric acid to lactic acid & polylactic acid).

Link of expansion project:

<http://fgw.xam.gov.cn/fgw/1119945/zdjsxm17/3589829/index.html>

Table 3-1 Citric acid capacity forecast to 2025

No.	Company	Capacity, '000 t/a						
		2019	2020	2021	2022	2023	2024	2025
1	Weifang Ensign	600	600	600	1,000	1,000	1,000	1,000
2	RZBC	360	370	370	670	670	670	670
3	TTCA	350	350	350	350	350	350	350
4	Guoxin Union	180	180	180	180	255	255	330
5	COFCO	180	180	180	180	180	180	180
6	Laiwu Taihe	160	160	160	160	160	160	160
7	Seven Stars	100	100	100	300	500	500	500
8	Qiqihar Longjiang Fufeng Biotechnology Co., Ltd.	/	/	/	/	/	/	/
9	Inner Mongolia Meca Biotechnology Co., Ltd.	/	/	/	/	/	/	/
Total		1,930	1,940	1,940	2,840	3,115	3,115	3,190

Source: CCM

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