

Production and Export of Clethodim in China

The Sixth Edition

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Executive summary

As of 1 Dec., 2022, there were altogether 180 valid registrations of clethodim from 116 companies in China, including 27 for TC, 17 for TK, 110 for single formulations and 26 for mixed formulations, respectively.

In 2022, there were 12 clethodim technical producers in China and 8 of them were active. The capacity increases from 15,680 t/a in 2018 to 28,800 t/a in 2022 (estimated), with a CAGR of 16.42%, while the output increases from 10,170 tonnes in 2018 to 17,400 tonnes in 2022 (estimated), with a CAGR of 14.37%.

With unstably growing demand, the total export volume (converted into 100% AI) of clethodim technical and formulations in China went through ups and downs in 2022. In Q1–Q3, 2022, China exported approximately 12,769 tonnes of clethodim, a 17% increase year on year.

Introduction and methodology

Production and Export of Clethodim in China is CCM's report on production situation of clethodim industry in China finished in Dec. 2022. This intelligent report attaches importance to following parts:

- Registration of clethodim (including technical and formulations) in China;
- Production (capacity & output) and producers of clethodim in China, 2018–Nov. 2022;
- Export of clethodim in China by volume and price, 2020–Sept. 2022.

The report is drafted by diverse methods as follows:

- Desk research

The sources of desk research are various, including published magazines, journals, government statistics, industrial statistics, customs statistics, association seminars as well as information from the Internet.

- Internet

CCM contacted with players in the domestic agrochemical industry through B2B websites and software as well as obtained registration information on the internet.

- Data processing and presentation

- CCM's database
- China Customs
- Published articles in periodicals, magazines, journals and third-party databases
- Statistics from governments and international institutes
- Telephone interviews with domestic producers, joint ventures, service suppliers and governments
- Third-party data providers
- Comments from industrial experts
- Professional databases from other sources
- Information from the internet

The data from various sources have been combined and cross-checked to make this report as precise and scientific as possible. Throughout the process, a series of internal discussions were held in order to analyse the data and draw the conclusions.

- Abbreviation

CAGR: Compound annual growth rate

YoY: Year-on-year

TC: Technical material

TK: Technical concentrate

ME: Micro emulsion

EC: Emulsifiable concentrate

OD: Oil dispersion

- Unit

t: tonne

t/a: tonne/annual

USD: currency unit in the US

RMB: currency unit in China, also named yuan

tonne: equals to metric ton in this report

Table USD/RMB exchange rate, Jan. 2016–Dec. 2022

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
2016	6.5527	6.5311	6.5064	6.4762	6.5315	6.5874	6.6774	6.6474	6.6715	6.7442	6.8375	6.9182	6.6401
2017	6.8918	6.8713	6.8932	6.8845	6.8827	6.8019	6.7772	6.7148	6.5909	6.6493	6.6300	6.6067	6.7662
2018	6.5079	6.3045	6.3352	6.2764	6.3670	6.4078	6.6157	6.8293	6.8347	6.8957	6.9670	6.9431	6.6070
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 Registration of clethodim in China

As of 1 Dec., 2022, there were altogether 180 valid registrations of clethodim from 116 companies in China, including 27 for TC, 17 for TK (with one export-only), 110 for single formulations and 26 for mixed formulations, respectively, according to the Institute for the Control of Agrochemicals, Ministry of Agriculture and Rural Affairs (ICAMA). Generally, clethodim formulations are applied to fields of soybean, rapeseed, tobacco, potato, mung bean and red bean against gramineous weeds.

Only three types of clethodim formulations—EC, OD and ME—were registered. In the registrations of clethodim's single formulations, 109 registrations were for EC and only 1 was for OD in China. As to mixed formulations, 16 registrations were for OD, 9 for EC and one for ME.

Table 1-1 Registrations of clethodim technical in China, as of 1 Dec., 2022

No.	Registrant	Registration number	Type of formulation	Content	Expiry date
1	Hebei Wanquan Lihua Chemicals Co., Ltd.	PD20080653	TC	90%	2023/5/27
2	Hebei Wanquan Lihua Chemicals Co., Ltd.	PD20080651	TK	70%	2023/5/27
3	Jiangsu Henglong Crop Protection Co., Ltd.	PD20183123	TC	95%	2023/7/23
4	Jiangsu Sevencontinent Green Chemical Co., Ltd.	PD20082579	TC	95%	2023/12/4
5	Shaoxing Shangyu Xinyinbang Biochemical Co., Ltd.	PD20082747	TC	90%	2023/12/8
6	Jiangsu Changqing Agrochemical Co., Ltd.	PD20086078	TC	93%	2023/12/30
7	Jiangsu Agrochem Laboratory Co., Ltd.	PD20092487	TC	90%	2024/2/26
8	Ningxia Yifan Biotechnology Co., Ltd.	PD20093488	TC	94%	2024/3/23
9	Hebei Lanrun Plant Protection Technology Co., Ltd.	PD20094828	TC	90%	2024/4/13
10	Zhejiang Heben Pesticide & Chemicals Co., Ltd.	PD20140982	TC	94%	2024/4/14
11	Jiangxi Heyi Chemical Co., Ltd.	PD20141071	TC	95%	2024/4/25
12	Hebei Wanquan Hongyu Chemical Co., Ltd.	PD20096012	TC	90%	2024/6/12
13	Jiangsu Flag Chemical Industry Co., Ltd.	PD20096795	TC	90%	2024/9/15
14	Jiangsu Yunfan Chemical Co., Ltd.	PD20142210	TC	94%	2024/9/28
15	Jingbo Agrochemicals Technology Co., Ltd.	PD20142204	TC	95%	2024/9/29
16	Jiangsu Yunfan Chemical Co., Ltd.	PD20150784	TK	37%	2025/5/13
17	Hebei Lansheng Biotech Co., Ltd.	PD20200395	TK	37%	2025/6/8
18	Jiangxi Heyi Chemical Co., Ltd.	PD20151057	TK	70%	2025/6/14
19	Jiangxi Heyi Chemical Co., Ltd.	PD20151148	TK	37%	2025/6/26
20	Capital Industry Construction Technology Co., Ltd.	PD20151290	TC	95%	2025/7/30
21	Shanxi Lvhai Pesticide Science and Technology Co., Ltd.	PD20151560	TC	95%	2025/8/3

No.	Registrant	Registration number	Type of formulation	Content	Expiry date
22	Hunan Bide Biotechnology Co., Ltd.	PD20151702	TC	94%	2025/8/28
23	ADAMA Huifeng (Jiangsu) Ltd.	PD20102077	TC	95%	2025/11/3
24	Shandong Weifang Rainbow Chemical Co., Ltd.	PD20152532	TC	94%	2025/12/17
25	Wuwei Lianshuo Biotechnology Co., Ltd.	PD20160452	TK	37%	2026/3/16
26	Hengshui Jingmei Chemical Co., Ltd.	PD20110340	TC	95%	2026/3/24
27	Shenyang Sciencreat Chemicals Co., Ltd.	PD20110326	TK	37%	2026/3/24
28	Jiangsu Changqing Agrochemical Co., Ltd.	PD20110444	TK	70%	2026/4/21
29	Hengshui Jingmei Chemical Co., Ltd.	PD20161059	TK	37%	2026/8/30
30	Shandong Weifang Rainbow Chemical Co., Ltd.	PD20161273	TK	37%	2026/10/14
31	Shandong Cynda Chemical Co., Ltd.	PD20170031	TK	37%	2027/1/7
32	ADAMA Huifeng (Jiangsu) Ltd.	PD20120328	TK	37%	2027/2/17
33	Liaoning Cynda Chemical Co., Ltd.	PD20070066	TC	90%	2027/3/20
34	Shenyang Sciencreat Chemicals Co., Ltd.	PD20070065	TC	94%	2027/3/20
35	Shenyang Sciencreat Chemicals Co., Ltd.	PD20170685	TK	70%	2027/4/9
36	Wuwei Lianshuo Biotechnology Co., Ltd.	PD20120722	TC	90%	2027/4/27
37	Shandong Cynda Chemical Co., Ltd.	PD20120967	TC	90%	2027/6/14
38	Hebei Lansheng Biotech Co., Ltd.	PD20171148	TC	95%	2027/7/18
39	Jiangsu Sevencontinent Green Chemical Co., Ltd.	PD20171250	TK	37%	2027/7/18
40	Liaoning Cynda Chemical Co., Ltd.	PD20171163	TK	70%	2027/7/18
41	Ningxia Gerui Fine Chemical Co., Ltd.	PD20171961	TC	94%	2027/9/18
42	Shandong Binnong Technology Co., Ltd.	PD20171869	TC	95%	2027/9/18
43	Jiangsu Yunfan Chemical Co., Ltd.	EX20220172	TK	50%	2027/10/8
44	Liaoning Cynda Chemical Co., Ltd.	PD20122114	TK	37%	2027/12/25

Note: Capital Industry Construction Technology Co., Ltd. previously known as Shoujian Technology Co., Ltd.
Source: Institute for the Control of Agrochemicals, Ministry of Agriculture and Rural Affairs (ICAMA)

Table 1-2 Registrations of clethodim formulations in China, as of 1 Dec., 2022

Formulation		Active ingredient	Content	Number	Share	
Single formulations	EC	Clethodim	240g/L	52	47%	
		Clethodim	120g/L	31	28%	
		Clethodim	24%	13	12%	
		Clethodim	30%	6	5%	
		Clethodim	35%	4	4%	
		Clethodim	26%	1	1%	
		Clethodim	13%	1	1%	
		Clethodim	12%	1	1%	
	OD	Clethodim	12%	1	1%	
Sub-total		/		110	100%	
Mixed formulations	OD	Clethodim·Clopyralid·Picloram	20%	2	8%	
		Benazolin-ethyl·Clethodim·Clopyralid	16%	1	4%	
		Clopyralid·Clethodim	8%	1	4%	
		Clethodim·Rimsulfuron	15%	1	4%	
		Clomazone·Fomesafen·Clethodim	37%	4	15%	
		Fomesafen·Clethodim	21%, 28%	4	15%	
		Clethodim·Metribuzin·Rimsulfuron	22%, 25%, 28%	3	12%	
	EC	Clomazone·Fomesafen·Clethodim	22%, 32%, 39%	5	19%	
		Clethodim·Haloxypop-P-methyl	22.5%, 23%	2	8%	
		Fomesafen·Clethodim	25%	1	4%	
		Benazolin-ethyl·Clethodim	12%	1	4%	
	ME	Fomesafen·Clethodim	30%	1	4%	
	Sub-total		/		26	100%
	Total		/		136	

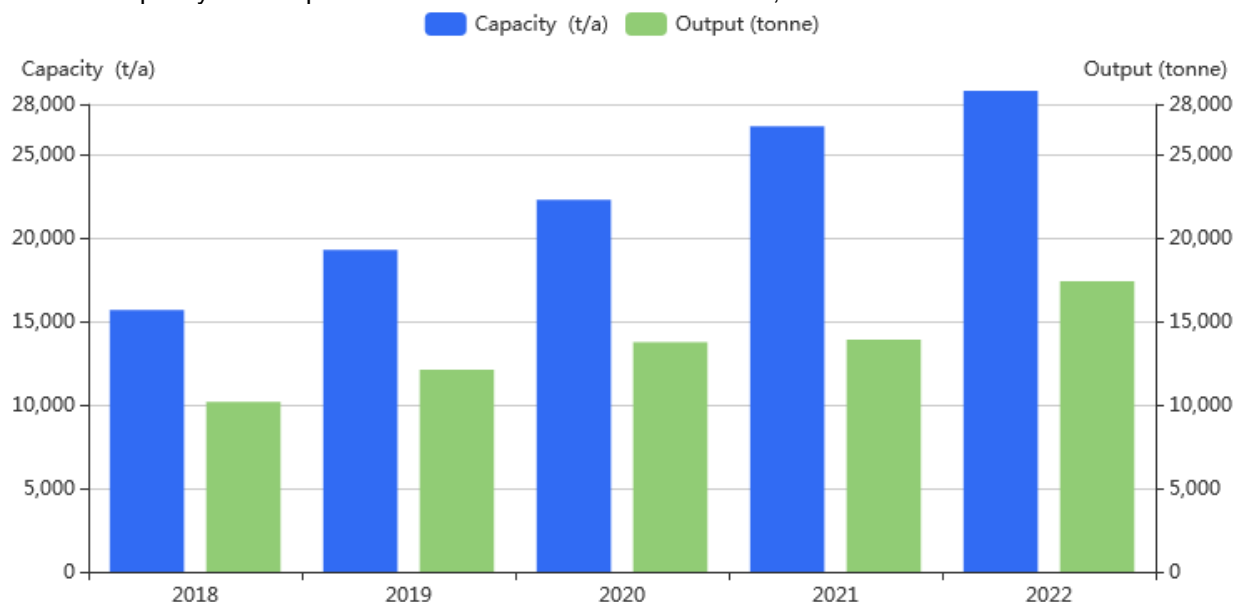
Source: ICAMA

2 Supply of clethodim in China, 2018–2022

2.1 Overview of production

On the whole, the production capacity and output of clethodim technical in China maintain an uptrend from 2018 to 2022. The capacity increases from 15,680 t/a in 2018 to 28,800 t/a in 2022 (estimated), with a CAGR of 16.42%, while the output increases from 10,170 tonnes in 2018 to 17,400 tonnes in 2022, with a CAGR of 14.37%.

Figure 2.1-1 Capacity and output of 90% clethodim technical in China, 2018–2022E



Note: 2022E means the data for 2022 are estimated.

Source: CCM

2.2 Producer

In 2022, there were 12 clethodim technical producers in China and 8 of them were active.

On 8 June, 2021, Ningxia Gerui Biotechnology Co., Ltd. (Ningxia Gerui), the wholly-owned subsidiary of Shandong Weifang Rainbow Chemical Co., Ltd., passed the completion acceptance for 500 t/a clethodim technical.

On 8 Jan., 2022, Hebei Lansheng Biotech Co., Ltd. (Hebei Lansheng)'s 4,000 t/a clethodim technical project completed construction and entered operation.

According to the 2022 semi-annual report of Shandong Cynda Chemical Co., Ltd. (Shandong Cynda), its wholly-owned subsidiary Liaoning Cynda Chemical Co., Ltd.'s new clethodim technical production lines (8,000 t/a) were put into operation in H1 2022, making Shandong Cynda the largest clethodim producer in China with total clethodim capacity of 12,100 t/a as of 2022.

Hebei Wuqiao Pesticide Co., Ltd. transferred 90% TC qualification to its subsidiary, Wuwei Lianshuo Biotechnology Co., Ltd. who now has 2,000 t/a clethodim technical capacity in operation since April 2021.

It is worth noting that some main clethodim technical producers in China were still in production suspension in 2022, due to strong pressures from environmental protection policies.

Table 2.2-1 Capacity and output of clethodim technical in China, 2018–2022, t/a

No.	Company	Status, as of Dec. 2022	2022		2021		2020		2019		2018	
			Capacity	Output	Capacity	Output	Capacity	Output	Capacity	Output	Capacity	Output
1	Yifan Biotechnology Group Co., Ltd.	Active	6,000	4,700	6,000	4,600	6,000	3,500	3,000	3,000	3,000	1,800
2	Shandong Cynda Chemical Co., Ltd.	Active	4,100	3,800	4,100	3,800	4,100	4,000	4,100	3,200	3,000	3,000
3	Cangzhou Green Chemical Co., Ltd.	Active	3,000	1,500	3,000	1,400	3,000	1,500	3,000	1,450	500	400
4	Shenyang Sciencreat Chemicals Co., Ltd.	Active	1,200	1,200	1,200	700	1,600	1,200	1,600	1,000	1,600	920
5	Wuwei Lianshuo Biotechnology Co., Ltd.	Active	2,000	950	2,000	1,000	1,000	950	1,000	1,000	1,000	980
6	Liaoning Cynda Chemical Co., Ltd.	Active	8,000	3,300	3,000	1,700	/	/	/	/	/	/
7	Ningxia Gerui Biotechnology Co., Ltd.	Active	500	450	500	350	/	/	/	/	/	/
8	Hebei Lansheng Biotech Co., Ltd.	Active	4,000	1,500	/	/	/	/	/	/	/	/
Total			28,800	17,400	26,680	13,900	22,280	13,750	19,280	12,100	15,680	10,170

Source: CCM

There were potential capacities planned in 2022.

On 5 Sept., Ningxia Gerui's renovation and expansion project was issued with the environmental impact assessment, planning to expand the current 500 t/a clethodim TC capacity to 2,000 t/a. Its plan for 2,000 t/a clethodim TC, 20,000 t/a 2,4-D TC and 500 t/a Haloxyfop-P-methyl TC proposed in 2017 would not continue according to Shandong Weifang Rainbow Chemical Co., Ltd.

On 22 Sept., Hebei Lansheng's 20,000 t/a clethodim TK project was approved for the environmental impact assessment by local governments. On 17 Oct., its subsidiary Lanrun Plant's renovation and environmental facilities upgrade project for technical and adjuvants was publicised, including 3,000 t/a clethodim TC, 500 t/a of 120g/L clethodim EC. and 900 t/a of 240g/L clethodim EC.

On 25 Nov., the EIA document of the relocation and upgrading project about 15,200 t/a pesticide technicals and intermediates of Jiangxi Heyi Chemical Co., Ltd., a wholly-owned subsidiary of Nutrichem Co., Ltd., was publicised, which is to build capacity of 2,000 t/a clethodim TC.

On 2 Dec., the EIA document of the pesticide project of Liaoning Youchuang Plant Protection Co. Ltd., a wholly-owned subsidiary of Jiangsu Yangnong Chemical Co., Ltd. was publicised, which is to build capacity of 15,650 t/a pesticide technical and 7,000 t/a intermediates, including 5,000 t/a clethodim TC.

On 5 Dec., the environmental impact assessment (EIA) document of Zhongnong Ruihua (Gansu) Pharmaceutical Co., Ltd.'s pesticide and pharmaceutical intermediates, technical and formulation production line project (Phase I) to build capacity of 4,000 t/a clethodim TC and 2,500 t/a clethodim EC.

Table 2.2-2 Potential capacity of clethodim technical in China, 2022

No.	Producer	Project location	Planned capacity, t/a	Remark
1	Zhongnong Ruihua (Gansu) Pharmaceutical Co., Ltd.	Gansu Province	4,000	Environmental impact assessment approved
2	Liaoning Youchuang Plant Protection Co., Ltd.	Liaoning Province	5,000	Under environmental impact assessment
3	Jiangxi Heyi Chemical Co., Ltd.	Jiangxi Province	2,000	Environmental impact assessment approved
4	Hebei Lansheng Biotech Co., Ltd.	Hebei Province	20,000	Environmental impact assessment approved
5	Hebei Lanrun Plant Protection Technology Co., Ltd.	Hebei Province	3,000	Under environmental impact assessment
6	Ningxia Gerui Biotechnology Co., Ltd.	Ningxia Province	2,000	Under environmental impact assessment

Source: CCM

3 Export of clethodim in China, 2017–Q3 2022

3.1 Export situation

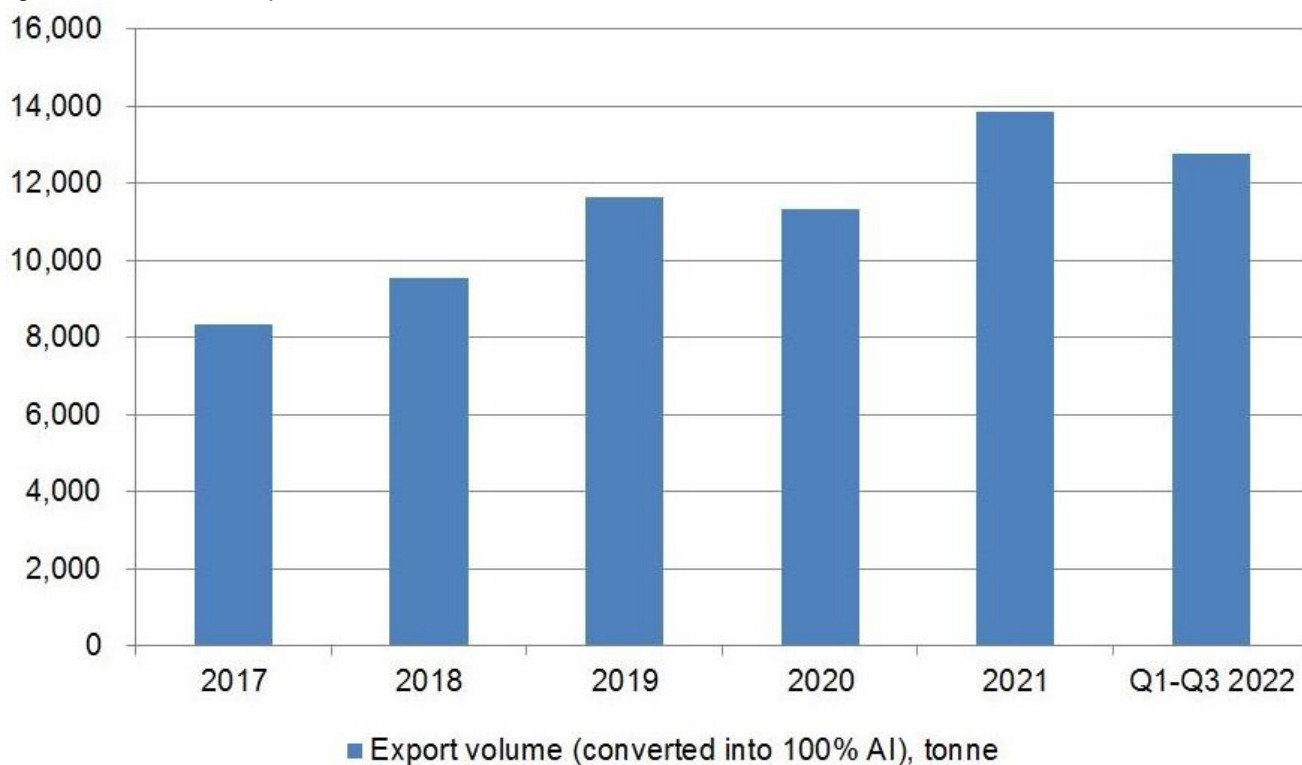
With unstable growing demand, the total export volume (converted into 100% AI) of clethodim technical and formulations in China went through ups and downs. In Q1–Q3, 2022, China exported approximately 12,769 tonnes of clethodim, registering a YoY increase of 17%.

In 2021, China's major export-oriented clethodim products were 37% TK, 94% TC and 95% TC. Of those, the volume (in real terms) of 37% TK and 94% TC accounted for 54.84% and 37.50% of China's total exports of clethodim technical, respectively. While the types of exported clethodim formulations were 240g/L EC, 120g/L EC and 36 g/L EC; the 240g/L EC accounted for 91.22% of the total export volume of clethodim formulations in 2021.

In 2021, China's clethodim were exported to at least 28 countries and regions. The top five export destinations by volume were Brazil, the US, Argentina, Russia and Paraguay in the year, accounting for 95.90% of China's total clethodim export volume (100% AI volume).

In 2021, a total of 94 companies took part in the clethodim export business in China. The top three exporters by volume (100% AI volume) were Zhejiang Hengdian Import and Export Co., Ltd., Shandong Cynda Chemical Co., Ltd. and Jiangsu Yunfan Chemical Co., Ltd., respectively.

Figure 3.1-1 China's exports of clethodim, 2017–Q3 2022



Source: Tranalysis

- By month

Table 3.1-1 China's exports of clethodim by month, Q1-Q3 2022

Month	Formulation						Technical												Total (100% AI clethodim), tonne
	120g/L EC		240g/L EC		36g/L EC		37% TK		70% TK		90% TC		93% TC		94% TC		95% TC		
	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
Jan.	0.000	/	2,499.090	3.34	41.042	0.00	901.016	0.32	0.000	/	134.600	26.82	0.000	/	387.836	12.46	48.334	13.29	1,504.546
Feb.	7.000	6.00	1,735.921	5.31	0.000	/	570.271	4.81	0.000	/	73.000	28.39	143.000	28.46	897.989	12.23	44.245	19.28	1,730.653
March	0.000	/	1,304.083	8.30	0.000	/	190.440	3.98	0.000	/	20.000	32.62	124.000	17.18	429.672	15.93	20.000	34.31	952.695
April	5.116	7.41	970.696	5.61	144.000	13.25	0.000	/	0.000	/	0.000	/	25.000	27.24	460.334	24.29	77.000	31.68	824.242
May	0.000	/	2,068.903	9.55	0.000	/	222.872	6.39	0.000	/	0.000	/	50.000	27.04	788.000	23.31	75.000	23.92	1,458.158
June	9.739	0.00	1,451.882	7.56	48.000	10.75	664.306	4.56	168.000	16.49	0.000	/	0.000	/	1,199.002	21.30	0.000	/	1,871.874
July	21.000	4.45	2,639.728	7.36	83.800	10.64	499.014	3.59	0.000	/	0.000	/	75.000	15.50	1,062.000	21.69	0.000	/	1,945.285
Aug.	0.000	/	197.311	6.42	28.640	3.32	48.000	11.24	0.000	/	0.000	/	100.000	15.50	766.314	20.58	0.000	/	890.733
Sept.	0.000	/	380.513	0.52	0.000	/	423.628	0.00	0.000	/	0.000	/	16.000	20.60	1,409.006	20.29	0.000	/	1,591.216
Total	42.855	4.05	13,248.125	6.45	345.482	9.87	3,519.546	8.45	168.000	16.49	227.600	27.83	533.000	21.15	7,400.153	19.61	264.579	24.24	12,769.404

Source: Tranalysis

Table 3.1-2 China's exports of clethodim by month, 2021

Month	Formulation						Technical												Total (100% AI clethodim), tonne
	120g/L EC		240g/L EC		36g/L EC		37% TK		70% TK		90% TC		93% TC		94% TC		95% TC		
	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
Jan.	170.310	2.92	1,302.345	5.60	0.000	/	669.676	8.55	0.000	/	30.000	15.41	0.010	60.00	156.004	13.65	0.000	/	767.457
Feb.	99.940	3.82	821.463	5.95	0.000	/	952.200	5.49	24.010	9.91	0.000	/	0.000	/	118.000	15.95	67.655	15.65	761.672
March	105.840	3.82	2,224.747	6.17	0.000	/	908.620	6.18	0.000	/	18.000	13.75	0.000	/	200.000	15.67	84.600	15.51	1,189.647
April	1.620	5.73	2,387.285	7.31	0.000	/	587.338	7.44	0.000	/	0.200	18.00	0.000	/	322.932	14.65	95.009	18.70	1,208.325
May	1.620	6.14	3,403.554	8.66	0.000	/	63.000	6.45	0.000	/	0.000	/	100.000	14.00	715.075	12.72	20.400	28.80	1,658.943
June	320.219	5.10	2,468.293	6.84	46.000	7.20	881.704	7.94	0.000	/	0.000	/	128.000	14.23	842.616	15.20	39.000	28.69	1,946.439
July	76.564	5.12	2,086.688	5.42	21.600	8.03	742.960	6.52	0.000	/	0.000	/	24.010	13.96	274.327	15.30	20.000	28.80	1,112.728
Aug.	54.788	5.73	2,791.136	5.04	21.600	8.30	647.515	7.39	0.000	/	0.000	/	0.000	/	687.800	15.38	46.000	28.31	1,641.947
Sept.	691.016	4.95	589.055	7.55	40.220	8.44	417.540	6.69	0.000	/	0.000	/	22.000	31.50	219.920	18.58	0.000	/	626.339
Oct.	37.152	4.85	1,475.999	5.68	72.252	8.84	189.174	6.89	0.000	/	0.000	/	0.000	/	474.060	16.11	22.000	28.81	935.979
Nov.	90.760	6.06	479.073	5.79	49.446	21.52	397.106	7.22	0.000	/	0.000	/	12.000	28.25	573.935	17.67	164.000	28.14	1,001.848
Dec.	72.572	8.52	628.272	7.23	16.000	10.72	872.477	7.22	0.000	/	0.000	/	0.000	/	428.091	30.21	107.000	33.96	998.408
Total	1,722.401	4.88	20,657.909	6.55	267.118	10.85	7,329.310	6.99	24.010	9.91	48.200	14.80	286.020	16.04	5,012.760	16.63	665.664	24.96	13,849.733

Source: Tranalysis

Table 3.1-3 China's exports of clethodim by month, 2020

Month	Formulation				Technical										Total (100% AI clethodim), tonne
	120g/L EC		240g/L EC		37% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
Jan.	300.591	4.69	1,554.282	7.09	946.400	7.40	42.000	18.14	0.000	/	245.200	16.84	0.000	/	1,043.097
Feb.	41.732	5.48	225.011	6.97	273.000	7.27	0.000	/	0.000	/	50.000	16.28	0.000	/	209.271
March	141.415	2.41	2,713.501	6.91	635.610	7.43	87.020	14.19	0.000	/	277.750	16.62	0.000	/	1,269.924
April	70.775	4.74	2,748.702	6.64	1,063.730	7.31	0.000	/	0.000	/	96.000	17.02	0.000	/	1,179.489
May	0.808	6.30	2,227.316	7.24	748.800	7.87	0.000	/	0.000	/	396.000	18.05	0.000	/	1,206.222
June	0.000	/	2,222.244	7.35	566.000	7.74	0.000	/	48.000	18.35	660.400	17.92	12.000	19.95	1,441.797
July	30.348	4.21	1,898.450	6.74	179.220	7.75	66.000	17.28	46.000	23.26	663.000	18.53	0.000	/	1,269.966
Aug.	0.000	/	1,756.934	7.14	592.000	6.63	96.000	15.59	24.000	17.17	249.000	18.75	0.000	/	1,001.054
Sept.	0.000	/	1,657.791	6.53	206.000	3.63	24.000	14.35	24.000	16.08	359.000	18.23	0.000	/	872.048
Oct.	1.028	3.19	1,116.386	6.56	583.378	0.49	110.000	15.44	0.000	/	200.000	15.64	0.002	20.00	782.072
Nov.	2.749	4.65	623.232	3.02	608.954	0.44	84.000	12.58	25.000	13.00	172.800	17.60	0.000	/	642.733
Dec.	0.000	/	695.384	3.07	611.422	0.00	0.000	/	0.000	/	0.000	/	0.000	/	400.072
Total	589.447	4.18	19,439.234	6.66	7,014.514	5.47	509.020	15.19	167.000	18.40	3,369.150	17.76	12.002	19.95	11,317.743

Note: "37% TK" refers to as "37% TKL" in previous Production and Export of Clethodim Issues.

Source: Tranalysis

Table 3.1-4 China's exports of clethodim by month, 2019

Month	Formulation				Technical												Total (100% AI clethodim), tonne
	120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
Jan.	144.255	5.55	1,325.522	8.76	1,477.425	12.64	82.000	20.08	60.000	26.37	0.000	/	134.400	18.82	0.000	/	1,133.074
Feb.	1.410	6.88	1,181.932	9.29	921.820	11.81	32.000	15.67	7.000	27.15	0.000	/	67.600	22.23	0.000	/	728.970
March	67.960	5.00	1,350.532	9.21	1,168.020	10.05	0.000	/	0.000	/	0.000	/	140.800	20.80	0.000	/	910.308
April	4.650	5.50	1,247.790	9.03	1,403.277	9.91	0.000	/	0.000	/	0.000	/	115.400	21.98	0.000	/	940.194
May	0.000	/	3,229.784	8.04	1,046.000	9.74	0.000	/	0.000	/	0.000	/	104.800	22.57	0.000	/	1,292.978
June	8.604	5.31	3,038.788	7.91	500.640	9.86	0.000	/	0.000	/	0.000	/	157.990	23.36	0.000	/	1,094.477
July	0.940	5.00	3,360.765	8.04	432.000	9.67	0.000	/	12.000	23.16	0.000	/	119.000	22.98	37.000	21.74	1,157.954
Aug.	2.000	4.98	1,963.830	8.14	510.750	9.99	0.000	/	12.000	23.71	12.000	24.10	285.800	21.49	12.000	23.81	982.187
Sept.	13.730	5.45	1,697.698	8.29	153.434	10.41	0.000	/	101.000	23.27	0.000	/	266.000	20.00	19.400	22.36	842.213
Oct.	19.400	5.04	2,214.701	8.35	199.000	9.76	0.000	/	0.000	/	0.000	/	163.400	23.73	0.000	/	783.229
Nov.	10.000	4.74	814.763	9.13	1,048.000	9.80	0.000	/	43.400	18.49	56.000	20.19	503.000	17.89	10.000	21.39	1,166.111
Dec.	50.640	5.28	665.733	7.75	523.420	10.84	0.600	11.28	35.000	18.27	0.000	/	194.400	18.05	37.800	20.49	616.741
Total	323.589	5.32	22,091.838	8.35	9,383.786	10.56	114.600	18.80	270.400	22.66	68.000	20.88	2,252.590	20.48	116.200	21.62	11,648.436

Source: Tranalysis

Table 3.1-5 China's exports of clethodim by month, 2018

Month	Formulation				Technical										Total (100% AI clethodim), tonne
	120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		94% Tech.		95% Tech.		
	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
Jan.	62.736	5.25	1,629.196	8.80	1,435.400	10.17	91.000	18.58	67.600	25.80	75.000	26.32	0.000	/	1,140.965
Feb.	26.455	5.61	1,287.319	8.63	699.500	9.96	16.000	15.92	16.000	28.85	33.600	25.35	0.200	16.03	641.193
March	7.717	5.22	429.260	9.32	961.840	10.28	0.000	/	103.400	21.53	36.200	22.05	0.000	/	591.210
April	13.580	4.38	1,161.889	9.20	828.640	9.93	0.000	/	4.000	23.05	0.000	/	0.000	/	602.299
May	9.750	3.09	2,225.846	8.21	1,439.000	9.34	0.000	/	0.000	/	32.000	22.63	0.000	/	1,120.142
June	6.512	3.92	2,203.044	7.73	464.000	9.20	0.000	/	0.000	/	51.000	22.38	0.000	/	771.162
July	0.000	/	1,751.103	7.56	256.600	8.99	0.000	/	80.800	22.56	12.110	28.91	0.000	/	616.821
Aug.	5.452	5.09	1,945.825	7.65	126.000	9.39	0.000	/	75.200	25.26	0.000	/	0.100	25.99	601.506
Sept.	0.000	/	1,719.413	7.99	414.000	9.23	0.000	/	41.200	21.96	33.600	16.38	0.000	/	651.697
Oct.	4.650	4.80	1,140.440	8.18	893.500	11.41	0.000	/	24.000	24.61	92.000	16.52	0.000	/	724.343
Nov.	0.000	/	820.686	9.12	2,142.208	11.22	0.000	/	43.800	25.10	117.600	17.11	0.000	/	1,147.752
Dec.	4.650	5.49	972.103	8.72	1,347.200	11.80	64.000	15.66	56.000	25.81	68.600	19.49	19.000	25.38	919.782
Total	141.502	5.01	17,286.124	8.25	11,007.888	10.43	171.000	17.24	512.000	24.00	551.710	20.40	19.300	25.29	9,528.872

Source: Tranalysis

Table 3.1-6 China's exports of clethodim by month, 2017

Month	Formulation				Technical										Total (100% AI clethodim), tonne
	120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		94% Tech.		95% Tech.		
	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
Jan.	30.898	4.86	1,497.251	5.80	1,595.020	7.09	50.000	13.75	15.688	16.11	97.000	17.18	0.000	/	1,108.477
Feb.	6.203	3.73	842.337	5.82	642.400	6.88	37.500	13.73	10.400	17.45	22.000	15.97	19.800	14.05	524.117
March	23.855	4.36	1,288.855	5.80	1,162.680	6.74	25.000	14.41	23.600	15.97	0.000	/	0.000	/	794.008
April	27.327	3.92	1,696.882	6.04	517.000	6.89	0.000	/	11.600	13.87	0.000	/	16.500	14.12	644.905
May	44.121	4.38	1,429.848	5.88	534.000	6.86	0.000	/	26.000	15.52	18.200	13.30	28.600	14.13	628.015
June	15.175	3.55	1,423.584	5.82	226.400	6.91	0.000	/	26.000	15.48	0.000	/	0.000	/	464.885
July	1.146	5.04	2,225.851	5.84	88.000	6.43	0.000	/	26.000	15.48	43.800	15.92	0.000	/	653.732
Aug.	0.000	/	1,864.028	5.94	153.500	6.58	0.000	/	26.000	15.47	26.000	15.21	0.000	/	570.642
Sept.	6.760	4.65	1,174.385	5.90	566.000	7.10	0.000	/	14.000	15.40	104.200	15.40	0.000	/	614.375
Oct.	19.600	4.37	730.772	6.09	729.000	7.65	88.000	15.03	0.000	/	51.600	17.05	0.000	/	564.879
Nov.	29.749	5.19	811.571	7.52	1,121.300	7.91	0.000	/	18.000	20.48	67.205	24.99	3.000	18.50	703.566
Dec.	9.500	4.90	1,145.004	8.00	1,443.660	9.60	50.000	19.47	140.000	16.22	87.600	25.36	0.000	/	1,064.889
Total	214.334	4.46	16,130.368	6.12	8,778.960	7.55	250.500	15.40	337.288	16.12	517.605	18.81	67.900	14.30	8,336.490

Source: Tranalysis

- By destination

Table 3.1-7 China's exports of clethodim by destination, Q1-Q3 2022

No.	Country	Formulation						Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		36g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
1	Argentina	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	25.000	29.58	493.000	21.02	5,266.000	23.67	216.000	28.92	5,636.230
2	Brazil	0.000	/	9,018.108	8.29	0.000	/	1,138.978	8.21	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	2,675.949
3	The US	0.000	/	2,619.299	0.00	0.000	/	2,225.986	0.00	0.000	/	0.000	/	0.000	/	1,180.293	0.00	24.334	0.00	2,611.032
4	India	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	768.000	21.15	0.000	/	721.920
5	Russia	0.000	/	705.646	8.40	0.000	/	64.050	10.51	0.000	/	202.600	27.62	0.000	/	130.000	30.36	0.000	/	504.650
6	Paraguay	0.000	/	104.080	7.41	284.400	11.99	30.000	11.71	168.000	16.49	0.000	/	0.000	/	0.000	/	0.000	/	257.104
7	Australia	0.000	/	268.613	0.00	61.082	0.00	19.012	0.00	0.000	/	0.000	/	0.000	/	25.860	0.00	0.000	/	120.486
8	Kazakhstan	0.000	/	200.552	10.12	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	50.138
9	Turkey	0.000	/	1.900	8.42	0.000	/	0.000	/	0.000	/	0.000	/	40.000	22.74	10.000	28.30	0.000	/	47.075
10	Mexico	0.000	/	30.400	29.15	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	16.000	10.43	22.800
11	France	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	20.000	0.00	0.000	/	18.800
12	Italy	0.000	/	42.365	0.00	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	8.245	0.00	18.424
13	Chile	0.000	/	32.815	13.93	0.000	/	18.000	10.79	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	14.864
14	Uruguay	0.000	/	15.520	0.00	0.000	/	23.520	0.00	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	12.582

No.	Country	Formulation						Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		36g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
15	Dominican Republic	9.739	0.00	40.705	0.00	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	11.345
Others		33.116	5.24	168.122	3.63	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	46.004
Total		42.855	4.05	13,248.125	6.45	345.482	9.87	3,519.546	8.45	168.000	16.49	227.600	27.83	533.000	21.15	7,400.153	19.61	264.579	24.24	12,769.404

Source: Tranalysis

Table 3.1-8 China's exports of clethodim by destination, 2021

No.	Country	Formulation						Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		36g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
1	Brazil	905.380	4.97	16,148.099	6.24	0.000	/	1,619.115	7.75	0.010	0.70	0.000	/	0.010	60.00	0.000	/	1.014	16.19	4,745.723
2	The US	518.324	4.14	1,961.224	7.05	0.000	/	3,263.091	7.14	0.000	/	0.000	/	0.000	/	1,397.832	17.29	208.250	15.65	3,271.648
3	Argentina	0.000	/	147.000	13.03	72.252	8.84	0.000	/	0.000	/	0.000	/	271.010	15.42	3,305.804	15.93	406.400	29.51	3,808.336
4	Paraguay	6.888	7.16	847.560	5.03	140.246	12.65	2,172.080	6.12	24.000	0.07	0.000	/	0.000	/	0.000	/	0.000	/	1,083.675
5	Russia	0.000	/	628.332	5.98	0.000	/	242.000	7.44	0.000	/	48.200	14.80	0.000	/	52.912	13.38	34.000	32.57	372.040
6	Ukraine	205.052	6.59	86.995	9.30	14.400	10.07	8.120	9.00	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	54.543
7	India	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	236.000	23.20	0.000	/	221.840
8	Mexico	0.000	/	220.220	25.75	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.012	0.18	0.000	/	55.066

No.	Country	Formulation						Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		36g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
9	Australia	0.000	/	158.699	5.79	40.220	8.44	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	54.154
10	Kazakhstan	0.000	/	130.256	8.32	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	32.564
11	Uruguay	0.000	/	91.200	5.70	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	22.800
12	Turkey	0.000	/	12.110	6.56	0.000	/	0.000	/	0.000	/	0.000	/	15.000	27.35	20.200	16.07	16.000	14.90	51.166
13	Peru	17.988	5.73	32.662	6.00	0.000	/	8.480	6.38	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	13.462
14	Vietnam	55.000	3.52	3.000	5.50	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	7.350
15	Chile	0.000	/	42.844	9.71	0.000	/	9.000	7.22	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	14.041
Others		13.769	0.00	147.708	0.00	0.000	/	7.424	0.00	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	41.326
Total		1,722.401	4.88	20,657.909	6.55	267.118	10.85	7,329.310	6.99	24.010	9.91	48.200	14.80	286.020	16.04	5,012.760	16.63	665.664	24.96	13,849.733

Source: Tranalysis

Table 3.1-9 China's exports of clethodim by destination, 2020

No.	Country	Formulation				Technical											Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.			
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg		
1	Argentina	0.000	/	2,601.536	6.75	0.000	/	431.000	15.64	167.000	18.40	2,959.200	17.94	12.000	19.95	3,986.642	
2	Brazil	52.800	4.69	9,591.990	7.22	1,648.820	7.35	0.000	/	0.000	/	0.000	/	0.000	/	3,014.397	
3	The US	93.240	1.41	2,136.723	4.11	3,296.254	3.10	0.000	/	0.000	/	22.400	14.00	0.000	/	1,786.040	

No.	Country	Formulation														Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
4	Paraguay	0.000	/	1,816.618	6.84	1,053.400	7.77	0.000	/	0.000	/	0.000	/	0.000	/	843.913
5	Uruguay	0.000	/	816.484	6.31	164.000	7.71	0.000	/	0.000	/	0.000	/	0.000	/	264.801
6	Russia	21.168	5.44	654.038	6.29	192.000	8.49	78.000	12.70	0.000	/	152.800	16.65	0.000	/	450.922
7	Kazakhstan	0.000	/	124.284	7.84	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	31.071
8	Ukraine	102.145	4.45	157.392	7.60	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	51.605
9	Peru	9.153	4.59	36.156	6.93	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	10.137
10	Saudi Arabia	0.000	/	75.188	4.98	2.400	12.01	0.000	/	0.000	/	0.000	/	0.000	/	19.685
11	Colombia	0.000	/	30.329	7.86	8.000	7.09	0.000	/	0.000	/	0.000	/	0.000	/	10.542
12	Vietnam	35.864	3.98	14.994	5.80	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	8.052
13	Chile	0.000	/	86.605	7.93	36.000	7.60	0.000	/	0.000	/	0.000	/	0.000	/	34.971
14	Australia	154.000	5.33	836.512	6.48	401.620	7.28	0.000	/	0.000	/	216.000	16.52	0.000	/	579.247
15	Ecuador	0.000	/	18.946	10.27	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	4.737
	Others	121.077	/	441.439	/	212.020	/	0.020	/	0.000	/	18.750	/	0.002	/	220.981
	Total	589.447	4.18	19,439.234	6.66	7,014.514	5.47	509.020	15.19	167.000	18.40	3,369.150	17.76	12.002	19.95	11,317.743

Source: Tranalysis

Table 3.1-10 China's exports of clethodim by destination, 2019

No.	Country	Formulation				Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
1	Argentina	0.000	/	7,702.923	8.03	514.000	10.53	0.000	/	191.400	23.39	68.000	20.88	899.990	23.46	89.000	21.89	3,281.951
2	The US	0.000	/	1,699.325	8.01	2,956.000	10.18	0.000	/	0.000	/	0.000	/	1,092.000	17.73	0.000	/	2,545.031
3	Brazil	0.000	/	7,161.427	7.56	1,184.019	9.75	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	2,228.444
4	Paraguay	0.000	/	971.934	8.44	1,429.051	9.57	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	771.732
5	Israel	0.000	/	0.000	/	1,864.020	10.23	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	689.687
6	Australia	0.000	/	655.428	9.09	184.000	10.20	50.000	22.28	0.000	/	0.000	/	144.000	21.56	0.000	/	402.297
7	Uruguay	4.650	5.00	1,304.204	8.38	123.600	9.32	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	372.341
8	Colombia	0.000	/	54.393	9.96	815.794	10.64	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	315.442
9	Russia	0.000	/	401.134	8.56	238.025	13.60	64.000	15.67	62.000	23.48	0.000	/	0.600	29.00	0.000	/	289.517
10	Chile	0.000	/	504.262	8.58	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	126.066
11	Bolivia	0.000	/	478.070	8.05	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	119.518
12	South Africa	0.000	/	163.856	8.41	0.000	/	0.000	/	0.000	/	0.000	/	36.400	17.53	0.000	/	75.180
13	France	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	72.000	23.52	0.000	/	67.680
14	Turkey	1.920	5.92	43.322	8.31	0.000	/	0.000	/	10.000	24.45	0.000	/	4.000	25.96	25.800	20.27	48.331
15	Kazakhstan	0.000	/	183.558	10.79	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	45.890
	Others	317.019	5.29	768.002	8.92	75.277	12.01	0.600	11.28	7.000	13.52	0.000	/	3.600	16.31	1.400	23.80	269.329

No.	Country	Formulation				Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
Total		323.589	5.32	22,091.838	8.35	9,383.786	10.56	114.600	18.80	270.400	22.66	68.000	20.88	2,252.590	20.48	116.200	21.62	11,648.436

Source: Tranalysis

Table 3.1-11 China's exports of clethodim by destination, 2018

No.	Country	Formulation				Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		94% Tech.		95% Tech.				
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg			
1	The US	0.000	/	1,674.135	8.12	5,040.248	10.74	0.000	/	0.000	/	352.800	18.90	0.000	/	2,615.058		
2	Argentina	0.000	/	4,857.346	7.83	620.000	10.44	0.000	/	350.600	24.72	74.000	22.51	0.000	/	1,828.836		
3	Brazil	0.000	/	5,044.579	7.81	34.000	9.46	0.000	/	0.000	/	0.000	/	0.000	/	1,273.725		
4	Israel	0.000	/	0.000	/	3,084.000	9.52	0.000	/	0.000	/	0.000	/	0.000	/	1,141.080		
5	Paraguay	0.000	/	1,435.198	7.77	1,462.000	9.91	0.000	/	0.000	/	0.000	/	16.000	25.26	914.939		
6	Australia	0.000	/	1,098.842	9.15	312.840	10.56	75.000	19.47	79.200	22.15	18.000	23.79	0.000	/	531.161		
7	Uruguay	0.000	/	1,016.925	8.12	132.000	11.10	0.000	/	0.000	/	0.000	/	0.000	/	303.071		
8	Russia	5.880	5.33	558.575	8.66	107.000	11.41	96.000	15.79	42.000	22.38	0.000	/	0.000	/	284.939		
9	Chile	0.000	/	363.530	7.99	96.000	8.30	0.000	/	0.000	/	0.000	/	0.100	25.99	126.497		
10	South Africa	0.000	/	147.686	7.97	14.000	9.54	0.000	/	0.000	/	54.600	18.83	0.000	/	93.426		
11	Saudi Arabia	0.000	/	149.066	9.21	14.000	14.24	0.000	/	0.000	/	8.000	15.10	0.000	/	49.967		

No.	Country	Formulation				Technical										Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
12	Turkey	0.000	/	41.145	7.96	3.000	16.42	0.000	/	35.000	25.59	5.400	30.14	0.000	/	47.972
13	Thailand	0.000	/	183.533	8.41	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	45.883
14	France	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	36.000	25.37	0.000	/	33.840
15	Malaysia	0.000	/	100.898	8.02	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	25.225
	Others	135.622	4.79	614.666	8.92	88.800	13.66	0.000	/	5.200	17.43	2.910	31.39	3.200	21.01	213.253
	Total	141.502	5.01	17,286.124	8.25	11,007.888	10.43	171.000	17.24	512.000	24.00	551.710	20.40	19.300	25.29	9,528.872

Source: Tranalysis

Table 3.1-12 China's exports of clethodim by destination, 2017

No.	Country	Formulation				Technical										Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
1	The US	0.000	/	1,971.027	6.57	4,108.980	7.97	88.000	15.03	0.000	/	218.400	20.97	0.000	/	2,279.975
2	Argentina	0.000	/	5,271.724	6.12	108.000	7.30	0.000	/	142.888	16.14	115.000	15.27	0.000	/	1,594.590
3	Australia	0.000	/	2,744.801	6.06	389.280	7.13	162.500	15.61	11.600	13.87	0.000	/	64.900	14.10	1,016.079
4	Paraguay	0.000	/	1,879.041	5.82	760.000	6.99	0.000	/	0.000	/	0.000	/	0.000	/	750.960
5	Israel	0.000	/	0.000	/	2,580.000	7.04	0.000	/	0.000	/	0.000	/	0.000	/	954.600
6	Brazil	0.000	/	1,680.927	6.06	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	420.232

No.	Country	Formulation				Technical										Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
7	Russia	0.000	/	525.288	5.87	214.000	9.27	0.000	/	156.000	16.35	0.000	/	0.000	/	350.902
8	Chile	0.000	/	718.524	5.90	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	179.631
9	Colombia	0.000	/	40.342	8.01	504.500	6.78	0.000	/	0.000	/	0.000	/	0.000	/	196.750
10	Uruguay	0.000	/	404.564	6.05	17.000	7.44	0.000	/	0.000	/	0.000	/	0.000	/	107.431
11	Ukraine	24.825	4.79	222.351	5.92	0.000	/	0.000	/	5.200	14.53	0.000	/	0.000	/	63.247
12	Malaysia	0.000	/	160.055	6.51	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	40.014
13	France	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	147.000	19.79	0.000	/	138.180
14	South Africa	19.600	4.37	86.840	5.97	0.000	/	0.000	/	0.000	/	36.400	13.17	0.000	/	58.278
15	Saudi Arabia	15.040	3.69	68.823	6.93	17.400	9.25	0.000	/	0.000	/	0.000	/	0.000	/	25.449
	Others	154.869	4.49	356.061	6.44	79.800	9.64	0.000	/	21.600	16.01	0.805	16.02	3.000	18.50	160.172
	Total	214.334	4.46	16,130.368	6.12	8,778.960	7.55	250.500	15.40	337.288	16.12	517.605	18.81	67.900	14.30	8,336.490

Source: Tranalysis

- By exporter

Table 3.1-13 China's exports of clethodim by exporter, Q1-Q3 2022

No.	Exporter	Formulation						Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		36g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
1	Jiangsu Yunfan Chemical Co., Ltd.	0.000	/	292.562	0.00	0.000	/	48.000	11.24	0.000	/	0.000	/	0.000	/	1,593.860	21.79	0.000	/	1,589.129
2	Shandong Weifang Rainbow Chemical Co., Ltd.	9.739	0.00	746.376	8.25	151.840	9.27	540.372	0.00	0.000	/	0.000	/	0.000	/	524.000	24.54	0.000	/	934.923
3	Adama Anpon (Jiangsu) Ltd.	0.000	/	3,061.940	8.29	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	765.485
4	Zhejiang Hengdian Import and Export Co., Ltd.	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	645.000	23.18	0.000	/	606.300
5	Qiantang (Shenzhen) International Supply Chain Co., Ltd.	0.000	/	2,164.173	9.41	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	541.043
6	Shandong Cynda Chemical Co., Ltd.	0.000	/	906.042	7.36	0.000	/	736.848	2.56	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	499.144
7	Suzhou Greenlands Chemical Co., Ltd.	0.000	/	0.000	/	0.000	/	889.188	1.94	0.000	/	0.000	/	0.000	/	168.000	21.40	0.000	/	486.920
8	Hebei Lansheng Biotech Co., Ltd.	0.000	/	554.912	0.00	0.000	/	0.000	/	0.000	/	20.000	27.95	40.000	22.74	288.000	21.80	0.000	/	464.648

No.	Exporter	Formulation						Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		36g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
9	UPL Limited	0.000	/	0.000	/	0.000	/	24.334	0.00	0.000	/	0.000	/	0.000	/	482.346	0.00	0.000	/	462.409
10	Liaoning Cynda Chemical Co., Ltd.	0.000	/	1,180.701	1.92	0.000	/	284.850	0.00	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	400.570
11	Shanghai Psyche Chemicals Co., Ltd.	0.000	/	95.040	7.37	0.000	/	718.578	7.98	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	289.634
12	Gross Procedure Management International Ltd.	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	75.000	27.11	204.000	24.68	0.000	/	261.510
13	Jebsen & Jessen Life Science Inc.	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	180.000	25.64	0.000	/	169.200
14	Adama Shanghai Trading Co., Ltd.	0.000	/	673.761	7.40	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	168.440
15	Shenyang Sciencreat Chemicals Co., Ltd.	0.000	/	471.280	1.29	0.000	/	16.000	8.29	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	123.740
Others		33.116	/	3,101.338	7.36	193.642	/	261.376	/	168.000	/	207.600	/	418.000	/	3,314.947	/	264.579	/	5,006.309
Total		42.855	4.05	13,248.125	6.45	345.482	9.87	3,519.546	8.45	168.000	16.49	227.600	27.83	533.000	21.15	7,400.153	19.61	264.579	24.24	12,769.404

Source: Tranalysis

Table 3.1-14 China's exports of clethodim by exporter, 2021

No.	Exporter	Formulation						Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		36g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
1	Zhejiang Hengdian Import and Export Co., Ltd.	110.000	5.20	5,391.144	7.20	0.000	/	110.000	7.21	0.000	/	18.000	13.75	0.000	/	0.000	/	0.000	/	1,417.886
2	Shandong Cynda Chemical Co., Ltd.	0.000	/	1,193.024	5.45	0.000	/	1,923.268	3.70	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	1,009.865
3	Adama Anpon (Jiangsu) Ltd.	176.000	5.20	1,557.984	5.16	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	410.616
4	At Agro Co., Ltd.	0.000	/	110.000	7.90	0.000	/	1,044.000	5.76	24.000	9.91	0.000	/	0.000	/	0.000	/	0.000	/	430.580
5	Shandong Weifang Rainbow Chemical Co., Ltd.	12.760	4.69	285.879	12.39	92.646	15.29	15.544	10.20	0.000	/	0.000	/	0.000	/	64.000	28.69	0.000	/	172.265
6	Jiangsu Yunfan Chemical Co., Ltd.	120.960	0.00	782.716	0.00	0.000	/	167.396	3.62	0.000	/	0.000	/	0.000	/	236.000	23.20	0.000	/	493.971
7	Shanghai Psyche Chemicals Co., Ltd.	0.000	/	300.080	5.62	0.000	/	499.411	7.53	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	259.802
8	Sino-Dg International Logistics Co., Ltd.	0.000	/	823.360	5.82	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	205.840

No.	Exporter	Formulation						Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		36g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
9	Qian Tang (Shenzhen) International Supply Chain Co., Ltd.	0.000	/	445.480	7.93	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	111.370
10	Freight Overseas Co., Ltd.	0.000	/	346.056	7.94	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	86.514
11	Willchem International Trading Co., Ltd.	0.000	/	358.476	5.09	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	89.619
12	Jebsen & Jessen Life Science Inc.	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	48.000	19.19	20.000	22.80	64.120
13	Zhejiang Chemicals Import and Export Corp.	0.000	/	0.000	/	0.000	/	16.000	7.50	0.000	/	0.000	/	0.000	/	0.000	/	34.000	32.57	38.220
14	Greenlands Investment International Limited	0.000	/	0.000	/	0.000	/	234.504	5.10	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	86.766
15	China Jiangsu International Economic and Technical Cooperation Group, Ltd.	0.000	/	194.104	5.42	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	48.526
Others		1,302.681	3.62	8,869.606	5.24	174.472	2.88	3,319.187	2.46	0.010	1.00	30.200	15.43	286.020	16.04	4,664.760	10.92	611.664	19.28	8,923.773
Total		1,722.401	4.88	20,657.909	6.55	267.118	10.85	7,329.310	6.99	24.010	9.91	48.200	14.80	286.020	16.04	5,012.760	16.63	665.664	24.96	13,849.733

Source: Tranalysis

Table 3.1-15 China's exports of clethodim by exporter, 2020

No.	Exporter	Formulation				Technical										Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
1	Jiangsu Yunfan Chemical Co., Ltd.	0.000	/	1,425.820	4.57	346.974	0.99	0.000	/	0.000	/	1,458.400	17.47	0.000	/	1,855.731
2	Zhejiang Hengdian Imp. & Exp. Co., Ltd.	0.000	/	1,833.987	7.38	0.000	/	0.000	/	167.000	18.40	574.000	16.79	0.000	/	1,153.367
3	Jiangsu Anpon Electrochemical Co., Ltd.	0.000	/	5,588.000	7.79	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	1,397.000
4	Shandong Weifang Rainbow Chemical Co., Ltd.	23.047	4.57	1,395.209	8.34	117.220	9.29	0.000	/	0.000	/	730.950	18.69	0.000	/	1,082.032
5	Shandong Cynda Chemical Co., Ltd.	298.200	4.78	3,196.400	5.75	1,840.640	5.40	0.020	23.00	0.000	/	0.000	/	0.000	/	1,515.939
6	Shanghai Psyche Chemicals Co., Ltd.	0.000	/	338.688	6.06	839.600	7.54	0.000	/	0.000	/	0.000	/	0.000	/	395.324
7	Sinochem Agro Co., Ltd.	0.000	/	786.856	6.01	504.000	7.48	25.000	15.44	0.000	/	36.000	18.34	0.000	/	439.534
8	Suzhou Greenlands Chemical Co., Ltd.	0.000	/	0.000	/	1,128.000	7.82	0.000	/	0.000	/	0.000	/	0.000	/	417.360
9	Ningbo Tide Import and Export Co., Ltd.	0.000	/	424.053	6.26	205.440	0.00	0.000	/	0.000	/	0.000	/	0.000	/	182.026
10	Shenyang Sciencreat Chemicals Co., Ltd.	0.000	/	574.148	7.21	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	143.537
11	Zhangjiagang Free Trade Zone Kanode Imp & Exp Co., Ltd.	0.000	/	0.000	/	365.256	2.99	0.000	/	0.000	/	0.000	/	0.000	/	135.145
12	Ningbo Jiangdong Agroskyrun Trading Co., Ltd.	0.000	/	405.650	5.65	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	101.413
13	Shandong Kesai Eagrow Chemical Co., Ltd.	0.000	/	0.000	/	0.000	/	15.000	15.96	0.000	/	69.000	15.34	0.000	/	78.360

No.	Exporter	Formulation				Technical										Total (100% AI clethodim), tonne		
		120g/L EC		240g/L EC		37% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.				
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg			
14	Nanjing Taikenuo International Trade Co., Ltd.	0.000	/	31.040	6.68	334.000	7.84	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	131.340
15	Liaoning Cynda Chemical Co., Ltd.	0.000	/	0.000	/	0.000	/	82.000	18.85	0.000	/	0.000	/	0.000	/	0.000	/	73.800
Others		268.200	89.14	3,439.383	455.05	1,333.384	109.29	387.000	84.93	0.000	0.00	500.800	54.03	12.002	39.95			2,215.836
Total		589.447	4.18	19,439.234	6.66	7,014.514	5.47	509.020	15.19	167.000	18.40	3,369.150	17.76	12.002	19.95			11,317.743

Source: Tranalysis

Table 3.1-16 China's exports of clethodim by exporter, 2019

No.	Exporter	Formulation				Technical										Total (100% AI clethodim), tonne		
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.			95% Tech.	
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg		Volume, tonne	Price, USD/kg
1	Shandong Cynda Chemical Co., Ltd.	69.910	5.47	5,457.207	7.84	3,214.020	9.67	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	2,561.878
2	Shandong Weifang Rainbow Chemical Co., Ltd.	0.000	/	4,293.664	9.61	2,167.225	11.70	0.000	/	0.000	/	0.000	/	289.600	25.17	0.000	/	2,147.513
3	Jiangsu Yunfan Chemical Co., Ltd.	0.000	/	1,726.160	7.93	317.000	9.55	0.000	/	0.000	/	0.000	/	1,638.400	19.12	0.000	/	2,088.926
4	Zhejiang Hengdian Imp. & Exp. Co., Ltd.	0.000	/	1,170.272	8.02	36.000	10.77	0.000	/	44.000	23.15	44.000	21.04	182.000	22.90	0.000	/	557.488
5	Sinochem Agro Co., Ltd.	48.880	5.44	1,909.801	8.04	0.000	/	50.000	22.28	41.000	23.86	0.000	/	0.000	/	0.000	/	555.216
6	Suzhou Greenlands Chemical Co., Ltd.	0.000	/	167.616	7.19	1,072.000	10.35	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	438.544

No.	Exporter	Formulation				Technical												Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		93% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
7	Shanghai Psyche Chemicals Co., Ltd.	0.000	/	1,045.907	7.23	256.019	7.68	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	356.204
8	Shanghai Ouyi Chemical Co., Ltd.	0.000	/	1,128.981	7.17	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	282.245
9	Nanjing Taikenuo International Trade Co., Ltd.	0.000	/	24.000	9.90	668.000	9.95	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	253.160
10	Nanjing Bioagriland Crop Care Co., Ltd.	0.000	/	604.187	7.35	17.640	9.30	0.000	/	20.000	22.85	12.000	19.63	0.000	/	30.000	21.96	215.234
11	Ningbo Generic Chemical Co., Ltd.	0.000	/	472.487	7.47	1.600	9.34	0.000	/	0.000	/	0.000	/	50.990	20.82	25.000	21.27	190.394
12	Jinan Ruisibang International Trade Co., Ltd.	0.000	/	23.990	7.49	337.000	12.77	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	130.688
13	Zhangjiagang Rongjiayike Trade Co., Ltd.	0.000	/	0.000	/	320.000	9.89	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	118.400
14	Shenyang Sciencreat Chemicals Co., Ltd.	0.000	/	388.724	7.89	36.000	9.63	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	110.501
15	Shanghai KJ Import and Export Co., Ltd.	0.000	/	224.076	8.11	108.000	9.41	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	95.979
Others		204.799	5.18	3,454.766	8.44	833.282	10.57	64.600	15.63	165.400	22.69	12.000	24.10	91.600	24.12	61.200	21.60	1,546.066
Total		323.589	5.32	22,091.838	8.35	9,383.786	10.56	114.600	18.80	270.400	22.66	68.000	20.88	2,252.590	20.48	116.200	21.62	11,648.436

Source: Tranalysis

Table 3.1-17 China's exports of clethodim by exporter, 2018

No.	Exporter	Formulation				Technical										Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
1	Shandong Cynda Chemical Co., Ltd.	64.037	5.20	4,574.841	7.66	3,461.040	10.02	0.000	/	0.000	/	0.000	/	0.000	/	2,431.979
2	Shandong Weifang Rainbow Chemical Co., Ltd.	0.000	/	3,063.439	9.38	859.600	11.20	0.000	/	148.000	23.50	0.000	/	0.000	/	1,217.112
3	Nutrichem Co., Ltd.	0.000	/	0.000	/	2,570.000	9.37	0.000	/	0.000	/	0.000	/	0.000	/	950.900
4	Jiangsu Yunfan Chemical Co., Ltd.	4.750	3.85	577.734	8.09	205.000	10.90	0.000	/	0.000	/	472.310	20.19	0.000	/	664.825
5	Zhangjiagang Rongjiayike Trade Co., Ltd.	0.000	/	0.000	/	832.000	12.62	0.000	/	0.000	/	0.000	/	0.000	/	307.840
6	China Jiangsu International Economic Technical Cooperation Group Co., Ltd.	0.000	/	148.185	8.42	684.000	10.19	0.000	/	0.000	/	0.000	/	0.000	/	290.126
7	Shanghai Psyche Chemicals Co., Ltd.	0.000	/	1,115.410	8.19	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	278.853
8	Sinochem Agro Co., Ltd.	0.000	/	276.504	8.95	245.000	11.67	75.000	19.47	44.000	23.96	0.000	/	0.000	/	251.876
9	Nanjing Taikenuo International Trade Co., Ltd.	0.000	/	0.000	/	666.000	9.04	0.000	/	0.000	/	0.000	/	0.000	/	246.420
10	Suzhou Greenlands Chemical Co., Ltd.	0.000	/	18.000	8.57	616.900	10.92	0.000	/	0.000	/	0.000	/	0.000	/	232.753
11	Shanghai Ouyi Chemical Co., Ltd.	0.000	/	703.780	7.53	2.000	9.18	0.000	/	0.000	/	0.000	/	0.000	/	176.685
12	Zhejiang Hengdian Imp. & Exp. Co., Ltd.	0.000	/	430.272	7.88	183.000	11.34	0.000	/	0.000	/	0.000	/	0.000	/	175.278
13	Shenyang Sciencreat Chemicals Co., Ltd.	0.000	/	660.956	7.55	23.000	9.59	0.000	/	0.000	/	0.000	/	0.000	/	173.749
14	Ningbo Generic Chemical Co., Ltd.	16.115	5.44	442.886	7.55	0.000	/	0.000	/	0.000	/	5.400	30.14	16.100	25.38	133.026

No.	Exporter	Formulation				Technical										Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
15	Yifan Biotechnology Group Co., Ltd.	0.000	/	480.356	6.95	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	120.089
	Others	56.600	4.93	4,793.761	8.45	660.348	11.48	96.000	15.79	320.000	24.94	74.000	22.60	3.200	21.01	1,877.361
	Total	141.502	5.01	17,286.124	8.25	11,007.888	10.43	171.000	17.24	512.000	24.00	551.710	20.40	19.300	25.29	9,528.872

Source: Tranalysis

Table 3.1-18 China's exports of clethodim by exporter, 2017

No.	Exporter	Formulation				Technical										Total (100% AI clethodim), tonne
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
1	Shandong Cynda Chemical Co., Ltd.	0.000	/	4,743.890	5.90	1,708.240	7.32	0.000	/	130.088	15.47	0.000	/	0.000	/	1,935.100
2	Shandong Weifang Rainbow Chemical Co., Ltd.	0.000	/	4,197.032	6.11	521.420	8.75	0.000	/	149.600	15.46	0.000	/	0.000	/	1,376.823
3	Nutrichem Co., Ltd.	0.000	/	0.000	/	4,259.400	7.34	88.000	15.03	0.000	/	0.000	/	0.000	/	1,637.578
4	Sinochem Agro Co., Ltd.	0.000	/	778.107	6.46	32.000	10.01	162.500	15.61	12.000	25.38	0.000	/	0.000	/	330.917
5	China Jiangsu International Economic Technical Cooperation Group Co., Ltd.	43.888	4.57	160.220	5.82	522.000	6.88	0.000	/	0.000	/	0.000	/	0.000	/	238.462
6	Jiangsu Yunfan Chemical Co., Ltd.	4.715	3.88	5.541	6.04	241.200	8.12	0.000	/	0.000	/	419.805	19.68	0.000	/	485.812

No.	Exporter	Formulation				Technical										Total (100% Al clethodim), tonne
		120g/L EC		240g/L EC		37% TK		70% TK		90% Tech.		94% Tech.		95% Tech.		
		Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	Volume, tonne	Price, USD/kg	
7	Ninghua Group Co., Ltd.	4.560	4.18	618.782	6.77	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	155.243
8	Jiangsu Sevencontinent Green Chemical Co., Ltd.	0.000	/	558.864	5.79	0.000	/	0.000	/	8.800	15.10	0.000	/	0.000	/	147.636
9	Shanghai Zijiang International Trading Co., Ltd.	0.000	/	545.594	5.87	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	136.399
10	Jiangsu Jinlikai Chemical Co., Ltd.	0.000	/	453.006	5.74	8.000	9.15	0.000	/	0.000	/	0.000	/	0.000	/	116.211
11	Hangzhou Leaflife Chemical Co., Ltd.	0.000	/	1.500	5.20	444.600	6.96	0.000	/	0.000	/	0.000	/	0.000	/	164.877
12	Ningbo Tide Import and Export Co., Ltd.	0.000	/	270.262	7.93	128.000	7.72	0.000	/	0.000	/	0.000	/	0.000	/	114.925
13	Nanjing Redsun Group International Trade Co., Ltd.	0.000	/	239.904	5.81	48.000	6.78	0.000	/	0.000	/	0.000	/	0.000	/	77.736
14	Shanghai E-tong Chemical Co., Ltd.	22.279	5.13	221.916	5.91	15.800	9.70	0.000	/	0.000	/	0.000	/	0.000	/	63.998
15	High Hope Zhongtian Corporation	0.000	/	252.618	5.86	0.000	/	0.000	/	0.000	/	0.000	/	0.000	/	63.155
Others		138.892	4.34	3,083.132	6.34	850.300	8.70	0.000	/	36.800	18.34	97.800	15.10	67.900	14.30	1,291.618
Total		214.334	4.46	16,130.368	6.12	8,778.960	7.55	250.500	15.40	337.288	16.12	517.605	18.81	67.900	14.30	8,336.490

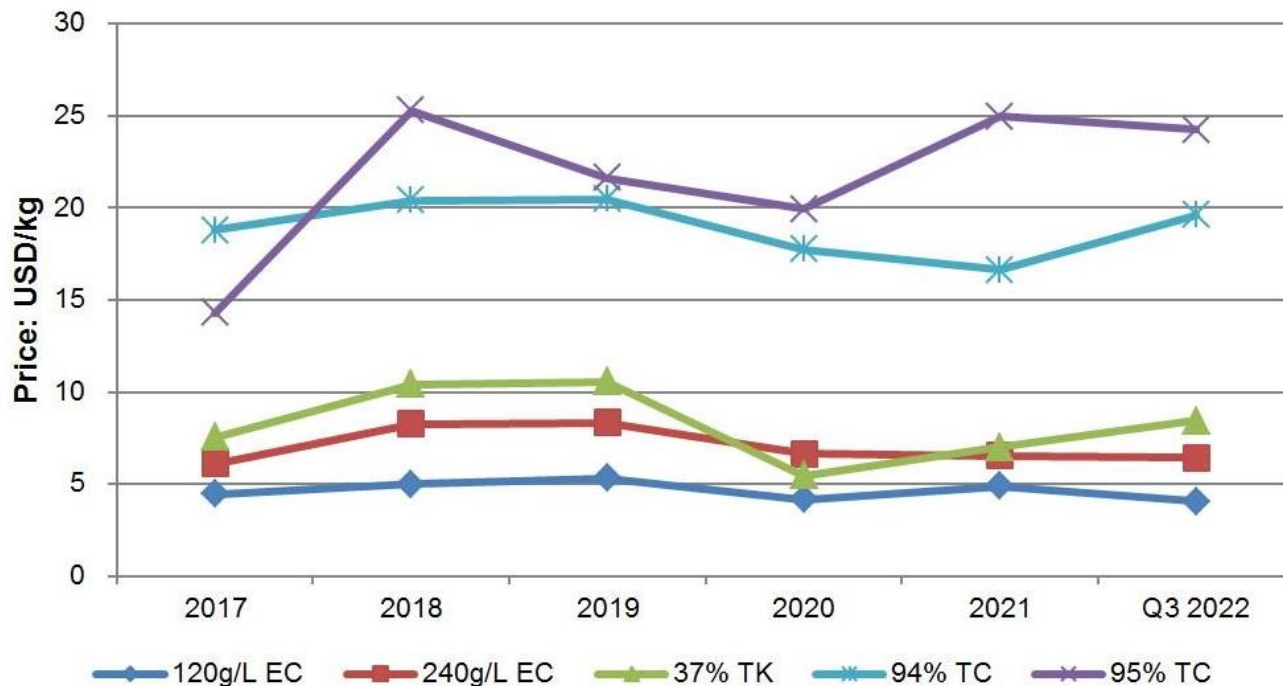
Source: Tranalysis

3.2 Export price

Export prices of clethodim formulations saw slight fluctuations over recent years, gradually rising from 2017 with a peak in 2019 before a lasting decline to Q3 2022.

The clethodim technical export prices moved more drastically than that of the formulations. For example, the annual export price of 95% TC peaked in 2018 at USD25.29/kg and dropped in 2019–2020. In 2021, the rebounded figure reached a new high and in Q3 2022, it fell slightly.

Figure 3.2-1 Annual export price of clethodim formulations and technical in China, 2017–Q3 2022



Source: Tranalysis

4 Current problem

Problems have arisen in the rapid development of the domestic clethodim industry in recent years, especially when China becomes increasingly competitive amongst the global rivals.

- Excessive expansion of companies may lead to overcapacity

In recent years, seeing increasing demand for clethodim at home and abroad, several domestic clethodim companies have expanded their production capacity since 2019, and some planned to continue to expand further. It's worth noting that the competition will intensify and may lead to overcapacity in the future as domestic capacity continues to increase.

- Limited varieties of clethodim formulation products

As of Dec. 2022, only three types of clethodim formulations—EC, OD and ME—were registered.

- Weak brand influence of clethodim products

In 2022, there were 12 Chinese enterprises producing clethodim technical, yet their brands were not prominent to the world, with exports heavily dependent on the lower prices. Clethodim had its debut in the global market in 1987, whereas the production in China first came in 2003.

- Impact of genetically modified (GM) crops

The herbicide-resistant GM soybean, cotton and rapeseed have been widely planted, which is also unfavorable to the development of clethodim.

The popularity of herbicide-resistant GM crops brings a great impact to post-emergence selective herbicides including clethodim. Herbicide-resistant GM crops usually have resistance to one or several herbicides including glyphosate, glufosinate-ammonium, 2,4-D and dicamba, which makes them strong competitors to post-emergence selective herbicides. The low price of 2,4-D and glyphosate and broad weed control spectrum of these four herbicides are unfavorable to the development of post-emergence selective herbicides.

Therefore, the clethodim producers should expand the use range of clethodim and focus on exporting clethodim to the regions having relatively small acreage of GM crops.

5 Conclusion and opportunity

Clethodim has developed rapidly in the world, pushing up the development of China's clethodim industry in recent five years. In 2017–2022, the output of clethodim in China grew at an annual average growth rate of 13.30%. As of Dec. 2022, 116 enterprises have obtained the production certifications of clethodim products (including technical and formulations). Among them, 12 TC manufacturers have actively engaged in the production and construction of new capacity. It is forecasted that there will be a fiercer competition.

Clethodim has the advantages of high effectiveness, low residue and relatively lower price. Owing to the higher requirements on environmental protection at home and abroad in recent years, clethodim, as an effective and environment-friendly herbicide, gradually replaced some herbicide varieties with high residue and heavy toxicity, witnessing a rapid increase in sales.

The applicable crops of clethodim have further increased. Currently, clethodim is mainly applied to soybean field. At the same time, its use continues to expand to broad-leaved crops such as rape, sugar beet, sunflower, cotton and vegetables and non-arable land. In particular, in raising rape, sugar beet and sunflower, clethodim has been playing an important role.

Compared with other selective post-emergence herbicides such as fluazifop-P-butyl, haloxyfop-P-methyl and quizalofop-P-ethyl, other competing products in soybean application, clethodim is superior in costs of production and application. What's more, there is a great potential for glyphosate and clethodim mixed formulations in glyphosate-tolerant crops. These also open up a good market prospect for clethodim, which is one of the reasons for the rapid development of clethodim in recent years.

From the upper reaches, on 24 Aug., 2022, the EIA document of Gansu Runtaihe Science and Technology Co., Ltd.'s 10,000 t/a mercaptan series products project was published on the local government's website for the first public notice, involving building of production lines for 6,000 t/a ethyl mercaptan (major intermediate for clethodim) and supporting auxiliary facilities. This new intermediate capacity may ease the continuous tight supply of raw materials for clethodim and benefit Chinese clethodim manufacturers in terms of cost and supply efficiency, given most of the current use of ethyl mercaptan in the country are imported.

6 Contact information of major producers in China

Table 6-1 Contact information of major clethodim producers in China

No.	Producer	Tel.	Address
1	Shandong Cynda Chemical Co., Ltd.	86-543-2320028	6F Yinhe Building D, No. 2008 Xinluo Road, Hi-tech Development Zone, Jinan City, Shandong Province, P. R. China
2	Yifan Biotechnology Group Co., Ltd.	86-577-86637855	No. 555 Chang'an Road, Yaoxi Street, Longwan District, Wenzhou City, Zhejiang Province, P. R. China
3	Cangzhou Green Chemical Co., Ltd.	86-317-4852028	Xingji Town, Cangxian County, Cangzhou City, Hebei Province, P. R. China
4	Shenyang Sciencreat Chemicals Co., Ltd.	86-24-25850856	No. 17 Xihe 9th North Street, Economic and Technological Development Zone, Shenyang City, Liaoning Province, P. R. China
5	Hebei Wuqiao Pesticide Co., Ltd.	86-317-7238181	Songmen Industrial Park, Economic Development Zone, Wuqiao County, Cangzhou City, Hebei Province, P. R. China
6	Hebei Lansheng Biotech Co., Ltd.	86-311-84498010	Mayu Village, Jinzhou City, Shijiazhuang City, Hebei Province, P. R. China
7	Jiangsu Sevencontinent Green Chemical Co., Ltd.	86-512-58609901	Dongsha Chemical Zone, Zhangjiagang City, Suzhou City, Jiangsu Province, P. R. China
8	Jiangsu Yangnong Chemical Co., Ltd.	86-514-85860486	5/F High-tech Zone Building, Anqiao Road, Hanjiang District, Yangzhou City, Jiangsu Province
9	Zhongnong Ruihua (Gansu) Pharmaceutical Co., Ltd.	86-13831132042	No. 9 Xingfu Road, Yumen East Building Materials Chemical Industrial Park, Jiuquan City, Gansu Province

Source: CCM

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