



Overview and Market Potential of Fatty Acid in China














Dennis Liu

October, 2014

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Key Product Categories of Fatty Acid in China

Raw Material	Product	Application	2014 Price (USD/ton)
Palm Oil 	Stearic Acid	 <ul style="list-style-type: none"> • Plastic  <ul style="list-style-type: none"> • Rubber  <ul style="list-style-type: none"> • Textile  <ul style="list-style-type: none"> • Household Chemicals 	1,100-1,400
	Palmitic Acid	 <ul style="list-style-type: none"> • Household Chemicals  <ul style="list-style-type: none"> • Candle 	1,250-1,450
Palm Kernel Oil 	Lauric Acid	 <ul style="list-style-type: none"> • Coating  <ul style="list-style-type: none"> • Household Chemicals 	1,450-1,800
	Myristic Acid	 <ul style="list-style-type: none"> • Household Chemicals 	1,800-2,100

Note:

- Other product categories include sodium aliphate, oleic acid, etc.

2013 China Key Product Categories of Fatty Acid Market Size

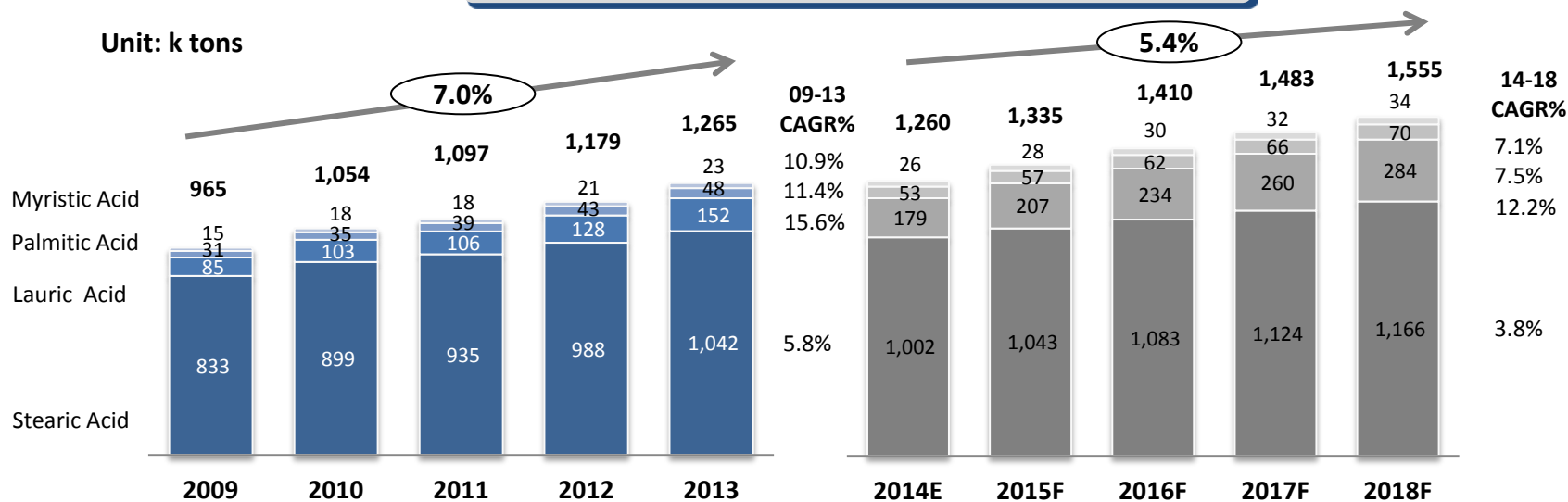
Product	Output (k tons)	Import (k tons)	Consumption (k tons)	Share by Consumption %
Stearic Acid	818	229	1,042	82%
Lauric Acid	53	99	152	12%
Palmitic Acid	32	16	48	4%
Myristic Acid	17	6	23	2%
Total	920	350	1,265	100%

Note:

- It is estimated the consumption of aforementioned 4 products accounts for roughly 80% of total fatty acid China market
- Stearic acid's importing volume is from China Customs (HS38231100), other fatty acid's importing volume is estimated based on Martec primary research and analysis
- Stearic acid's exporting in 2013 was about 6 k tons, lauric acid, palmitic acid and myristic acid almost have no exporting

In the next five years, China fatty acid market demand will grow at CAGR of +5.4%, because of the slow down growth of downstream

2009-2018 China Fatty Acid Market Demand by Products



Source: Martec Analysis

- **Stearic acid**
 - 70-80% local supply, and 20-30% import
 - Over capacity and excessive supply
 - Lower pricing and profit
- **Lauric acid**
 - 60-70% import and 30-40% local supply
 - High entrance barrier and high technology requirement
 - Demand exceeding supply with higher pricing and profit
- **Palmitic acid**
 - 60-70% local supply and 30-40% import
 - Balanced supply and demand with lower price and profit
- **Myristic acid**
 - 80% from domestic supply and 20% import
 - Balanced supply and demand
 - Higher price and profit



Top 5 manufacturers have over 60-70% share of capacity in China

Manufacturers	Company Nature	Capacity (k tons)	Factory Location	Product
Yihai Kerry (益海嘉里)	 Multinational (Singapore)	500	<ul style="list-style-type: none"> Lianyungang (Jiangsu province) Shanghai Dongguan (Guangdong province) Tianjin 	<ul style="list-style-type: none"> Stearic Acid Lauric Acid Palmitic Acid Myristic Acid
Shuangma Chemical (双马化工)	 Chinese Private	250	<ul style="list-style-type: none"> Nantong (Jiangsu province) 	<ul style="list-style-type: none"> Stearic Acid Palmitic Acid
KLK OLEO (泰柯棕化)	 Multinational (Malaysia)	170	<ul style="list-style-type: none"> Zhangjiagang (Jiangsu province) 	<ul style="list-style-type: none"> Stearic Acid Lauric Acid Palmitic Acid Myristic Acid
Dongma OLEO (东马油脂化工)	 Multinational (Malaysia)	120	<ul style="list-style-type: none"> Zhangjiagang (Jiangsu province) 	<ul style="list-style-type: none"> Stearic Acid
Cambridge Olein (康桥油脂)	 Joint Venture (Hong Kong)	100	<ul style="list-style-type: none"> Nantong (Jiangsu province) 	<ul style="list-style-type: none"> Stearic Acid

Note:

- Capacity is for stearic acid, lauric acid, palmitic acid, myristic acid and other fatty acid including sodium aliphatae and glycerin
- KLK OLEO is now expanding its fatty acid capacity (Phase II capacity of 170 k tons, mainly for lauric acid and myristic acid), and plans to launch in the end of 2015

Stearic Acid: Top 15 manufacturers have about 80-90% share of output in China

	Company #	Share of Output %	2013 Output (k tons)	Key Manufacturers	
Tier 1	5	60~70%	~618	<ul style="list-style-type: none"> • Yihai Kerry • Shuangma Chemical • KLK OLEO • Dongma OLEO • Cambridge Olein 	<ul style="list-style-type: none"> • Have large capacity (> 100 k tons, with over 60-70% utilization) • High quality and durable performance
Tier 2	5-10	15~20%	~100	<ul style="list-style-type: none"> • Shanghai Soap • Hangzhou Oleochemical • Jinda Shuangpeng Grease Chemical • Qingdao Soda Ash Industrial • Jiahua Energy Chemical 	<ul style="list-style-type: none"> • Mainly local companies • Capacity (<50 k tons) • Durable performance
Tier 3	100 +	15~20%	~100	<ul style="list-style-type: none"> • Small manufacturers 	<ul style="list-style-type: none"> • Small local company • Small capacity • Unstable performance • Low price

2013 China Output = 818 k tons



Lauric, Palmitic & Myristic Acid: Yihai Kerry and KLK OLEO have 80-90% share of output in China

	Company #	Share of Output %	2013 Output (k tons)	Key Manufacturers	
Tier 1	2	90%+	~95	<ul style="list-style-type: none"> Yihai Kerry (Lianyungang) KLK OLEO (Zhangjiagang) 	<ul style="list-style-type: none"> Both Yihai Kerry and KLK OLEO produce lauric acid, palmitic acid & myristic acid
Tier 2	3-5	~10%	~10	<ul style="list-style-type: none"> Shuangma Chemical Dongma OLEO (Zhangjiagang) 	<ul style="list-style-type: none"> Shuangma Chemical only produces stearic acid and palmitic acid Dongma OLEO has lauric acid and myristic acid capacity, but its output depends on customers' orders and demands

2013 China Output = 105 k tons

Plastic, rubber, household chemicals and textile are the four largest applications of fatty acid

Production Center

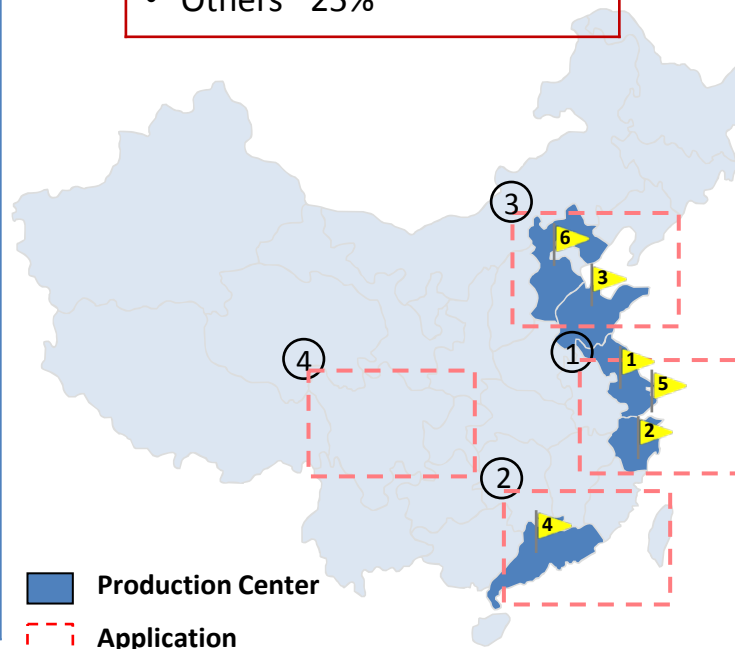
- 1 Jiangsu ~ Capacity of 700 k tons**
 - Shuangma Chemical
 - Dongma OLEO
 - Yihai Kerry
 - Cambridge Olein
 - KLK OLEO
 - Shanghai Soap
- 2 Zhejiang ~ Capacity of 150 k tons**
 - Hangzhou Oleochemical
 - Jiahua Energy Chemical
- 3 Shandong ~ Capacity of 100 k tons**
 - Jinda Shuangpeng Grease Chemical
 - Qingdao Soda Ash Industrial
- 4 Guangdong ~ Capacity of 100 k tons**
 - Yihai Kerry
- 5 Shanghai ~ Capacity of 100 k tons**
 - Factory ~ Yihai Kerry
- 6 Tianjin ~ Capacity of 100 k tons**
 - Yihai Kerry

Application

- Plastic ~30%
- Rubber ~20%
- Household Chemicals ~15%
- Textile ~10%
- Others ~25%

Regional Distribution

- ① Jiangsu, Zhejiang & Shanghai**
 - Household chemicals
 - Plastic
 - Paper
- ② Guangdong, Fujian**
 - Household chemicals
 - Textile
 - Plastic
- ③ Shandong, Hebei**
 - Plastic
 - Rubber
 - Paper
- ④ Chongqing, Sichuan**
 - Plastic



Note:

- Capacity is estimated by key manufacturers' capacity mainly for stearic acid, lauric acid, palmitic acid and myristic acid

Government Policies and Regulations for Fatty Acid Market

Raw Material – Elimination of exporting tariff in Indonesia and Malaysia



- To prompt the exporting of palm oil, both Indonesia and Malaysia government announced to eliminate exporting tariff in the end of 2014. It is expected to promote development of fatty acid market as well as more penetration of these two countries in the China market
 - *In Sep, Indonesia Ministry of Trade announced to eliminate palm oil exporting tariff in Oct. (tariff in Sep. was 9%), it is the first time eliminating exporting tariff since 2009 Sep and it is expected to keep to be executed in Nov. of 2014*
 - *Malaysia government eliminated palm oil exporting tariff in Sep. and Oct 2014*

Downstream – Limited development of textile and paper industry

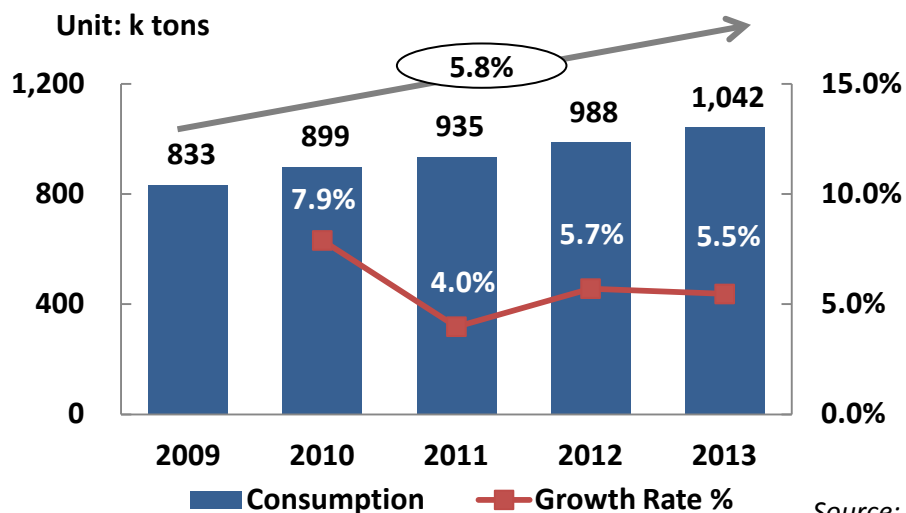
- Development of textile and paper industry will be limited due to high environment pollution and high energy consumption. The consumption of fatty acid will be influenced by the growth shrinkage of applications
 - *Textile: China government will put more effort to reform textile industry for energy saving and air pollution controlling- “Air Pollutants Emission Standards for Textile Dyeing ” will be issued in 2015*
 - *Paper: “Technology Policy of Pollution Prevention in Paper Industry” was issued by Chinese Ministry of Environmental Protection in Oct. of 2013*





China stearic acid consumption in 2013 was 1,042 k tons, accounting for over 80% share of aforementioned four categories

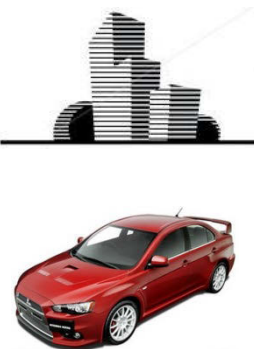
2009-2013 China Stearic Acid Consumption



2009-2013 China Stearic Acid Import and Export

Year	Output (k tons)	Import Volume (k tons)	Export Volume (k tons)	Consumption (k tons)
2009	708	139	13	833
2010	771	143	15	899
2011	794	155	14	935
2012	750	243	5	988
2013	818	229	6	1,042

Source: China Customs, China Cleaning Industry Association, Martec Analysis



Growth %

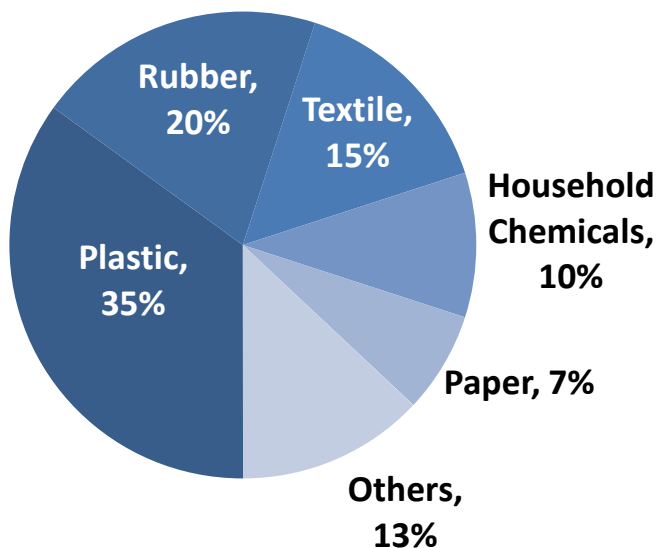
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- In 2013, stearic acid consumption was 1,042 k tons, 70-80% from local production and others from import and export volume were very small
- In 2012, stearic acid importing increased rapidly at +57% growth rate, both output and export slump at a negative growth of -6% and -64%
 - Downstream customers prefer to choose imported stearic acid because of its lower price (10-15% lower)
 - Shuangma Chemical launched its new capacity in Indonesia factory in 2012, and exported stearic acid to China
- In 2011, stearic acid's growth rate slow down, which was influenced by the growth shrinkage of real estate (New house transaction growth decreased from +9.1% to +4.3%) and automotive industry (growth decreased from +30.7% to +2.5%)



Among all the applications, plastic, rubber and textile are three largest downstream of stearic acid, accounting for about 70% share

2013 China Stearic Acid Consumption by Application
- 1,042 k tons



Source: Martec Analysis

Note:

- Other applications include candle, food, coating, medical, etc.









Plastic

- Key ingredient of stabilizer, plasticizer and lubricant, mainly for PVC plastic
- Influenced by real estate industry
- Production Center: Shandong, Henan, Tianjin, Inner Mongolia, Jiangsu and Sichuan provinces

Rubber

- Raw material of stabilizer and vulcanizing agent
- Influenced by tire (mainly for export) and automobile industry
- Production Center: Shandong, Jiangsu, Guangdong, Shanghai, Fujian and Liaoning provinces

Textile

- Raw material of softener
- Textile Additives Production Center: Jiangsu, Zhejiang, Shanghai, Guangdong, Shandong and Fujian provinces

Household Chemicals

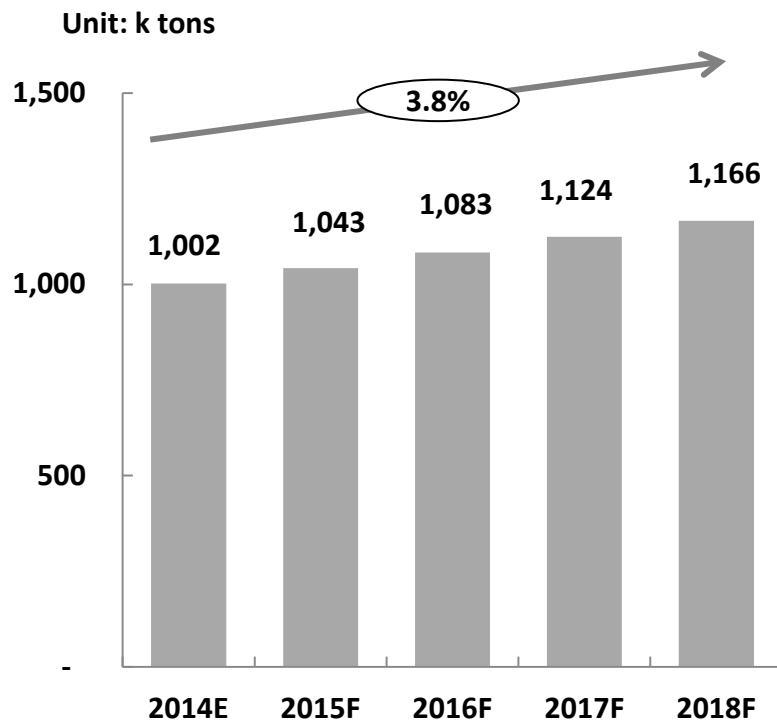
- Raw material of Ethylene Glycol Distearate, surfactant
- Production Center: Jiangsu, Zhejiang, Shanghai and Guangdong provinces

Paper

- Raw material of surfactant
- Production center mainly located in Jiangsu and Shandong provinces

It is estimated China stearic acid market growth slow down at about +4% in the next five years

2014-2018 China Stearic Acid Consumption



Source: Martec Analysis



Growth %



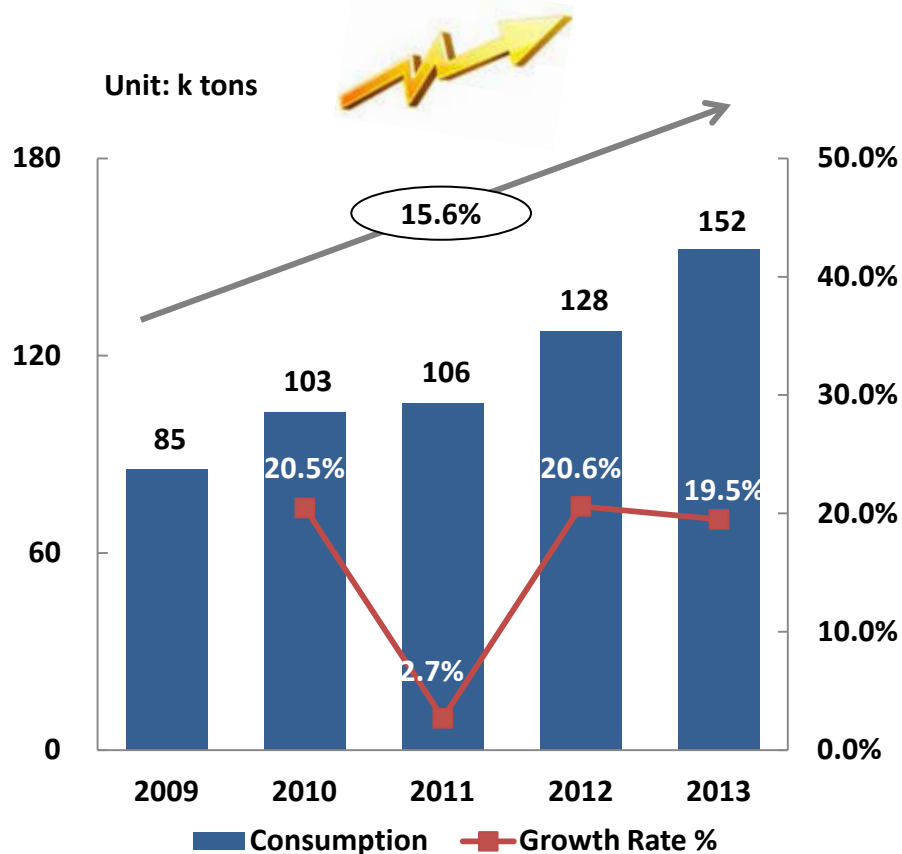
- In 2014, it is estimated that stearic acid consumption will decrease to 1,002 k tons at a negative growth of -3.8%

➤ Dual influenced by the shrinkage growth of real estate (Estimation: -8%, because of strict national policy control) and automotive industry (Estimation: +7%)

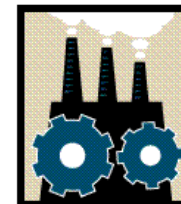
- In the next few years, CAGR is about +4%
 - With the issuing of strict control policy in real estate, both new sell out and new complete floor area growth rate retard
 - It is estimated automotive industry growth rate also slow down
 - For textile additive, it occurred that hardened oil replace stearic acid to produce softener because of its low cost and simplified processing
 - More and more stearic acid replace petroleum based materials to produce surfactant for household chemicals because of its environmental-friendly

Lauric acid has the second largest market of fatty acid in China, grows at a rapid CAGR of about +16% in the last five years

2009-2013 China Lauric Acid Consumption



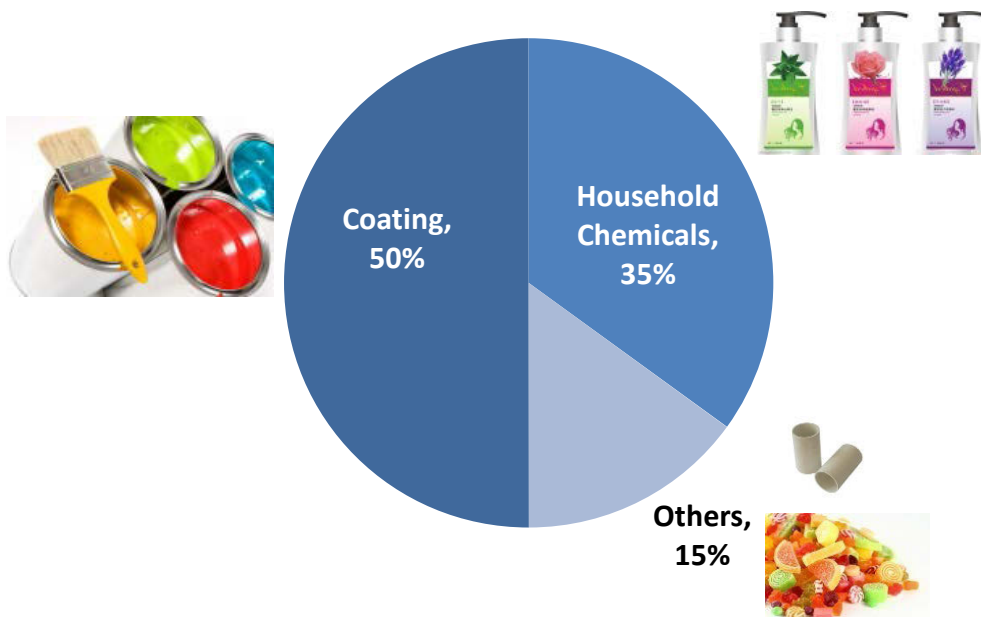
- In 2013, lauric acid consumption was 152 k tons, 60-70% imported from Indonesia and Malaysia, 30-40% from domestic output
 - *High entrance barriers: higher equipment requirement and higher technical barriers to produce lauric acid and myristic acid*
 - *Price competition: import product has better performance and lower price*
- *Yihai Kerry and KLK OLEO are two key suppliers for lauric acid, have 80-90% share of output in China*
- In 2011, growth rate was +2.7%, which was caused by the higher importing price of palm kernel oil in the first half year
- Lauric acid grows rapidly driven by the fast growth of coating and household chemicals
 - *China is the largest coating production center and 2009-2013 CAGR was about +15%*
 - *More and more lauric acid products replace petroleum based materials to produce surfactant for household chemicals because of its environmental-friendly*



Coating and household chemicals are two largest applications for lauric acid, 85% share of total

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2013 China Lauric Acid Consumption by Application
-152 k tons



Source: Martec Analysis

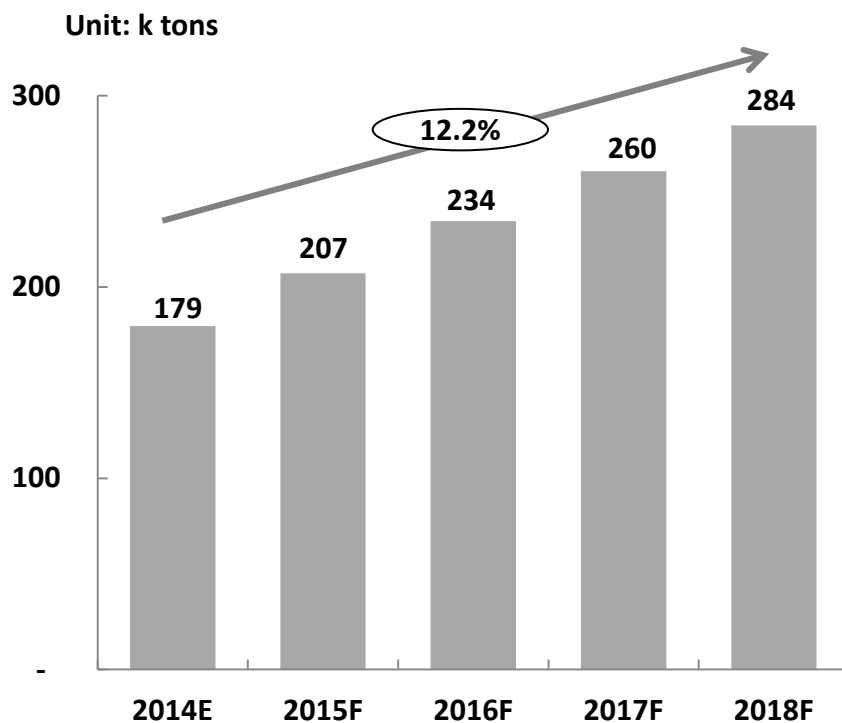
Note:

- Other applications include food, plastic, etc.

- Lauric acid is widely used in alkyd resin to produce solvent-based coating
 - Including automotive coatings, anticorrosive coatings, wood coatings, architectural coatings, etc.
- Lauric acid is raw material of surfactant (preservative, emulsifier and wetting agent etc.) of household chemical
 - Surfactant are mainly applied in detergents, personal care products and cosmetics
 - In 2013, China detergent output was over 10 million tons, in which surfactant dosage rate is over 15%

It is estimated that China lauric acid growth slow down to a CAGR of +12%

2014-2018 China Lauric Acid Consumption



Source: Martec Analysis

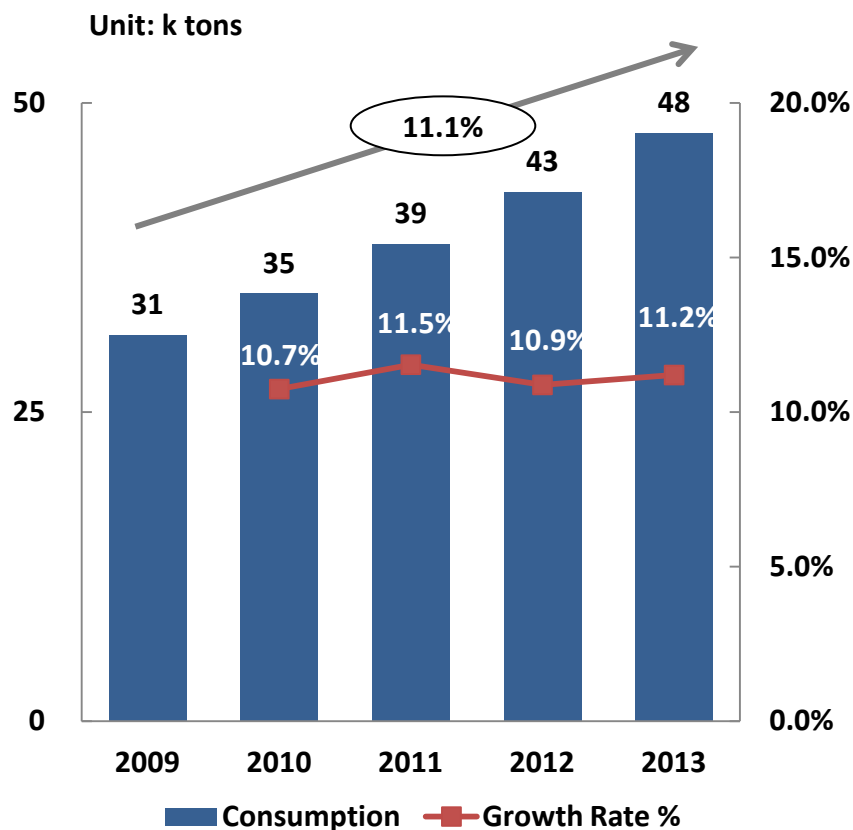


- In 2014, it is estimated lauric acid consumption increase to 179 k tons at a growth rate of 18%
 - *Both coating and household chemicals keep a rapid growth of about +10% and +15 to 20%*
- In the next five years
 - *With the increasing recognition of environment protection, palm oil based lauric acid as a renewable raw material, becomes more popular and widely used to produce surfactant*



China palmitic acid market size is small, total consumption in 2013 was 48 k tons, grows at a relative stable CAGR of about 11.1% in the last five years

2009-2013 China Palmitic Acid Consumption



Source: Martec Analysis

High Cost



- In 2013, palmitic acid consumption was 48 k tons, 60-70% from domestic output and 30-40% imported

Low Profit



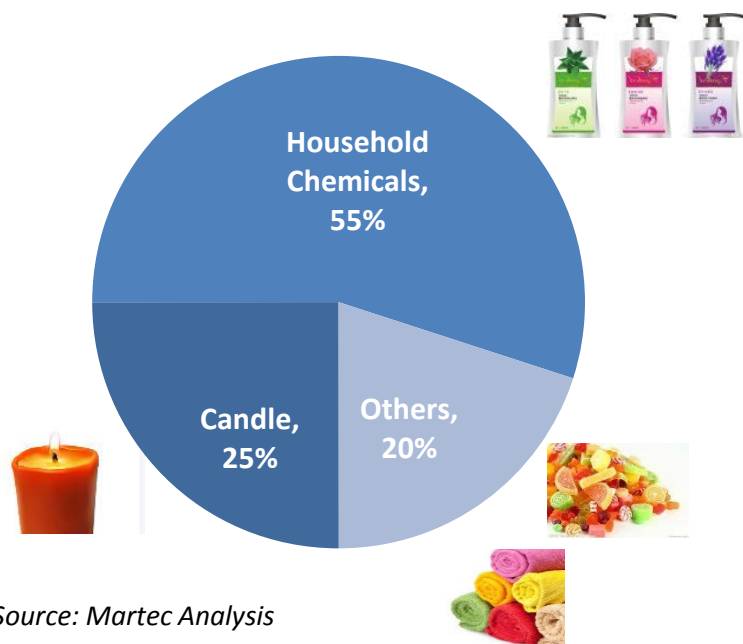
- To produce palmitic acid, extra fractionation equipment is required

- China manufacturers are not willing to produce palmitic acid due to its extra cost spending and lower profit

- Yihai Kerry, KLK OLEO and Shuangma Chemical are three largest manufacturers, have about 80-90% share of output in China
- The palmitic acid market obtained a growth by CAGR +11.1% in the past five years due to the stable domestic application market's growth
 - In 2010, with the recovery of macroeconomic from economic crisis, and as a result of government stimulation policy, domestic demand for household chemicals increased
 - From 2010 to 2013, the market demand basically had no big fluctuation and the consumption stood at a growth level around +11%

Household chemicals are the largest application for palmitic acid in China

2013 China Palmitic Acid Consumption by Application - 48 k tons



Source: Martec Analysis

Note:

- Others include food, textile and medical industries

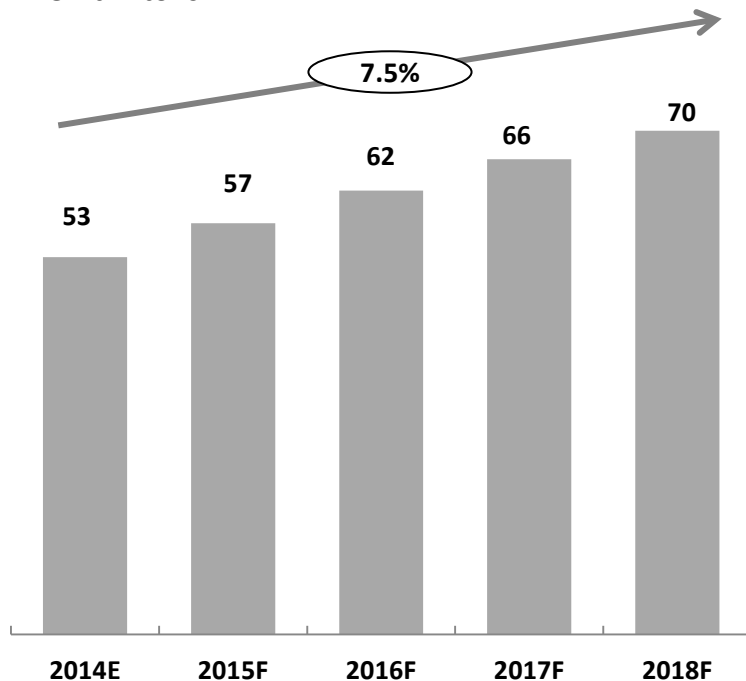
- Palmitic acid is mainly used as raw material of surfactant for household chemicals
 - *Applied in detergents, personal care products and cosmetics*
- Also applied to produce craft candle because of its safety, less smoky and long burning period



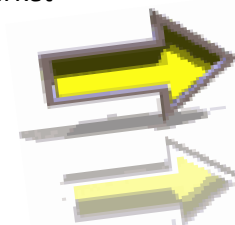
China palmitic acid market growth slow down in the next five years

2014-2018 China Palmitic Acid Consumption

Unit: k tons



- In 2014, it is estimated palmitic acid consumption will increase to 53 k tons with a growth rate of +10.5%
- In the next five years
 - *Compared with stearic acid and lauric acid market, niche downstream application in household chemicals and candle makes palmitic acid market become a stable and small market*

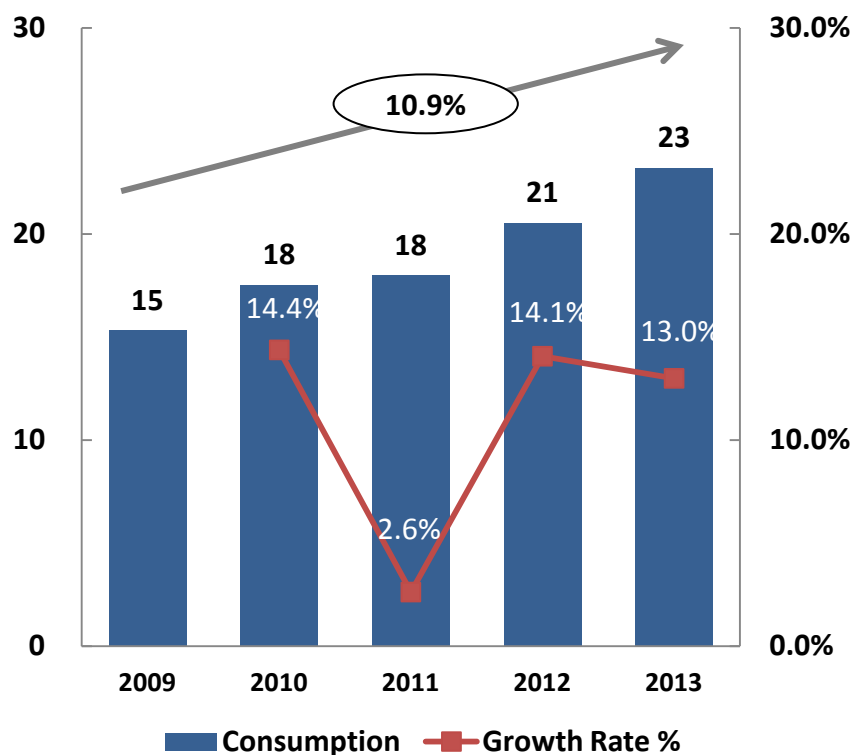


Source: Martec Analysis

China myristic acid market is small and total consumption in 2013 was 23 k tons

2009-2013 China Myristic Acid Consumption

Unit: k tons

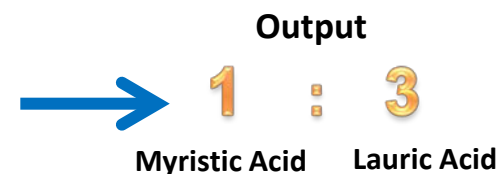


Source: Martec Analysis

- Myristic acid is 80% manufactured by domestic suppliers



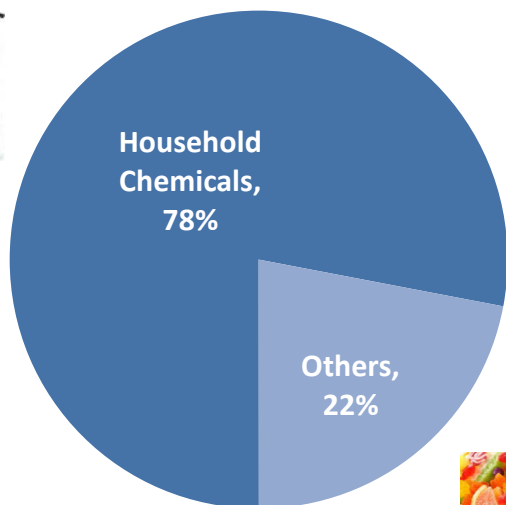
Palm Kernel Oil



- Domestic demand for myristic acid is small, to promote the sales of myristic acid, domestic manufacturers will sell this product at a lower price than importing products
- In the application of surfactant for household chemicals, myristic acid and lauric acid can replace each other, but myristic acid's price is higher than lauric acid generally
- In 2011, growth rate had a shrinkage due to the higher importing price of palm kernel oil in the first half year

Household chemicals are myristic acid's key application

2013 China Myristic Acid Consumption by Application - 23 k tons



Source: Martec Analysis

Note:

- Others include food, etc.

- As myristic acid has higher price than lauric acid, it is limited for its application in surfactant for household chemicals (detergents, personal care products, cosmetics, etc.)
 - *When myristic acid and lauric acid have similar price, customers prefer to use myristic acid instead of lauric acid because of its better performance*

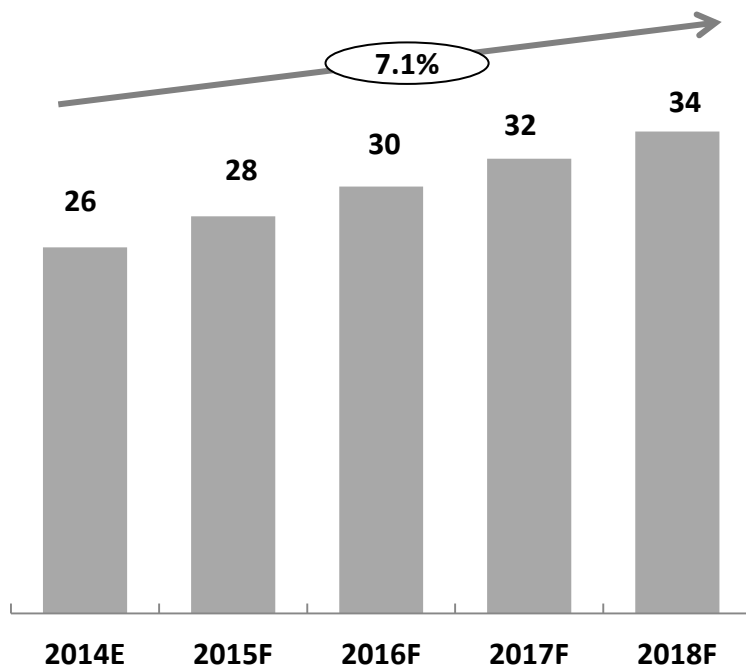


In the next five years, China myristic acid market will grow at a CAGR of +7%

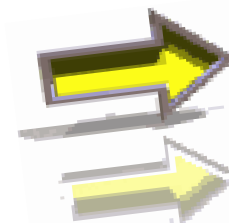
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2014-2018 China Myristic Acid Consumption

Unit: k tons



- In 2014, it is estimated that myristic acid consumption will increase to 26 k tons and the growth rate is +10%
- In the next five years, demand for myristic acid will grow steadily



Source: Martec Analysis

Products' Competitive Intensity

Product	Competitive Intensity	Rationale
Stearic Acid	3	<ul style="list-style-type: none"> • Larger market demand (2013 ~ 1042 k tons) and local production (2013~ 818 k tons), 70-80% from local supplier, and 20-30% from import • Intensive pricing competition due to over capacity • Excessive supply and demand with lower pricing and profit
Lauric Acid	2	<ul style="list-style-type: none"> • Second largest market demand (2013~ 152 k tons) and 60-70% from import (2013~ 99 k tons) and 30-40% local output (2013~ 53 k tons) • Relatively high entrance barrier and high technology requirement • Concentrated local production, 2 key suppliers have 80-90% share of local output • Demand exceeds supply with higher pricing and profit
Palmitic Acid	2	<ul style="list-style-type: none"> • Market demand (2013~ 48 k tons), 60-70% domestic supply and 30-40% import • Extra fractionation equipment is required • Concentrated local production, 3 key suppliers have 80-90% share of local output • Balanced supply and demand with lower price and profit
Myristic Acid	2	<ul style="list-style-type: none"> • Market demand (2013~ 23 k tons), 80% from domestic supply and 20% import • Relatively high entrance barrier and high technology requirement • Concentrated local production, 2 key suppliers have 80-90% share of local output • Balanced supply and demand with highest price and profit

Competitive intensity*: 1 = Least intense, 2 = medium intensive 3 = Most intense

Criteria: competitors, entrance barrier, supplying and demanding, technology requirement, pricing competition, etc.



Attractiveness Rating Model by Products

Factors Colors	Market Potential Assessment						Competitive intensity	
	CAGR 09-13	Supply and Demand	Raw Material	Application	Forecasting CAGR 14-18	Total	Competitive Intensity	Total
Weight	0.2	0.3	0.1	0.1	0.3	1.0	1	1
Stearic Acid	1	1	3	3	1	1.4	3	3
Lauric Acid	3	3	1	2	3	2.7	2	2
Palmitic Acid	2	2	3	2	2	2.1	2	2
Myristic Acid	2	2	1	1	2	1.6	2	2

Scores: High = 3; Medium = 2; Low = 1

CAGR: 1 = CAGR<5-9%; 2 = CAGR between 10%-15%; 3 = CAGR>15%

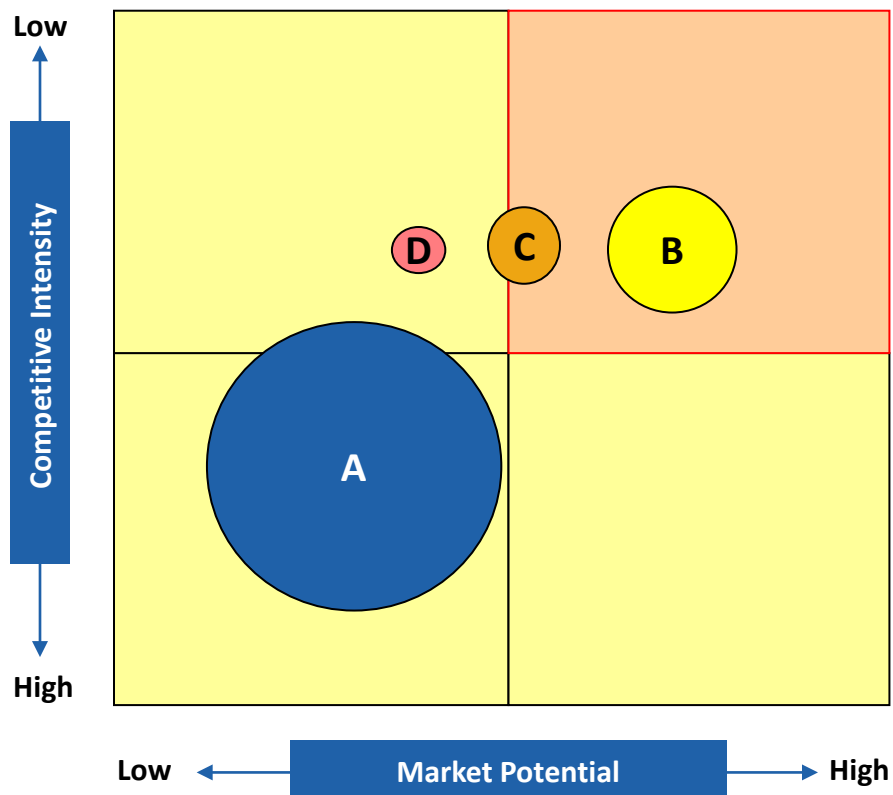
Raw Material: 1 = Shortage of raw material, 2 = Balanced raw material supply, 3 = Rich raw material supply

Application: 1= Niche application, 2 = Medium application, 3 = Broad application

Supply and Demand: 1 = Supply is more than demand; 2 = Supply equals demand; 3 = Supply is less than demand

Growth Forecasting (2014-2018 CAGR): 1 = 1-5%; 2 = between 6%-9%; 3 = above 10%

Attractiveness Analysis by Products



Note: Bubble size represents market size in 2013

A - Stearic Acid

B - Lauric Acid

C - Palmitic Acid

D - Myristic Acid

- Lauric acid is expected to have higher market potential and relative lower competitive intensity because market demand exceeds supply
- Although stearic acid has relatively large market size, but has intensive competition, and it is matured with low market potential because of excessive supply and demand
- Palmitic acid and myristic acid both have medium market potential and relative lower competitive intensity, but have small market size due to limited application and balanced supply and demand

Conclusion – Challenges and Opportunities of China Fatty Acid Market

By Products



Challenges

- Over capacity and low margin of stearic acid limit its potential
- Small market size and medium growth of palmitic and myristic acid are not attractive for producers
- Intensive competition on pricing among large and numerous local producers

Opportunities

- Lauric acid is attractive due to lower competitive intensity, higher profit and high entrance barrier
- To develop specific products with better performance targeting different applications
- Product innovation by functions and new segments will build more opportunities

Challenges

- Government control policies on real estate in the last 2 years negatively impact related application industries
- Strict environmental policies on paper and textile have negative impacts
- Steady growth of automotive is another challenge for fatty acid

Opportunities

- Rapid growth of household chemicals is an opportunity for fatty acid
- Substitute of petroleum based surfactant in household chemicals results opportunities
- Jiangsu, Zhejiang, Shanghai and Guangdong provinces are key production centers of household chemicals

By Applications



Martec is a reputable B2B market research and strategic consultancy firm with 30 years' history

Dennis Liu, **Managing Director**, Martec Shanghai



M.S.

Statistics

Katholieke University of
Leuven, Belgium

B.A.

Economics

Chongqing Technology and
Business University, China

Dennis is the Managing Director of Martec Shanghai. He has over 10 years of strategic consulting and market research experiences gained from multinational consulting firms. He has worked within a wide spectrum of industries, including chemical, lubricant, food & beverage, and other industries. He has been in charge of project management, client communication and consulting services for a variety of multinational companies, including DSM, Basf, DuPont, Henkel, Akzo Nobel, Eastman Nestlé, Coca-Cola, PepsiCo and other clients.

Dennis' experience includes working on market insights and strategic consulting projects related to market entry strategy, market sizing, competitive intelligence, value chain analysis, etc. His expertise lies in converting client's issues into effective market research, which is then transformed into actionable marketing and business recommendations.



Contact Information

Dennis Liu

TEL: 0086 21 6246 2121 ext. 228

DL: 0086 21 6246 2779

FAX: 0086 21 6246 2066

Email: dennis.liu@martecgroup.com

