China Pesticides Manufacturing Capability

Current and Future

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China Pesticides Industry System

- Have stepped into the legal road

- More than 20 departments relate to pesticides
China Pesticides Industry-Registration

- Registrant of pesticides: 2,100+ (105 foreign companies)
- Technical materials registrant : 675
- Formulation registrant: 2,000+
- Registration approved: 34,000+
- Active ingredients: 600+
- Public company: 44
Production and export of pesticides in China
Production of pesticides in China

Pesticides Output in China (Unit: 1000 tons)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungicides</td>
<td>152</td>
<td>203</td>
<td>230</td>
<td>182</td>
<td>160</td>
</tr>
<tr>
<td>Insecticides</td>
<td>673</td>
<td>613</td>
<td>561</td>
<td>513</td>
<td>409</td>
</tr>
<tr>
<td>Herbicides</td>
<td>1,657</td>
<td>1,800</td>
<td>1,803</td>
<td>1,774</td>
<td>1,507</td>
</tr>
</tbody>
</table>

Data Source: 国家统计局
China Pesticides Industry-Export

Pesticides exported from China in 2015 (Unit: 1000 tons)

- **Formulation**
- **Technical Material**

- **180+ countries and regions**
## Product exported from China in 2015

- More than 400 A.I. exported
- Quantity and Price both felled
- Technical Material Export

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity (1,000 tons)</th>
<th>Growth</th>
<th>Amount (Million USD)</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>654</td>
<td></td>
<td>3,919</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>742.6</td>
<td>13.55%</td>
<td>5,121</td>
<td>30.66%</td>
</tr>
<tr>
<td>2013</td>
<td>629.3</td>
<td>-15.26%</td>
<td>5,082</td>
<td>-0.75%</td>
</tr>
<tr>
<td>2014</td>
<td>616.8</td>
<td>-1.98%</td>
<td>5,028</td>
<td>-1.06%</td>
</tr>
<tr>
<td>2015</td>
<td>545.6</td>
<td>-11.54%</td>
<td>4,261</td>
<td>-15.27%</td>
</tr>
</tbody>
</table>

Data Source: ICAMA
Product exported from China in 2015

Formulation Export

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity (1,000 tons)</th>
<th>Growth</th>
<th>Amount (Million USD)</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>754.8</td>
<td></td>
<td>2,280</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>856.8</td>
<td>13.52%</td>
<td>2,742</td>
<td>20.30%</td>
</tr>
<tr>
<td>2013</td>
<td>992.7</td>
<td>15.86%</td>
<td>3,441</td>
<td>25.47%</td>
</tr>
<tr>
<td>2014</td>
<td>1,024.9</td>
<td>3.25%</td>
<td>3,732</td>
<td>8.46%</td>
</tr>
<tr>
<td>2015</td>
<td>963.8</td>
<td>-5.96%</td>
<td>3,022</td>
<td>-19.02%</td>
</tr>
</tbody>
</table>

Data Source: ICMA
## Product exported from China in 2015

### Top 10 active ingredient exported from China

<table>
<thead>
<tr>
<th>No.</th>
<th>Product</th>
<th>Registration</th>
<th>Quantity (1,000 tons)</th>
<th>Growth</th>
<th>Amount (Million USD)</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Glyphosate</td>
<td>1,079</td>
<td>526.4</td>
<td>-14.53%</td>
<td>1,273</td>
<td>-39.24%</td>
</tr>
<tr>
<td>2</td>
<td>Paraquat</td>
<td>52</td>
<td>181.4</td>
<td>22.75%</td>
<td>443</td>
<td>-15.79%</td>
</tr>
<tr>
<td>3</td>
<td>Imidacloprid</td>
<td>1,290</td>
<td>21.7</td>
<td>-7.86%</td>
<td>224</td>
<td>-29.34%</td>
</tr>
<tr>
<td>4</td>
<td>Clethodim</td>
<td>133</td>
<td>16.8</td>
<td>52.42%</td>
<td>144</td>
<td>47.07%</td>
</tr>
<tr>
<td>5</td>
<td>Chlopyrifos</td>
<td>1,06</td>
<td>27.2</td>
<td>-24.71%</td>
<td>133</td>
<td>-27.47%</td>
</tr>
<tr>
<td>6</td>
<td>Atrazine</td>
<td>773</td>
<td>4.08</td>
<td>-14.95%</td>
<td>120</td>
<td>-30.49%</td>
</tr>
<tr>
<td>7</td>
<td>Dicamba</td>
<td>74</td>
<td>7.5</td>
<td>16.51%</td>
<td>117</td>
<td>5.55%</td>
</tr>
<tr>
<td>8</td>
<td>Abamectin</td>
<td>2492</td>
<td>10.4</td>
<td>8.18%</td>
<td>109</td>
<td>49.15%</td>
</tr>
<tr>
<td>9</td>
<td>Sulfentrazone</td>
<td>8</td>
<td>4.0</td>
<td>11.98%</td>
<td>106</td>
<td>9.46%</td>
</tr>
<tr>
<td>10</td>
<td>Chlorothalonil</td>
<td>276</td>
<td>24.6</td>
<td>13.45%</td>
<td>100</td>
<td>19.38%</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>6,282</strong></td>
<td><strong>860.8</strong></td>
<td></td>
<td><strong>2,769</strong></td>
<td></td>
</tr>
</tbody>
</table>
Top 20 countries import pesticides from China 2014

Data Source: ICAMA
Main South-east Asian countries import pesticides from China from Jan. to June, 2016 (Million USD)

Data Source:

AgroPages.com
<table>
<thead>
<tr>
<th>Pesticides</th>
<th>Jan.-June,2015</th>
<th>Jan.-June,2016</th>
<th>Change Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glyphosate</td>
<td>143.4</td>
<td>123.5</td>
<td>-13.87%</td>
</tr>
<tr>
<td>Paraquat</td>
<td>85.3</td>
<td>70.63</td>
<td>-17.20%</td>
</tr>
<tr>
<td>Chlopyrifos</td>
<td>25</td>
<td>19.58</td>
<td>-21.68%</td>
</tr>
<tr>
<td>Chlorantraniliprole</td>
<td>27.87</td>
<td>16.34</td>
<td>-41.37%</td>
</tr>
<tr>
<td>Imidacloprid</td>
<td>8.4</td>
<td>14.37</td>
<td>71.07%</td>
</tr>
<tr>
<td>Abamectin</td>
<td>12.24</td>
<td>12.48</td>
<td>1.96%</td>
</tr>
<tr>
<td>Mancozeb</td>
<td>4.77</td>
<td>11.13</td>
<td>133.33%</td>
</tr>
<tr>
<td>Carbendazim</td>
<td>7.12</td>
<td>9.85</td>
<td>38.34%</td>
</tr>
<tr>
<td>Tricyclazole</td>
<td>15.94</td>
<td>9.73</td>
<td>-38.96%</td>
</tr>
<tr>
<td>Atrazine</td>
<td>8.86</td>
<td>9.03</td>
<td>1.92%</td>
</tr>
<tr>
<td>Fipronil</td>
<td>8.17</td>
<td>8.7</td>
<td>6.49%</td>
</tr>
<tr>
<td>Ametryn</td>
<td>11.63</td>
<td>8.44</td>
<td>-27.43%</td>
</tr>
<tr>
<td>Es-Bioallethrin</td>
<td>2.34</td>
<td>6.99</td>
<td>198.72%</td>
</tr>
<tr>
<td>Emamectin benzoate</td>
<td>6.72</td>
<td>6.79</td>
<td>1.04%</td>
</tr>
<tr>
<td>Azoxystrobin</td>
<td>5.02</td>
<td>6.5</td>
<td>29.48%</td>
</tr>
<tr>
<td>Difenoconazole</td>
<td>5.45</td>
<td>6.46</td>
<td>18.53%</td>
</tr>
<tr>
<td>Glufosinate</td>
<td>8.31</td>
<td>6.06</td>
<td>-27.08%</td>
</tr>
<tr>
<td>Profenofos</td>
<td>4.79</td>
<td>6.04</td>
<td>26.10%</td>
</tr>
</tbody>
</table>

Main pesticides exported into South-east Asia from Jan. to June, 2016 (Million USD)

Data Source: World Agrochemical Yellow Pages Online
Hot topic 2016 in China Agriculture

- Internet Age--Intelligent Agriculture
Hot topic 2016 in China Agriculture

- Aerial Pesticide Application
  - 500+ Enterprises
  - Need 100,000 Smart Aircrafts
  - Formulation?
Hot topic 2016 in China Agriculture

- Internet Age
Hot topic 2016 in China Agriculture

- Internet Plus in Crop Protection
  - Innovation revolution
  - E-Business (B to C)
Hot topic 2016 in China Agriculture

- Internet Plus in Crop Protection
Hot topic 2016 in China Agriculture

- Internet Plus in Crop protection
Hot topic 2016 in China Agriculture

- Planting Technology & Crop Protection Service
Trend of China Pesticides Industry

- Environment protection: more and more strict supervision
- New generic product: Prothioconazole, Penoxsulam (20), Dinotefuran (31), Pyraclostrobin (181), Thiamethoxam (323), Azoxystrobin (462)
- Production: won’t add the amount of producer -1163 (MIIT)
- Risk Assessment or forbidden: Glyphosate, Neonicotine, Chlopyrifos, Paraquat
- Zero growth in pesticides application amount by 2020
  Pesticides application effective from 35% to 40%
Trend of China Pesticides Industry

- 13th five-year plan
- Supply-side reform policies: go to capacity, to inventory, to leverage, reduce costs, make short board
- New pesticides management regulatory in 2016
- The petrochemical industry Plan Action 2016-2018
- The planting structure adjustment plan 2016-2020
Key factors affecting the production & export

- Price of agricultural product
- Supply & Market Demand
- Policy - Tax
- Economic
- Environment supervision
- Weather - Climate: El Nino, La Nina, drought, rain storm, etc
- Raw material: Glycine, Liquid caustic soda, Triphen, Bromine, Hydroxytropone, Hydrazine hydrate
- Intermediate: Triazole, 3-cyanopyridine
- Exchange rate
Key factors affecting the production & export
Key factors affecting the production & export

- Environmental supervision tighten
  - Result of 1st Supervision: 8 provinces, 8, punish 3,422 persons, verbal warning 2,176 persons, fine 198 million RMB
  - 2nd Supervision: started until Dec. in 8 provinces (Beijing, Shanghai, Guangdong, Chongqing, Hubei, Gansu, Shaanxi)
  - Limit the production: Beijing, Hebei(3), Shanxi, Shandong(2), Henan, Sichuan
New Opportunity

Bio-stimulant

Seed Treatment

Soil Conditioner

Resistance Management

Bio-control Technology
New Opportunity

- Resistance management

Glyphosate Resistant Palmer Amaranth

Where is crop ??
There are currently **471 unique cases** (species x site of action) of herbicide resistant weeds globally, with **250 species** (145 dicots and 105 monocots). Weeds have evolved resistance to **23 of the 26 known herbicide sites of action and to 160 different herbicides**. Herbicide resistant weeds have been reported in **86 crops in 66 countries**.  

[http://weedscience.org](http://weedscience.org)
Number of Resistant Species for Several Herbicide Sites of Action (WSSA Codes)

- ACCase Inhibitors (1)
- ALS Inhibitors (2)
- Synthetic Auxins (4)
- EPSP Synthase Inhibitors (9)
- PSII Electron Diverter (22)
- Microtubule Inhibitors (3)
- HPPD Inhibitors (27)
- PSII Inhibitors (5, 6, 7)

Note: PSII Inhibitors Combined

Year:
- 1955
- 1965
- 1975
- 1985
- 1995
- 2005
- 2015

Number of Species:
- 0
- 20
- 40
- 60
- 80
- 100
- 120
- 140
- 160

Dr. Ian Heap, WeedScience.org 2016
Increase in Unique Resistant Cases for Selected Countries and Europe

- United States
- Australia
- Canada
- China
- Brazil
- Europe

Number of Unique Resistant Cases

Year


Dr. Ian Heap, WeedScience.org 2016
New Opportunity

- Resistance management
  - New A.I. to kill resistant weed
  - Mixture formulation to delay resistant and kill weed
  - Biocontrol
  - Professional in resistance management
New Opportunity

➢ Bio-stimulant

- Plant biostimulants contain substance(s) and/or micro-organisms whose function when applied to plants or the rhizosphere is to stimulate natural processes to enhance/benefit nutrient uptake, nutrient efficiency, tolerance to abiotic stress, and crop quality
- Biostimulants have no direct action against pests, and therefore do not fall within the regulatory framework of pesticides
- 2,524.02 million USD in 2019, growing 12.5% / year
New Opportunity

➢ Bio-stimulant

- The European Biostimulant Industry Council (EBIC) was founded in June 2011 as the European Biostimulant Industry Consortium and changed its name when it gained legal identity in 2013.

- China Biostimulants Development Alliance (CBDA) was founded in Dec. 02, 2016.
Application increase 15% per year

Sharing 3-4% of the crop protection market

Will share 10% of the crop protection in 10 years

Developing very fast in China

New Opportunity

- Biopesticides
  - Trichogramma
New Opportunity

- **Bio pesticides- Activator Protein**

- **IPP-CAAS+ Arysta--- Activator Protein**

ARYSTA LIFESCIENCE LICENSES PROPRIETARY IMMUNOPROTEIN BIOPESTICIDES FROM IPP

CARY, N.C. (March 9, 2016) - Arysta LifeScience recently signed a licensing agreement with the Institute of Plant Protection (IPP) granting Arysta LifeScience exclusive global access (excluding China) to certain protein technologies of IPP, one of which already has been successfully commercialized in China.

For more than 10 years, IPP, part of the Chinese Academy of Agricultural Science (CAAS), has been developing a platform for selecting, identifying, quantifying and patenting plant immunity inducers derived from fungal pathogens. One of these technologies is a protein from *Alternaria tenuissima* and identified as PeaT1. In June 2014, IPP formulated PeaT1 into an end-use product registered in China with ICAMA and launched it as the first plant immunoprotein biopesticide. In its first full year on the market, the product (marketed under the brand Alaling) generated sales in excess of US $10 million.
New Opportunity

- Biocontrol Technology-enterprises, R &D
New Opportunity

Seed Treatment Technology

- The sales of seed treatment agents in China in 2015 reached RMB 2.86 billion, up by 16.7% over the sales in 2014, will exceed RMB 5 billion by 2019.
- The global market value of seed treatment agents will reach 4.19 billion dollars by 2018.
New Opportunity

- Soil Conditioner

- 130 million hectares cultivated land in China
- 19.4% polluted
- 15 billion USD spent in soil conditioner every year in China
- More than 150 billion of the whole soil conditioner market in China
CAC
全球最大的农化贸易交流平台
Where the agrochemical world meets

2017年3月1-3日
1-3 Mar., 2017
上海新国际博览中心 N1-N5, E7
Hall N1-N5, E7 Shanghai New International Expo Centre

◆ 1,300  Exhibitors from over 20 countries & regions
◆ 30,000+ Industry professionals from over 120 countries & regions
◆ 10+  Professional Conferences
◆ www.cacshow.com
<table>
<thead>
<tr>
<th>Topic</th>
<th>Date &amp; Venue</th>
</tr>
</thead>
</table>
| **11th China International Forum on Development of Pesticide Industry** | Date: Feb. 28  
Venue: Shanghai Jumeirah Himalayas Hotel                                                  |
| **7th Beyond-Agriculture Seminar**                                   | Date: March 1  
Venue: Shanghai New International Expo Centre                                                |
| **3rd International Seminar on Seed Treatment Technology**           | Date: March 1  
Venue: Shanghai New International Expo Centre                                                |
| **6th China International Forum on Development of Bio-Control Technology** | Date: March 2  
Venue: Shanghai New International Expo Centre                                                |
| **9th World Academic Meeting for the Development of Pesticide Technologies & Applications** | Date: March 2  
Venue: Shanghai Jumeirah Himalayas Hotel                                                    |
Thanks for your attention