The Future of Fine Chemical Production

Chemical Production in Asia vs. the West

Production in Asia vs. the West - Fine chemicals are chemical substances that have a relatively high average price (similar to specialty chemicals), but they are sold based solely on a chemical specification, something they share with basic chemicals. Fig. 1 shows this classification along with some typical chemical examples for each segment.

Fine chemicals broadly share a number of characteristics (Pollak, 2007):

- Fine chemicals are produced in small quantities and have an average price above about $10 U.S. per kg.
- Fine chemicals are single, pure chemical substances that can be fully characterized and specified.
- Fine chemicals are generally produced in multipurpose plants employing multistep batch processes.
- There is a huge variety of fine chemicals, though of the ten thousands of different molecules, each individual chemical company tends to produce only a small share.
- The number of applications for each fine chemical tends to be quite limited compared to that of more basic chemicals, and for each individual fine chemical, there is only a limited number of suppliers.

The pharma industry is by far the largest customer of fine chemicals, globally accounting for about two-thirds of demand. Related life science areas (agrochemicals and animal health) account for more than half of the remainder, while there is also a broad range of other applications, e.g., in catalysts, dyestuffs, electronic chemicals, flavors, food additives, etc.

Where To Produce

What effect does all this have on where best to produce fine chemicals? Is it preferable to select production sites in countries such as India and China or in countries with more mature economies? A number of contradictory factors influence the overall balance.
Factors favoring production in Europe or the U.S. include:

- Raw materials costs (these are often higher in Asia because of added logistics costs).
- Stable energy supply (compared with the unstable supply particularly in India).
- Economic stability (as the sustainability of Asian economic growth is still questioned by some companies).
- Shorter supply chain and easier communication (as long as the majority of fine chemicals is still produced for Western markets).
- Easier monitoring of suppliers (for Western pharmaceutical companies).

On the other hand, the benefits of producing in Asia are getting more prominent:

- Salaries (though increasing faster than in the developed world) are still up to 90% lower, which leads to substantially lower overall labor costs even if adjusted for worker productivity. Salaries are quite relevant in fine chemicals production as the small amounts produced and the complex batch production process make it labor-intensive compared with basic chemicals.
- Lower investment costs per installed cubic meter of reactor capacity, with the difference ranging from a conservative estimate of 40% up to 60%.
- Lower costs to comply with local environmental regulation (this does not apply to all parameters, but in sum is still quite relevant).
- Fast-growing local market (for example, in China, recent growth of the pharmaceutical industry is about 15% per year, and the low amount of medicine spent per head compared with the Western world makes further strong growth very likely).

**Shifting Toward Asia**

From just examining these advantages and disadvantages of producing in Asia, it is difficult to come to a conclusion regarding the overall situation. However, it is telling that in the past few years, a number of fine chemicals units were sold and/or shifted to Asia. For example, in 2006 the pharma custom synthesis unit of Rhodia was bought by Shasun, an Indian API and intermediate producer. In the same year, the Chinese company Bluestar bought Adisseo, a producer of fine chemicals for animal nutrition. In 2008, two of the leading global chemical companies, Dow and BASF, sold some of their pharma production to the Indian pharma company Dr. Reddy’s (the U.K. units of Dowpharma small molecules and U.S. pharma contract manufacturing, respectively). And at the end of 2010, DSM effectively sold half of
its anti-infectives business to Sinochem by bringing the business into a joint venture.

**Consolidation and Technology Upgrades**

What can be expected for the near future of fine chemicals in China? There are a number of important trends. Among API producers, there is considerable consolidation.

Primarily, this takes place by the domestic market leaders acquiring secondary players - examples are the Sinopharma acquisition of China National Medicines or the Shanghai Pharma acquisition of Shanghai Zhongxi. At the same time, companies start focusing more on marketing and sales rather than just on the production of active ingredients. This is particularly pronounced among generics producers such as Harbin Pharmaceutical, which has started experimenting with direct sales. Other companies such as Lukang Pharmaceuticals have expanded their sales area within China and are also looking at export markets.

As in most segments of the Chinese chemical industry, improvement of ecological compliance is also a trend in fine chemicals, as seen in the implementation of a specific design code as well as the relocation of several major API producers. Finally, fine chemicals producers in China are actively upgrading their technology and investing in creating and protecting their intellectual property. For example, Hengrui Medicine claims to have 300 researchers, half of whom have a doctoral degree.

In light of these trends, how attractive are fine chemicals as an investment area in China? Several aspects indicate a promising development for the segment.

As mentioned above, the domestic pharma industry is growing rapidly, generating similarly high demand increases for active pharmaceutical ingredients, a key subsegment of fine chemicals.

Apart from the domestic pharmaceutical companies, there is also a strong and increasing presence of global pharma players similarly generating demand for APIs. By now, all top 20 global pharmaceutical companies have production in China, and foreign direct investment increased by 34% from 2008 to 2009. Costs are attractive as chemists in China still have comparatively low salaries. And the IP environment is indeed improving as Chinese companies more and more own their own intellectual property.

Finally, the competitive landscape of fine chemicals producers is improving. The industry is simultaneously consolidating, and the market share of SOEs is
decreasing (from 29% in 2007 to 20% in 2009), leading to a more level playing field.

**Domestic Advantage**

A final boost for fine chemicals in China comes from government support as outlined in the 12th Five-Year Plan. The plan foresees China's fine chemical production value to reach 1.6 trillion RMB in 2015, up 100% from the 2008 level, and a self-sufficiency level of 80% in 2015 (from 70% in 2009). So while the whole fine chemicals segment has bright prospects, it is the domestic companies that are likely to benefit most. On the other hand, in some areas such as agrochemicals, the share of high-end imported materials has been increasing in the past few years as grain growers increasingly pay attention to safety, efficiency and low toxicity. So the market for low-end fine chemicals (such as low-end pesticides) will shrink, allowing only those domestic companies that are capable of upgrading their technology in time to profit from the positive outlook for fine chemicals.

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