

Basic features, structure, worldwide sales, and competitive situation of the flavor and fragrance industry

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Flavors and fragrances make up a multitier industry consisting of

- Manufacturers of aroma chemicals and growers/processors of such products as natural essential oils, exudates, and secretions
- Compounders of finished flavors and fragrances sold to manufacturers of consumer goods
- Manufacturers of finished products (consumer and industrial goods) who compound flavors and fragrances as a relatively small part of their operations (captive manufacturing)

Essential oils and other natural products

Essential oils are volatile materials of vegetable origin that are isolated from particular plants and flowers mostly by steam distillation or solvent extraction. Some, however, are prepared by enfleurage, maceration, or expression. Although more than 3,000 essential oils have been identified, only 150-200 are commercial products. Other natural products include the absolutes, concentrates, concretes, and terpenic by-products of essential oils, exudates from resins, gums balsams, beans, and other plants, as well as animal secretions such as ambergris, castor, civet, or musk. Many of the exudates and most of the animal secretions are used as fixatives rather than odors in fragrance compounds. All the natural products suffer from uncertainties of supply. Many come from remote countries. Their availability varies with weather and other factors and their prices fluctuate sharply.

Traditionally, essential oils have been hand gathered in the most primitive way from wild plants. Gradually, farms and plantations were developed for the more popular natural products and over the last fifty years this has become the sole source. However, even here, a great deal of hand labor is required with the result that most of this agricultural production has moved from France, England, and Holland to North Africa, the Near East, Far East, and South America.

However, a notable recent fact is the development of highly sophisticated and mechanized agricultural and processing systems for certain materials, such as mint and clary sage in the United States and lavender in France and Australia. This intensive mechanized production of essential oils will undoubtedly increase as this system provides highly cost effective and dependable sources of materials.

Aroma chemicals

Aroma chemicals are fine composition/commodity chemicals serving as raw materials in the compounding of finished flavors and fragrances. In general, composition/commodity chemicals have only low or average profitability. Contributing factors are dependence on costs and availability of raw materials, increased labor and operating costs, increased capital and interest costs, under-utilization of capacity, heavy competition, and government regulations.

Composition/commodity chemicals are used for their chemical configuration. Their chemical structure is clearly known and adequately described by specification. As a result, the products of competitive manufacturers are usually interchangeable for most important uses. There are some aroma chemicals which are specialties due to patents, or to very special technology which removes them from the category of commodity chemicals.

Aroma chemicals include such products as isolates from, and derivatives of, essential oils; and synthetic chemicals either being substitutes (copies/duplicates) of naturally occurring materials such as essential oils, or having no counterpart in nature. Aroma chemicals are used as raw materials in flavor and fragrance compounds as well as in other industries. About 3,000 aroma chemicals are commercially available, but only a few hundred are used in important quantities.

Synthetic aroma chemicals were first used as inexpensive extenders of natural odors. However, today the majority of fragrance compounds are predominantly synthetic. Nevertheless, synthetics have not been able to duplicate exactly the odors of natural materials because of impurities in the natural products which add a certain richness to their aroma. But on the other hand synthetics are freely available, uniform in composition, and more stable in price. When compounded with natural products, they can both enhance the natural products and add new notes never obtained in natural products.

Almost all fragrance compounds and many flavor compounds are now blends (mixtures) of synthetics and naturals. In the future, natural products will probably be limited to those materials that are irreplaceable or that are extracted from crops that can be cultivated easily and cheaply.

Aroma chemicals are relatively low-volume undifferentiated fine composition/commodity chemicals with specific chemical formulas. Frequently, each product is used in a number of different applications. All are sold to specifications for what they contain chemically. Often, they are sold to a relatively small number of customers, each buying a moderate to low volume. Research and development are oriented towards the discovery of new synthetic aroma chemicals—either imitating natural essential oils or inventing new flavors and fragrances—as well as towards process technology. The chief technical skills required are synthesis and process engineering. The major focus is on raw materials (chemical intermediates) and improved or completely new processes. Accordingly, the research and development facilities consist mainly of synthetic laboratories as well as pilot and semi-works plants. Aroma chemicals require a relatively high capital investment for the plant. However, marketing costs, selling, and general and administrative expenses are relatively low. Their marketing requires highly skilled personnel in such areas as industrial market research, market development, and technical service.

Flavor and fragrance compounds

Flavor compounds are complex mixtures (blends) of natural extracts and aroma chemicals mostly diluted in a permitted solvent such as food grade ethanol, propylene glycol or isopropanol, edible oil, or absorbed in an edible carrier such as vegetable gums. They impart a desired flavor to, or reinforce natural flavors in, a great variety of different end-products, such as processed foodstuffs, beverages, and tobacco.

Fragrance compounds are complex mixtures (blends) of natural essential oils, their derivatives (absolutes, concentrates) and byproducts as well as aroma chemicals. Highly refined ethyl alcohol is almost always the supporting vehicle for fragrances. Fragrance compounds impart a desired odor to a great variety of different endproducts, such as soaps, detergents, cosmetics, toiletries, and candles.

Flavor and fragrance compounds are relatively low-volume, differentiated products designed to solve specific customer problems. They are either produced with real differences, or are at least marketed with imputed differences, and each one is generally used in only one or at most a few different applications. They are nearly always sold on the basis of how they perform in use and not to composition specifications. They are formulated in relatively low volumes and often sold to a relatively large number of customers, each buying a relatively low volume. Their main orientation is towards the customer.

The principal technical skills required in the production of flavor and fragrance compounds are formulation and knowledge of end uses, and the major focus is on practical know-how of operation conditions in the customer's plant. Research and development facilities are chiefly application laboratories.

The compounding plants usually produce many different products (several thousands), each in relatively

low volume. Production units are comparatively small and equipment is relatively simple, but with flexibility to produce hundreds of compounds. Consequently, they require a relatively low capital investment. However, marketing costs, selling, and general and administrative expenses are relatively high.

Flavor and fragrance compounds are mostly multipurpose additives and service items. Their marketing requires extensive knowledge of customer needs, high technical service, and extensive use of industrial and consumer market research, sales promotion, and market development. They are sold on performance and differentiated from competitive products, and are generally characterized (in contrast to commodity chemicals) by

- above average growth
- less dependence on raw material costs
- greater freedom in pricing and shelter from the vagaries of price attrition and supply/demand imbalances
- higher prices and value added
- reduced capital intensity
- higher operating and gross profit margins and returns on investment
- differentiation from competing products
- relatively short life-cycles
- heavy promotion to the end user

These components are considered specialty/performance chemical systems that are mixtures of different materials prepared by blending, to produce very specific functional results. Specifications therefore roughly describe the product and its effect, rather than precisely identifying it. Since the variations within the product, which are somewhat different for each producer, often influence performance, it is much more difficult to successfully interchange the apparently similar products from different suppliers. Thus, the distinguishing feature of any specialty business is that competitive products are not freely interchangeable. This factor has a profound effect on the proper management of a specialty operation.

When, however, the products of competitors become interchangeable, the product has passed from a specialty/performance to a composition/commodity chemical for that use, though the same product or related products may continue to be performance chemicals for other uses. It is important for managers to be aware of such transition points, for it can be very painful to retain the higher costs of supporting performance chemical sales while only receiving the lower profit margins of composition chemicals.

The orientation of a specialty/performance chemical company is a significant factor in its profitability and growth rate. The primary orientations are

- functionally-oriented (beverage flavors, etc.). These companies make a variety of different products and offer them to a variety of markets, but all for a similar function.
- product-oriented (pyrazine manufacturing, cheese flavors, etc.). These companies make products that are closely related, but offer them for different uses in different industries. Such companies may spe-

Table 1. Worldwide consumption (merchant sales) of flavors and fragrances

(Essential oils and other natural products, synthetic aroma chemicals, flavor and fragrance compounds)

(In millions of current U.S. dollars)

Regions	1970	1978	1985	Long-term average annual growth rate	
				1978/1970 (Historical)	1985/1978 (Projected)
Europe					
West, North and South Europe	400 (30.8%)	1,100 (30.6%)	2,200 (28.2%)	13.5%	10.5%
East Europe	150 (11.5%)	400 (11.1%)	850 (10.9%)	13.0%	11.4%
Total Europe	550 (42.3%)	1,500 (41.7%)	3,050 (39.1%)	13.4%	10.7%
North America (USA & Canada)	350 (26.9%)	900 (25.0%)	1,700 (21.8%)	12.5%	9.5%
Japan	130 (10.0%)	450 (12.5%)	1,050 (13.5%)	16.9%	12.9%
Rest of world *	270 (20.8%)	750 (20.8%)	2,000 (25.6%)	13.6%	15.0%
World Total	1,300 (100.0%)	3,600 (100.0%)	7,800 (100.0%)	13.6%	11.7%

* - Africa, Asia, Latin America, Middle East, Oceania.

Comments: The above figures are computed in current U.S. dollars and they thus include the effects of worldwide inflation as well as exchange rate fluctuations and distortions. Worldwide real average annual growth (excluding inflation and distortions), on the contrary, is estimated at about 4% to 5% for the historical 1978/1970 period and 3% to 4% for the projected 1985/1978 period.

Source: Compiled by Givaudan's Marketing Research Service, Geneva (Mr. L. Unger, Manager).

cialize in derivatives of a raw material or in a process.

- market-oriented (bakery flavors, soap fragrances, etc.). These companies offer products prepared by a variety of technologies for many different uses, but all within a given specific market or application.

Many companies, of course, have a hybrid orientation. That is, while they may be primarily functionally oriented, they may concentrate their activities in a few specific markets, or they may be primarily product oriented, but with emphasis on a few specific functions.

During the last decade, many composition/commodity chemical manufacturers seeking opportunities for improved profits have moved into specialty/performance chemicals. Not all of these ventures have been successful, often because the composition/commodity manufacturer lacked sufficient understanding of the specialty/performance chemicals business; the unique requirements of specialty/performance chemicals production and marketing were not appreciated; suitable segments and entry modes were not clearly identified; insufficient evaluation of strengths and weaknesses was made; and diversification plans lacked sufficient depth.

Captive manufacturing

As in other multitier industries, many companies operate at one or more levels, manufacturing many types of products, while other companies are highly specialized and manufacture only a few types of products. Most of the larger flavor and fragrance companies manufacture both aroma chemicals and compounds. Yet there are many small- and middle-sized companies that specialize in either the raw materials or the compounds. However, there is a growing trend for raw material suppliers to integrate forward to compounding, the more profitable part of the busi-

ness.

Flavor and fragrance is one of the few remaining areas inside the specialty chemical industry in which small- and middle-sized privately owned companies still thrive. However, there is a growing acquisition process. In recent years, the flavor and fragrance industry has seen a number of acquisitions by large corporations, particularly in the United States. This trend is accelerating and will continue to do so. Nevertheless, history shows several examples of ill-fated acquisitions experienced by many of the larger diversified chemical companies (mostly outsiders to the flavor and fragrance field).

A substantial part of the flavor and fragrance compounding business is in the hands of very large consumer goods companies who compound fragrances and flavors as a relatively small part of their overall manufacturing operations. In regard to fragrances, these companies include Procter & Gamble, Colgate, Unilever, and Henkel. Although fragrance compounding is a relatively small part of these companies' operations, their fragrance compounding activities would place these four companies into the ten largest fragrance manufacturers of the world. Other smaller captive compounding companies include such perfume houses as Rochas, Dior, Guerlain, 4711, and others. Although these companies are well known internationally, their fragrance compounding activities are relatively small. In the case of flavors, it is also true that the largest flavor manufacturing operations are probably captive within the beverage and tobacco industry.

It should be recognized that this description of the flavor industry does not include the use of a number of very high volume natural products that are used as flavors but not compounded. These would include such products as peppermint and spearmint oils, cocoa powder, licorice extract, nut pastes, orange, lemon, and lime oils, as well as the spice industry

Table II. Worldwide merchant sales of flavors and fragrances in 1979 by major companies

(In millions of current U.S. dollars)

Companies	Flavors *	Fragrances *	Total flavors and fragrances	Other products	Total sales
1. International Flavors & Fragrances (USA)	137 (34%)	272 (66%)	409 (100%)	---	409 (100%)
2. Givaudan (Switzerland)	53 (19%)	214 (76%)	267 (95%)	14 (5%)	281 (100%)
3. Naarden (Netherlands)	80 (36%)	107 (48%)	187 (84%)	35 (16%)	222 (100%)
4. Haarmann & Reimer (Germany)	68 (38%)	93 (52%)	161 (90%)	18 (10%)	179 (100%)
5. Firmenich (Switzerland)	69 (43%)	92 (57%)	161 (100%)	---	161 (100%)
6. Bush, Boake & Allen (U.K.)	47 (40%)	58 (50%)	105 (90%)	12 (10%)	117 (100%)
7. Dragoco (Germany)	45 (40%)	56 (50%)	101 (90%)	11 (10%)	112 (100%)
8. Takasago (Japan)	40 (36%)	71 (64%)	111 (100%)	---	111 (100%)
9. Universal Flavors & Fragrances (USA)	67 (75%)	23 (25%)	90 (100%)	---	90 (100%)
10. Fritzsche, Dodge & Olcott (USA)	56 (66%)	29 (34%)	85 (100%)	---	85 (100%)
11. Roure Bertrand Dupont (France)	8 (10%)	73 (90%)	81 (100%)	---	81 (100%)
12. Proprietary Perfumes Ltd (U.K.)	---	71 (100%)	71 (100%)	---	71 (100%)
13. Norda (USA)	39 (56%)	31 (44%)	70 (100%)	---	70 (100%)
Total	709 (36%)	1,190 (60%)	1,899 (96%)	90 (4%)	1,989 (100%)

* - Includes: Essential oils and other natural products; aroma chemicals; compounds. Flavors: 709 (37%) and Fragrances: 1,190 (63%); Total: 1,899 (100%).

Source: Compiled by Givaudan's Marketing Research Service, Geneva (Mr. L. Unger, Manager).

generally. These are all natural products that are normally bought and used by the food and beverage manufacturer as individual products and used individually and directly in their finished foods without separate flavor compounding.

Sales of flavors and fragrances

Worldwide consumption of flavors and fragrances amounted to about \$3,600 million in 1978 against \$1,300 million in 1970, thus growing at a historical long-term average annual rate of 13.6%. Growth rates among the various regions of the world, however, were sensibly different during this period, ranging from 16.9% for Japan to 12.5% for North America. The long-term average annual growth rate of worldwide sales is projected at 11.7% for the period 1978-1985, leading to about \$7,800 million in 1985. Again, growth rates among the various regions will be sensibly different. For more details, see Table I.

Competition is extremely keen in flavors and fragrances. Worldwide, there are perhaps more than 1,000 manufacturers of flavors and fragrances. However, the number of firms with sales in excess of \$1 million per year narrows the field to about 200-300 firms with perhaps 30 to 40 really significant competitors. The most important international companies (in 1979) are listed below (see Table II).

- International Flavors & Fragrances (USA)
- Givaudan (Switzerland)
- Naarden (Netherlands)
- Haarmann & Reimer (Germany)
- Firmenich (Switzerland)
- Bush, Boake Allen (UK)
- Dragoco (Germany)
- Takasago (Japan)
- Universal Flavors & Fragrances (USA)
- Fritzsche, Dodge & Olcott (USA)
- Roure Bertrand Dupont (France)
- Proprietary Perfumes Ltd (UK)

Norda (USA)

The large international companies strive to gain higher market shares through major plant expansions, acquisitions, and sophisticated marketing. Indeed, the progressive acquisition process of small- and middle-sized privately owned companies by larger corporations continues and will probably accelerate in the future.

Worldwide, the split between flavors and fragrances is estimated at around 40%-60% in value. For 1978, this breakdown was fragrances: \$2,200 million (60%) and flavors: \$1,400 million (40%); world total \$3,600 million (100%). For more details, see Table II.

The attraction of North America and Europe lies not only in the sheer size of these markets, which account together for about 56% of total worldwide consumption of flavor and fragrances. In the fragrance business, a solid stake in these two markets is essential for worldwide success. The supply of fragrances to major international customer companies such as Procter & Gamble, Colgate-Palmolive, Unilever, Henkel, L'Oreal, and Reckitt & Colman can bring repeat orders across the world. However, flavors are, by contrast, far less uniform. The nearest comparison is with soft drinks, but here the major international customer companies supply their own flavors.

Although flavors and fragrances are, by their nature, relatively high value products inside the specialty chemical industry, and transport costs are therefore relatively unimportant, the major international flavor and fragrance houses tend to have production plants in as many of the main regions as possible. This reflects the particular nature of the supplier-customer relationship in this industry, with the level of service and the ability to develop unique products a crucial part of the supplier's job. Often a supplier may have been serving the same company for many years.

Flavors and fragrances tend to show better margins and rates of return than their customer industries on

the one side, or chemicals on the other. However, activity in flavors and fragrances does not always involve high margins. Thus, several major international companies are believed to have profitability problems. On the other hand, a number of much smaller companies enjoy good margins. The lesson seems to be that to be profitable in the flavor and fragrance industry, one either has to be large and have a particular segment in certain markets, or small to middle-sized and very specialized, both in geography and product range.

Basic features of flavor and fragrance demand

Demand for flavors and fragrances is constantly growing because these specialty/performance chemicals are incorporated mostly in consumer and industrial nondurable goods, most of which are everyday necessities. Thus, demand for flavors and fragrance is essentially a derived demand.

Demand for flavors and fragrances depends directly on three variable factors.

- changes in the production of flavored/fragranced end products
- changes in flavor/fragrance concentrations
- new product introductions in flavored/fragranced consumer and industrial goods

New product introductions are particularly important to the growth of flavored/fragranced consumer and industrial goods. New and improved products will continue to find a market as consumers seek greater utility, convenience, safety, novelty, variety, and, in the case of cosmetics, elegance. Fashion, and the success of a competitor's new products, produce large but often short-lived trends in consumer buying, especially in cosmetics and toiletries. It is a fact that a great number of new products must be experimented with, because only about 20% to 30% of them eventually succeed in gaining enough consumer interest to remain in the market. On the other hand, it is also a fact that new product introductions vary with general economic conditions.

Indirectly, demand for flavors and fragrances depends on demand for flavored/fragranced consumer and industrial goods which, in turn, depend on such variable factors as

- population growth
- changes in nominal/real household and personal disposable income
- changes in prices of flavored/fragranced consumer goods relative to prices of other consumer goods competing for the consumer's purchasing power
- share of, and changes in, consumer spending on flavored/fragranced consumer goods
- changes in users of flavored/fragranced consumer goods
- habit
- dynamic marketing of flavored/fragranced goods
- consumerism
- government regulations

It seems that the most important factors are changes in disposable income, relative prices, and users. Furthermore, the role of habit in the demand for consumer nondurables is also widely known. With repeated use, a product becomes a necessity, thus causing further purchases. Economic research has shown that it is one of the strongest single factors in spending on consumer nondurable goods. All this has led to the image of the processed foodstuffs, beverages, tobacco, soap, detergent, cosmetic, and toiletries industries as industries that are relatively recession-resistant (but not recession-proof). That is, they do not react to short-run cyclical fluctuations in aggregate demand.

Indeed, the majority of flavored/fragranced consumer goods sell at the lower end of the consumer price scale and they are relatively immune to economic cycles and upheavals. Even in times of political or economic turmoil or inflation or recession, gratification of such senses as taste and smell will not be denied.

The middle- and long-term growth outlook (until 1985) for the flavor and fragrance industry is, therefore, relatively favorable. Industry sales will probably grow at an average annual rate of 11% (in dollars), including inflationary and exchange rate effects. Profits, however, will rise more slowly, possibly not more than 5% to 6% for the same time span due to increasing operating costs such as growing compliance with regulatory legislative bodies, rising allocation for research and development, continuing reformulations, and rising energy and raw material costs. Despite some negative factors that have appeared during the last years (such as increasing interrelationship with the economic cycle, higher levels of maturity and saturation of some flavored/fragranced consumer goods in western world countries), the positive factors will probably offset the negative ones.

The middle- and long-term growth is anticipated to stem from higher flavor/fragrance concentration levels and higher user and purchase-frequency levels of flavored/fragranced consumer goods as living standards increase, especially in the poorer countries. Increasing emphasis on better nutrition, body care, hygiene, ecology, and pollution, among other factors, pioneering efforts to counteract malodors in the environment, and significant expansion of flavored/fragranced consumer goods production in the developing countries of Africa, Asia, Latin America, and the Middle East will also affect growth.

As to flavors, it should be remembered that the shift from home-processed to factory-processed foods began the dynamic growth of the flavor industry nearly 100 years ago in Western countries. A similar transition during the next decade or more in the developing countries of Asia, Africa, Latin America, and the Middle East will provide a powerful impetus for the continued global growth of flavors. Equally, the worldwide flavoring of high-protein low-cost foodstuffs—for the purpose of enhancing their palatability—will significantly contribute to the future growth of the flavor industry.