

Fragrances & Flavors Industry Opportunities in Education, Training & Research

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GLOBAL INDUSTRY OVERVIEW

The Fragrance & Flavor (F&F) industry overall includes fragrances, flavors, essential oils, aroma chemicals and specialty aroma ingredients. The Food, Home, & Personal Care Industries are the largest consumers of flavors & fragrances. The beverages and confectionary industry segment drive the world flavors market and likewise increasing demand for cosmetics, household, and personal care products drives the fragrance industry.

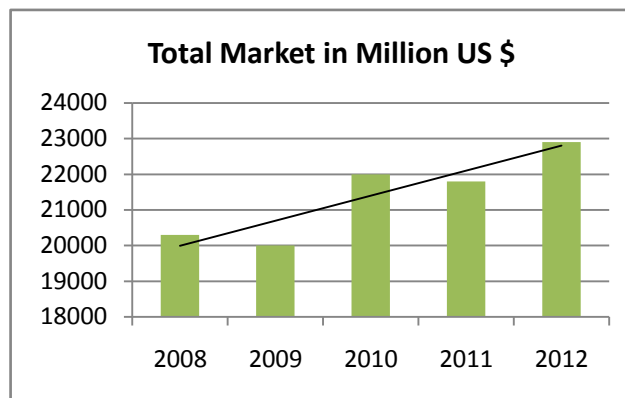
The F&F industry as on October 10, 2013 is around US\$23 billion, steadily growing over the years. The chart below will indicate the major players and their value share estimates in % in this industry.

Company	2008 %	2009 %	2010 %	2011 %	2012 %
Givaudan	18.90	19.10	20.60	19.10	20.30
Firmenich	12.20	13.90	13.50	12.90	13.80
IFF	11.80	11.60	11.90	12.80	12.30
Symrise	9.10	9.80	9.60	9.40	10.00
Takasago	6.70	6.10	6.40	6.80	6.00
Wild Flavors	NA	NA	NA	3.90	4.80
Mane SA	2.30	2.70	2.90	3.20	3.70
Sensient Flavors	2.90	2.70	2.60	2.80	3.20
Frutarom	2.30	2.10	2.10	2.40	2.70
Robertet SA	2.10	2.20	2.20	2.20	2.30
T. Hasegawa	2.50	2.30	2.50	2.60	2.20
Top 11 Totals	70.70	72.60	74.50	78.70	81.30
All Others	29.30	27.40	25.50	21.30	18.70
Total Market in billion US\$	20.3	20.00	22.00	21.80	22.90

The aggregate share of the top 11 players in the F&F industry is valued at US\$ 22.9 billion today i.e., about 81% of the world market. Givaudan lead this industry with a market share of about 20.3% with the 11th player only having a share of about 2.2% market. The remaining 20 of the market is highly fragmented with numerous players.

Trends indicate that the world F&F demand including, essential oils, natural extracts, and aroma chemicals will rise 4.4% a year to reach \$26.5 billion in 2016. The increasing consumer interest in natural products will drive value demand forward, as natural flavor and fragrance ingredients tend to be more expensive.

Increasing packaged food manufacturing, and consumption of convenience products requiring higher flavor usage, will also drive faster growth especially in developing countries.



Rising personal consumption expenditures in emerging economies will stimulate use of Home & Personal Care products contributing to industrial growth.

INDIAN INDUSTRY OVERVIEW

The Indian F&F market is highly fragmented with both purchasers and suppliers ranging from multinational companies and large Indian industrial houses to small-scale industrial units, and local manufacturers. This is particularly applicable to the flavor industry and more particularly to savory, bakery and confectionary segments where the manufacturing process is relatively simple in comparison to others. **In this case, even local eateries and individual homes contribute significantly to the increase in market.**

The Indian F&F market as per estimates is about 400 million US\$. Similar to the international market, there is almost equal distribution of the total Indian F&F market between flavors and fragrances.

International houses account for about 70% of the organised Indian market while Indian companies like M/s., S. H. Kelkar & Company Pvt. Ltd., Oriental Aromatics Ltd., Ultra International Ltd., Khattri Fragrances & Flavours Limited, Gupta & Company (P) Ltd., Sachee Aromatics Limited, Aarav Fragrances, etc., cater to the rest of the market. Almost all Indian companies have private ownership; and they are not very open to disclosing actual / true sales volume figures. M/s. S. H. Kelkar & Company Pvt. Ltd. leads the sales among Indian F&F companies followed by other houses as mentioned above.

Some Indian FMCG companies who use fragrances and flavors in their products also make their own fragrance blends, by purchasing individual aroma chemicals and mixing them. Mixing various fragrances purchased from different fragrance houses along with their in-house compounds is also a different way to make finished fragrance blends. Hence, the Indian F&F industry sales figures estimates given above could be 10% to 15% higher. In any case, competition is only likely to intensify with more and more international players expanding their footprints in the country.

FRAGRANCES TODAY

Fragrances creations earlier were of wholly natural ingredients. Perfumers used essential oils, resins, absolutes, extracts from plants and ingredients obtained from animal origin. Materials obtained by physical processing with no change occurring in the ingredients during the extraction process were commonly in use for fragrances creation. The dwindling agricultural forestlands because of encroaching civilization, ever increasing world population, have all reduced the natural flora and fauna. The declining natural vegetation has invariably lowered the supply of natural fragrance ingredients for fragrance manufacture. Limited availability, of natural fragrance ingredients has now led to their lower relative concentrations in fragrance formulas. **Sadly, nowadays almost 90-95% of the raw materials used in fragrance creation are synthetics and only 5-10% is of natural origin.** Consumers' fascination of fragrances has only increased with time as the manufacture of fragranced personal care, laundry care, and household care products is ever growing. In addition, fragrances are present in a number of other commercial products such as tissues, candles, baby diapers, etc. Fragrances have also made their way into scented stationeries, and trash bags that now come in fragranced versions. **Nowadays marketers sell products with fragrances as their main selling point with entire advertising campaigns centering on the fragrance odor of a product.** The consumer trend too has been towards more powerful and long lasting fragrances.

FLAVORS TODAY

Rapidly rising incomes and urbanization is spurring interest in convenient packaged foods and fast food. This will boost growth in the food and beverage market, as packaged goods require high flavoring loadings to preserve taste lost during large-scale manufacturing. The Food and beverage industry will continue to remain the key driver. The flourishing food industry and increasing demand for processed foods, the F&F industry in India will witness strong growth. This growth will drive the widespread use of flavors in processed food, snacks, soft drinks, candy and confectioneries, meat and seafood products, sauces and condiments, etc. Expansion of fortified food, as well

as beverages, will provide opportunities, since flavors are required to cover up the off-tastes of vitamins, minerals, antioxidants and other added ingredients.

Increasing global interest in products that promote health benefits will also drive demand in both the food and beverage, as masking flavors are necessary to use in conjunction with antioxidants and vitamins to reduce off-tastes and off-odor. Furthermore, efforts to reduce calories, salt, and fat in foods will increase demand for flavors to improve the taste of those products. There has been a rising global interest in natural, organic, products across a number of consumer markets, including food and beverages and industry will have to take efforts to meet this demand by use of by essential oils and natural extracts, in product categories.

VALUE DRIVERS

India is the country of the future. Its economy inspite of minor glitches is robust, with strong fundamentals, and it will continue to be one of the fastest growing countries in the world in years to come. The vast growing Indian market is a reality. Increasing number of households, professionals, businesspersons, along with a thriving consumer finance business, have led to a steep rise in the number of consumers with greater disposable income growth in the last decade. India offers one of the largest markets in the world for products of mass consumption such as clothing, footwear, detergents, cooking oil, etc. 70% of Indians live, in villages and rural areas, have witnessed rapid market growth in recent times, largely due to agricultural growth, income redistribution, and the high proliferation by the audio-visual media.

India has extensive sales and distribution network with over one million market intermediaries, like wholesalers, stock keepers, transporters, and retailers who are involved in the distribution of a variety of consumer goods, and marketers use this network access, that is spread over 35 states & union territories, comprising of 640 districts, 5924 sub-districts, 7,935 towns and 6,40,867 villages. Population growth rate in the last decade was 17.64% with rural areas at 12.18% and urban areas around 31.80%.

Urbanization rate is set to increase to 45% in the next 40 years. Urban areas have a range of distribution outlets, like supermarkets and large stores in addition to smaller neighborhood retail stores, small shops that are part of the local supply network and cater to almost every individual in India. The banking network with consumer financing is now ably supporting this extensive sales and distribution network.

Cultural diversity, varying climatic conditions, influx of foreign influences over various periods of our country's history is all responsible for complex

fragrance preferences of the consumers across India.

Today the electronic media, faster travel and communications, and easy access to latest trends and globally influence keeps young urban Indians abreast with latest international preferences to flaunt a modern and fashionable image. Even though it is true that odor has limited influence, but still we cannot undervalue its importance as a determining factor in interpersonal relationships.

The dramatic increase in the use of fine fragrances in recent times reveals the effort taken by people at large to smell nice, not only to please themselves, but more importantly to please others. When people greet each another, in addition to the inherent human body odor, externally applied body fragrances also comes to the fore to make a final impression. Can we disregard this?

Companies today are currently strategizing ways to strengthen their presence and are focusing their sales expansion plans to cater to increasing demand from tier II and tier III cities that eventually drive growth. To quote, as an example in the fragrance market, companies are launching a range of affordable deodorants, perfumes, and colognes for consumers willing to spending on fragrances to stay well groomed. In short, companies are taking all efforts to fulfill consumer demand.

In absolute terms, & Fragrances Rising incomes, better education, and more awareness will mean a higher inclination to spend on 'Quality Lifestyle' products for home and health, personal grooming and social symbols. Regular use of flavors and fragrances in a product is no longer a luxury but a necessity for consumer acceptance. Flavors and fragrances that are novel will continue to be popular and gain better and faster acceptance.

India traditionally used more of natural flavors as Indians preferred freshly prepared foodstuff unlike in Europe and America where artificial or synthetic flavor were in demand due to the use of canned frozen food and beverage. This is likely to continue. However, due to fundamental changes in lifestyles certain food items, beverages, confectionaries, bakery, and snacks that generally use artificial additives will increase giving a fillip to the flavor industry in times to come and the demand for flavors will continue to rise as the processed food market continues to grow

CHALLENGE TO INDIA AND STEPS NEEDED FOR SUCCESS

Even today, some Indian companies extract essential oils in India, in an unorganized manner.

This industry can grow only by following scientific means and methods of propagation and extraction.

Systematic exploitation of aromatic plants by Indian Industry can bring a great economic advantage to our country as; we bring more plants that are aromatic under use.

Setting up of small-scale essential oil extraction and processing units can provide ample employment opportunities for the rural youths. Once these units come into operation, local farmers can be motivated easily for large-scale cultivation of selected aromatic crops according to the prevalent agro-climatic conditions.

During the initial stages raw material requirement of these industries can be met either through collection from wild habitats or through intercropping cultivation in agricultural farms. Either way, it will provide employment to millions of youths from farming communities.

Value addition through post harvest technology can also generate further agricultural income and employment opportunities to many.

Conservation of aromatic plants by promoting sustainable genetic management schemes at the community level is necessary. This can bring equitable distribution of acquired benefits and improve livelihoods of the rural poor.

We can achieve this only if we provide proper training for cultivation, primary processing, grading, packaging, storage and marketing to rural cultivators. In addition, bio-partnership, networking and providing access to information between the prime stakeholders namely local communities, R&D scientists and industry is necessary.

Generating a strong database on genetic resources of aromatic plants and creation of protectorates/biosphere reserves to conserve the genetic stock of endangered species (in situ conservation) is essential.

Sufficient quantity of quality seed and planting material of aromatic plants for cultivators should be available.

Newer agro-techniques and technology should be developed, assessed, and refined for large-scale cultivation to maintain sustainability and competitive advantage.

We need to adopt tissue culture transplantation techniques for species whose propagation through seeding is not easy.

We need to establish Analytical laboratories for testing and maintaining quality controls.

Give utmost priority to develop skilled work force to handle all aspects of aromatic plants through intensive training programs.

Evolving a long-term human resource development strategy for continuous improvement in competence and skills should ensure upgrading technical knowledge for field personnel.

India's agro climatic conditions provide an ideal habitat for the natural growth of a variety of aromatic plants and herbs. The climatic diversity also offers large opportunities for domestication of many herbs that are in short supply and have to be imported. This will not only supplement internal demands but also save substantial foreign exchange.

The fact that derivatives of aromatic plants are non-narcotic without noticeable side effects, even if used for a prolonged time, in permissible doses fuels its demand around the world.

Cultivation, processing, and use of aromatic plants are a great potential for employment generation in rural areas. Our tilt and liking towards synthetic aroma chemicals is slowly destroying nature's gift of aromatic plant species used for fragrance creation in ancient India, which grew abundantly in our forests.

Another reason for the disappearance of many plant species is our ignorance with regard to its identity and use. In our ignorance, we are destroying many useful species of aromatic plants as useless weeds leaving with no scope for its regeneration.

In spite of our country's innumerable benefits there exists constraints like inequitable trade practices allowing only a very small amount of profit to percolate down to the collectors, cultivators and harvesters of aromatic plants.

Inadequate government funding and prioritization, insufficient information sharing and co-ordination among stake-holders, poor mechanism to improve resource conservation, livelihood security in rural and marginal communities, lack of co-ordination of any holistic research program, weak linkages between stakeholders right from production to consumption value chain are all responsible in impeding the growth of this industry.

India is no exception to the global phenomenon of environmental problems and depletion of natural plant resources. However, we need to exploit the rich diversity in aromatic plants that nature has provided India judiciously without disturbing the ecological balance.

Harness resources for economic development, and at the same time their regeneration, preservation, and propagation and maintain it for sustenance.

The restoration and preservation of our biological heritage is a challenge to all our planners, administrators, scientists, industrialist, farmers,

entrepreneurs, common individuals, and citizens at large.

Efforts to coordinate development of quality planting material, encouraging commercial cultivation, value addition through processing, liaison with industries, and trade including export, is necessary to boost India's economy and our standard of living.

Markets today demand new value. Innovation and creativity are important factors for survival. We have to adopt technologies that guarantee performance.

Introducing a new essential oil or aroma chemical or herbal extract is not easy. We need to perform a lot more tests today to obtain authentic certifications from recognized laboratories on safety aspects. These tests are quite elaborate and require funding.

R&D activities cannot remain limited to merely identifying a new strain of an essential oil bearing crop or new source of existing aroma chemical because of its major component.

We have to carry out thorough investigation on every new strain for all major, minor and trace constituents by advance chromatographic techniques to collaborate their safety data.

Similarly need of clinical studies is necessary to gather authenticated results on functionality and efficacy of ingredients done, in order to make claims on products.

A strong R&D backup, good marketing network and financial strength is required for achieving success. However, the current position of India in this trade is not at its potential best.

We need look into the following aspects with all seriousness for proper development of the Indian essential oil, fragrance & flavor industry to happen.

- Make substantial investment in Research & Development activities in consultation with Indian industry.
- Promote & develop quality products with safety & efficacy.
- Tap on the non-utilized and underutilized natural resources by promoting farmers to cultivate aromatic crops with proper market interventions.
- Carry out the standardization of number of synthetic & natural aroma products.
- Create a platform where farmer, producer, trader, user, exporter, R&D organization, educational organizations, & government can meet and share their views.

- Set up of technology diffusion centers in different parts of country according to area specific needs.
- Create a special task force to gather detail information about Indian natural aromatic plants and take steps to use them for industry development.
- Make use of Bio and information technology
- Harmonize Indian industry with global safety and regulatory norms.
- Harmonize all chemical classification and communication elements, including labels and safety data sheets, with global requirements to ensure information on physical hazards and toxicity from chemicals is available to enhance protection of human health and the environment during handling, transport, and use at the national, regional, and global level, a very important factor for trade facilitation.
- Create well-trained human resource at every level right from worker at laboratory, field, production, sales, & marketing.
- Set up a specific university to train students to train Indian students to create exotic fragrances and flavors for the industry, and establish a talent pool for the Indian and the global market.

Today, in the industry mostly persons trained within the industry meet real practical need for human resource. The following organizations are developing human resource in F&F industry.

1. ISIPCA in collaboration with University of Versailles, France
2. Grasse Institute of Perfumery, France
3. Perfumers World, Bangkok
4. University of Plymouth, U K
5. Institute of Chemical Technology, Mumbai, India
6. V. G. Vaze College, Mumbai, India
7. Forest Research Institute, Dehradun in collaboration with FFDC Kannauj, India
8. Fragrance & Flavor Development Centre, Kannauj, India

The courses are ranging from few months two years and are of PG diploma/diploma/certificate, except for M. Tech. (Perfumery & Flavors) from ICT, Mumbai that is master degree course.

There is no degree course in the subjects cited above and there are no organizations capable of offering the courses with all the practical aspects right from cultivation to creation of fragrance & flavor all under one roof.

In nutshell there is vacuum worldwide for an organization who can offer certificate, diploma & degree course covering all aspects with

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practical exposure to students at each and every stage so that they can be a part of industry/research immediately after course completion.

Some important aspects where training and expertise is necessary for F & F industry include,

1. Basic science involved in essential oils, fragrance & flavors
2. Cultivation, post harvest management
3. Processing of aromatic plants for production of natural fragrant materials
4. Fragrance & flavor raw materials & classifications
5. Quality Assessment of fragrant raw materials
6. Value addition in essential oil
7. Processing & production of aroma chemicals
8. Chemistry of Ingredients in modern aroma industry
9. Modern analytical techniques for fragrant raw materials
10. Safety & Toxicology of fragrant raw materials
11. Study of stability of fragrant and flavor raw materials in different end products
12. Fragrance & flavor creation: Principles & Methods
13. Application and evaluation of fragrances & flavors
14. Consumer insights and market research
15. Biotechnology of natural fragrant raw materials
16. Research Techniques in fragrant & flavor raw materials,
17. Advances in Aromatherapy
18. Packaging, transport & export in aroma trade
19. Marketing, finance, management of intellectual property rights
20. Management Principles for Aroma trade

India, the land of opportunities will truly be one of the world's largest economies, in terms of GDP, and purchasing power parity in future.

The Indian population of over one billion, in this millennium will be extremely young, with 70% under 34 years of age unlike in the developed countries.

It is up to all of us, to grab this opportunity and choose whether we need to strive back to our pre-eminent position of being the world leader of the natural fragrance industry as in ancient times or rest satisfied by becoming the world's largest consumer of imported fragrances and fragranced products.

Additional Reading:

1. *Career in the Fragrance and Flavor Industry*, by Sitaram Dixit; *Chemical Weekly*; August 11, 2009
2. *The Sense that Excites* by Sitaram Dixit; *Chemical Weekly*; December 23, 2003
3. *The Incredible Sense of Smell* by Sitaram Dixit; *Chemical Weekly*; December 30, 2003