

Fragrances & Flavors Industry in India

Opportunities & Challenges

Dr. Sitaram Dixit

www.sitaramdixit.4t.com, www.dixitsitaram.itgo.com

GLOBAL INDUSTRY OVERVIEW

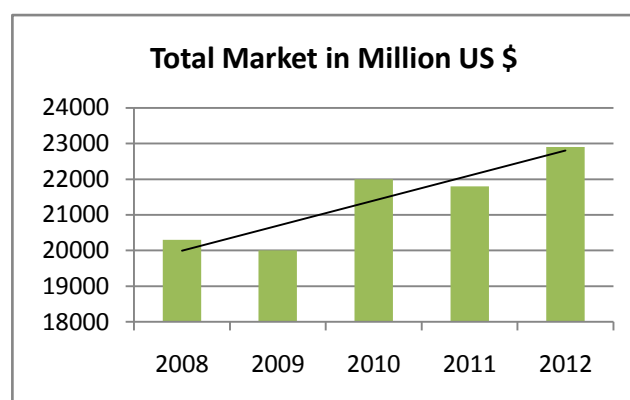
The Fragrance & Flavor (F&F) industry overall includes fragrances, flavors, essential oils, aroma chemicals and specialty aroma ingredients. The Food, Home, & Personal Care Industries are the largest consumers of flavors & fragrances. The beverages and confectionary industry segment drive the world flavors 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.

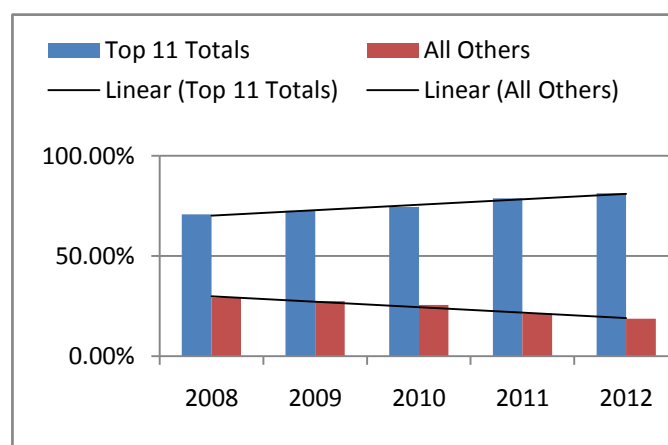
Company	2008 %	2009 %	2010 %	2011 %	2012 %
Givaudan	18.90	19.10	20.60	19.10	20.30
Firmenich	12.20	13.90	13.50	12.90	13.80
IFF	11.80	11.60	11.90	12.80	12.30
Symrise	9.10	9.80	9.60	9.40	10.00
Takasago	6.70	6.10	6.40	6.80	6.00
Wild Flavors	NA	NA	NA	3.90	4.80
Mane SA	2.30	2.70	2.90	3.20	3.70
Sensient Flavors	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\$ 22.9b 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.



It is interesting to see that the top 11 (MNC's) are increasing their market share where as all others i.e., (small & medium enterprises) are actually losing market share steadily over the years.

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 is 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. In comparison, there is better consolidation in the fragrance market, with larger players like Unilever, Godrej, Dabur, Reckitt Benkeiser, Wipro, Henkel, ITC, etc., generating most of the sales.

• Competitive Environment

The top ten companies in the list above have had a substantial presence and business in India for many years now. Other international F&F houses in the last ten years or so have also setup shop and are active in the Indian 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 flavours 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 flavours 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.

• Why India lost its leadership position in the world fragrance market?

Development of the science of perfumery and fragrance creation were so high that India was in a pivotal place in the ancient cosmetic and perfumery world economy. Botanist Buchanan, in his detailed informative paper "*Account of the manufacture of rose water and other perfumes at Patna in 1811 AD and its bearing on the history of the Indian perfumery industry*", gives very interesting insights on the state of the perfumery industry, in Kannauj of Mythili (Kanyakubja as mentioned in Sanskrit literature) and the importance given to it by the Europeans. He further states that the industrial revolution that took place in Europe was largely due to the awakened interest of the European nations to the excellence of the Indian perfumery industry and their zest to compete with it.

Buchanan's paper infers that their keenness to compete with India and dislodge its premier position resulted in the successful penetration of the world fragrance market that was once a domain of the Indian perfumery industry and where India enjoyed complete monopoly. Interestingly India which was once a world leader of the fragrance industry is today one of the world's largest consumers of foreign fragrances and fragranced products. The rapid advancements made by the European industry in the 20th century due to modern scientific thought

and knowledge made sure that India missed all that it had treasured over centuries. Sadly today sandal, jasmine and herbal-related fragrances, and spice-based flavor products distinguish the country's capability in the F&F industry.

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 civilisation, 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 centring on the fragrance odour 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. The credit card culture too has shown tremendous growth in recent years, with several international companies like Diners Club, Visa International, Master Card, and American Express Bank players vying for business along with several Indian banks.

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?

CURRENT STRATEGIES IN INDIA BY INTERNATIONAL F&F COMPANIES

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.

Companies are exploring newer variants, thereby creating product differentiation to spur consumption. People today are willing to experiment with new, more exotic flavors rather than opting for basic flavors such as vanilla and chocolate. Examples include flavors that combine Tahitian vanilla with honey or white chocolate with cranberries. Consumers nowadays are becoming progressively health conscious, providing ample opportunity for "health and wellness" food flavors like Blueberry, Grape, Aloe Vera, Pine bark, Soy, etc. They are also exploring the natural and functional flavors segment for more variety and marketers are tapping this high potential segment. The concept of natural and traditional Indian herb extracts is also gaining significance in fragrance markets.

Symrise has set up its first perfumery school outside Germany. The Chennai, school intends to train Indian students to create exotic fragrances and flavors for the industry, strengthening its presence in India, as well as establish a talent pool for the Indian and the global market. International Flavour and Fragrance (IFF) India Ltd., recently announced the opening of a new facility for creating new flavors

and fragrances for its business unit in Gurgaon. Major FMCG players like, Hindustan Unilever plans to capitalize on the fragrance segment through its deodorant range. ITC is looking to launch into the aromatherapy market by introducing customized agarbattis.

Leading global F&F players, already having presence in India, are all now envisioning India as an important manufacturing destination. The country has a strong potential to become a manufacturing hub, given the abundant availability of raw materials essential for the industry.

FACTORS AFFECTING THE INDIA F&F INDUSTRY

Traditionally flavors and fragrances commanded a high price due to the flavorist or perfumer's artistic ability and difficulty in creation. Flavors and fragrances now have very similar requirements as consumer goods. It too requires investments in marketing and presentation, for commercial success. This does not mean that flavors and fragrances are far from artistic creation but merely states that we need to follow all commercial rules during creation while retaining the same quality followed in earlier times.

Clients today believe flavors and fragrances to be simple mixtures of aromatic materials and not a harmonious accord achieved with difficulty. We grade flavors and fragrances according to the price of the raw material used to create them, as it is easy to decipher the composition with modern analytical methods. The cost of creation, technical application and research, evaluation and panel testing largely ignored in the calculations.

Ironically, without hesitation one purchases a marble carving or a canvas painting at exorbitant price, much more than the cost of the marble stone or the cost of canvas and paint, but is very much reluctant to spend similarly on a flavor and fragrance purchase.

In the last decade, prices offered to fragrance and flavor houses by FMCG manufacturers to supply flavor and fragrances have consistently gone down. Raw materials costs for manufacturing FMCG are rising. FMCG manufacturers are unable to pass on the same to consumers by increasing product costs. FMCG manufacturer strongly resist, price increases requested by flavor and fragrances houses ignoring the genuine concern of the F&F industry affected by the overall increase in the prices of aroma and flavor chemicals that are the building blocks of their products. Price increases and fluctuations in petrochemical industry that are precursors in the manufacturing of aroma chemicals have also squeezed profit margins substantially for the F&F industry. Domestic players also face increased competition from MNC's aroma chemical manufacturers with advanced R&D facilities. This exerts added pressure on these players to accelerate the improvement of their research and technological facilities, as they are still in the upgrading process.

Flavor and fragrance market in the developed nations have fully matured with sales almost stagnant. Global F&F industries in order to grow are increasingly looking at developing nations, especially India, China, and countries of the erstwhile USSR. The Indian market is still in its nascent stage and there is a long way to traverse before it fully matures. The lowering of margins have forced many global F&F manufacturers to look at India and China as sourcing centers for essential oils, and for manufacturing quality aroma and flavor chemicals required by their creative setups around the world.

Fragrance and flavor manufacturing is not complex. It involves simple mixing and making a blend of about 10-100 different chemical ingredients in the right proportions. On these, some may be natural and some synthetic. Improving fragrance delivery systems using techniques like encapsulation, sustained release, or using newer methods in

counteracting specific malodors, etc., are some areas where F&F houses are concentrating to maintain their existing business and to increase profit margins. The development of captive aroma chemicals is another way larger F&F houses use to maintain leadership position and prevent cheaper imitation of their fragrance creations. One major method global FMCG manufacturers and F&F houses use is to make a long term purchase arrangement among themselves which permit large discounts for FMCG manufacturer and in lieu an assured amount of global business for the F&F houses. This core listing process procedures adopted by most international FMCG manufacturers and F&F houses, effectively thwarts attempts by Indian F&F manufacturer's acquire or corner their existing business making these exclusive only to the selected few.

The Indian F&F industry lacks buying power to influence the prices of raw materials consumed in the manufacturing of aroma chemicals. Polymers and paints, industry that require larger quantities of these common raw materials are, in a better position to bargain with suppliers.

Regulatory issues also limit the availability of raw materials in certain areas. The availability of CST, a by-product of the paper industry, which is a vital source of raw materials for the fragrance industry, is restricted due to environmental issues related to the use of wood pulp in the manufacture of paper. Similarly, for export of Guaiacawood oil from Paraguay, getting a mandatory 'Cites' certificate causes tighter supplies and higher prices. Inefficiencies with respect to taxation and cost of electricity to SME's in some of the cities also exist. In Ghaziabad, for example, the Mandi Samiti levies a 4% tax on methanol, while large companies worth 100 million Indian rupees do not have to follow the same regulation, according to local dealers.

SAFETY – RULES & REGULATIONS

Another important factor in the F&F industry is the strict safety norms,

restricting the use of many chemicals, either due to governmental regulations or due to self-regulation by the industry itself. For example, some fragrance ingredients are not, permitted for use on grounds of safety, while some others are restricted in their level of use in fragrances, depending on the intended end-use. Products intended to remain on skin viz.; "leave-on" products, such as body, lotions have stricter restrictions than those for products that are, washed off the skin viz., household products (e.g., floor cleaners) for which there are little or no intentional skin contact. IFRA (International Fragrance Association) guides the F&F industry by providing guidelines for fragrance ingredients as defined and published in the IFRA safety standards.

The 'American Fragrance Manufacturing Association' established the 'Research Institute for Fragrance Materials (RIFM)', in 1966 in USA as a non-profit making, independent body whose task is to evaluate the safety of fragrance ingredients. The types of test carried out on behalf of RIFM include oral toxicity, irritation skin sensitization, and photo-toxicity (sensitization induced by sunlight). RIFM also gathers information from other independent research, published scientific literature and aroma chemical manufacturers. An independent panel of international experts in toxicology, pharmacology, and dermatology reviews the test results. RIFM publishes the results as monographs in the journal "Food & Chemical Toxicology". In case there is any cause for concern about the use of an ingredient, it is immediately, indicated in the publications by RIFM through an Advisory Letter, which is acted on by IFRA. Environmental safety is another area of growing concern. RIFM has also started to evaluate the environmental impact of many of the high volume ingredients.

All flavoring substances are, regulated by legislation, issued by FDA. Government departments that control the safety of foods is also responsible to control the

safety of flavors used in the food products. The flavor industry too over the years have accumulated a lot of information and data regarding use, occurrence, biological properties and all the information have been used to carry out independent safety evaluation by various experts. The flavor industry is also, regulated by GRAS regulations of the 'Flavor and Extract Manufacturer's Association (FEMA)'.

The manufacturers of flavor ingredients around the world have set up the 'International Organization of the Flavor Industry (IOFI)' based in Geneva, Switzerland. IOFI issues guidelines to the members, makes recommendations, draw up rules and make available their expertise, to harmonize the diverse rules in various countries for the betterment of the industry and for the benefit of the consumer.

Intergovernmental organizations like European Flavor & Fragrance Association, European Council, The Scientific Committee for Food of European Commission (SCF), The Food, and Agriculture Organization (FAO), and the World Health Organization (WHO) of the United Nations also conduct independent study group to evaluate the safety of the flavoring substances. Fragrances and Flavor Association of India (FAFAI), and Essential Oil Association of India (EOAI), are similar bodies set up by the Indian Industry.

F&F OPERATIONS

The flavor and fragrance industry operations are minuscule when compared to the bulk chemical industry. The flavor and fragrance industry still uses, batch process unlike the continuous processing methods prevalent in the chemical industry. Effective management of inventory is very important in the F&F setup. The flavor and fragrance industry requires a lot more number of ingredients albeit in smaller quantities in order to create a single flavor or fragrance. Although raw materials available for use by the F&F industry exceed 3,000, most

companies have only around 1,000 materials for use. It is difficult for industry players to maintain sufficient inventory at all times. This, coupled with a high dependence on imports, leads to long lead times and higher costs for local manufacturers. This explains why every F&F companies manufacture their products only on receipt of confirmed purchase orders, to meet their needs of keeping low inventories of raw materials. Inventory management thus is a very important function and streamlining systems and their operations necessary. Maintaining sufficient quantities of aroma materials at all times is difficult without accurate forecasting of the fragrance or flavor need by the purchasing companies. This leads to longer lead times, sometimes almost six to eight weeks for fragrance or flavor supply, which can be critical to end-user FMCG manufacturers.

Environmental conditions, political upheavals, dependence on imports, are other reasons responsible in affecting availability and cost of aroma ingredients thereby impacting, supply and demand. This has led the global F&F houses to source the raw materials from Indian suppliers, which help in bringing down the cost for procurement and reducing lead times.

The F&F industry today is at the crossroads finding it tough with rising input costs and dropping prices of the compounded products. However, still there is growth in absolute terms. 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.

The demand for flavors will also continue to rise as the processed food market continues to grow. 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.

OUTLOOK

Competition is intense in the F & F industry in terms of quality, price, and services rendered to the end user. They can achieve a competitive edge only by use of captive and exclusive ingredient technology that will make ones flavor and fragrance unique and difficult to copy. Cost control will continue to play a very important role if one has to maintain a leading position.

In recent times, we have seen economic crisis, conflicts, and confrontation, among nations. As the outcome of all these upheavals, independent nations have become interdependent. Energy conservation, environmental concerns, communications, and the will to survive have made commercial co-existence on one another crucial. The ability to function on a truly integrated world scale and service globally will be a key in gaining core listing and long-term contracts mutually beneficial to the F&F houses and the FMCG players.

Today commercial economic power is valued more than brute military strength. Today we are witnessing economic construction in India, China, and countries of the erstwhile Soviet Union. The large population in these nations is fast emerging into major marketing opportunities for all marketers. Speed in building up sizeable presence and market strength in these regions of Asia is critical for survival in view of the dwindling or near stagnant markets of the west.

Despite the presence of many international and Indian F&F houses, we can expect, more F&F houses will attempt to penetrate the Indian market and get their share of the pie. Locally grown private Indian F&F houses too are consolidating and regrouping themselves professionally to measure up to the international houses. With the Indian FMCG market, heating up it is highly unlikely that local Indian F&F companies will lag behind in giving a fair competition to the global giants.

CONSTRAINTS & OPPORTUNITIES

Global changes occurring due to eroding forest cover has led to increased environmental awareness, among people. This in turn has led to a change in consumer perception and redefining of priorities to save the eco system and reemphasize the need to encourage use of forestland plant based products.

God almighty has blessed India with different types of soils and climates that supports growth of a variety of Plants. We find more than 18000 native species in India of which 1300 species on the last count contain aromas. In spite of its rich natural forest vegetation and a home of many exotic natural plants, India cultivates only limited items of commercial value. There is a great scope for commercial cultivation of several aromatic crops in India as there is always a market demand for new and specific aroma ingredients for development of new exotic fragrances.

Although fragrance usage is on an increase, the availability of quality plant oils for fragrance creation is not sufficient to keep pace with the demand generated. Plant cultivation largely depends on climatic conditions. Yields vary, year after year. Availability differs season to season. Unpredictable quality and odor profile is common. Price fluctuation is rampant. Supply and demand is rarely even. Advent of biotechnology and modern farming techniques has to an extent insulated plant cultivation from the vagaries of nature but this is far too less to make a

significant difference on the industry dependence on nature.

Aromatic crop cultivation freshens up the polluted atmosphere and is a renewable resource in the ecosystem. The crops are useful even after the extraction of available essential oil, as we can convert them into artificial board for carpentry, used as fodder for animals, or decomposed to get bio-fertilizers. Essential oil bearing crop cultivation and processing is labor-intensive generating good employment opportunities.

One of the major challenges for players in this industry is to address constantly changing flavor and fragrance demands from consumers. MNC players in the industry extensively focus on undertaking surveys, conducting internal research and forming consumer panels. Cost involved in the research and tracking of consumer trends through exhibitions and trade shows is substantial. Indian companies however, do not give much importance to this aspect of their business, which negatively affects their F&F creations.

Speed in fulfilling customer's demand of right F&F creations is very important to this market. Customers do not want to miss on trends. Indian companies lack behind in this aspect especially so in the latest international trends, concepts, ideas and products. Global competition is the major challenge. As most international companies have advanced R&D facilities, which India companies is truly lacking. Adhering to stringent safety norms issued by the Flavor and Extract Manufacturers' Association (FEMA) and International Fragrance Association (IFRA), in the use of several chemicals in the production and creation of flavors and fragrances is also important to Indian F&F houses to succeed at the global level.

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.

Interestingly IFRA prohibits 30% of the natural ingredients by on grounds of safety or otherwise. 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 coordination 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, entrepreneurs, farmers, and to 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 through 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.

International companies succeed because of strong R & D backup, marketing network and financial strength. The current position of India in this trade is not at its potential. 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.
- Create well-trained human resource at every level right from worker at laboratory, field, production, sales, & marketing.
- 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.

- 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.
- 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.

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.



Dr. Sitaram Dixit is an independent Consultant for Fragrance, Home, Fabric, & Personal Care Chemical Industry. He has over 26 years, industrial experience in the Household and Personal Care. He has published more than 90 papers in Scientific Journals of national and international repute.