

Market overview

Vibrant India

Opportunities for the flavor and fragrance industry

Sant Sanganeria, Ultra International Limited

India is the country of the future. Its economy is robust, with strong fundamentals, and it will continue to be one of the fastest growing markets in the world for years to come.

The vast and growing Indian market is a reality. The increase in the number of households headed by salary earners, professionals and businesspersons, along with the emergence of a thriving consumer finance business, have led to a steep rise in the number of consumers with greater disposable incomes. Expenditures on consumer durables has shown an impressive growth in the last decade.

India offers one of the largest markets in the world for manufactured items of mass consumption such as clothing, footwear, detergents and cooking oil. Markets for most manufactured products have exhibited strong growth rates over the past few years. Rural areas, where more than 70 percent of Indians live, have witnessed rapid market growth recently, driven largely by agricultural growth, income redistribution and inroads made by the audio-visual media. The rural share of the durable goods market has steadily grown over the last few years.

India has an extensive sales and distribution network. It is estimated that there are more than one million market inter-

mediaries, such as wholesalers, stockists, transporters and retailers, who are involved in the distribution of a variety of consumer goods. Marketers use this network to access nearly 3,800 cities and towns and more than 500,000 villages.

While urban areas have a range of distribution outlets, from large supermarkets and superstores to the smaller neighborhood retail stores, small shops that are part of the local supply network cater to almost every village in India.

The widespread sales and distribution network is supported by an equally extensive banking network. Consumer financing is an accepted form of consumer

Indian economy at a glance

- Currently the fourth largest economy in PPP terms after the United States, China and Japan
- Will be the third largest economy in terms of GDP in next five years
- Second fastest growing economy in the world
- Among top 10 FDI destinations
- Stable government with second stage reforms in place
- Growing corporate ethics (labor laws, child labor regulations, environmental protection lobby, intellectual and real property rights responsibility)
- Major tax reforms including implementation of VAT
- US\$130 billion investment plans in infrastructure in next five years
- Second most attractive developing market, ahead of China
- Fifth amongst the 30 emerging markets for new retailers to enter

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Sant Sanganeria on India's promising place in future food processing (dairy, beverage, confectionary, etc.), cosmetics and toiletries markets.

Indian aromatic chemical industry overview

- Total US\$150 million
- Fragmented and dispersed: multiple products and multi-faceted
- Aroma chemicals sold directly to large customers and through distribution channels
- Distribution channels mostly consist of stockists and dealers spread all over India addressing small segments and retail markets
- Industry structure highly fragmented and widely dispersed
- Western India accounts for 45-50 percent of total Indian chemical industry
- Both large and small players in fine and speciality bulk chemicals
- Presence of many multinational companies

goods marketing in India. The presence of several non-banking finance companies engaged in leasing and higher purchase activities has given a fillip to consumer goods sales. The credit card market has also shown tremendous growth in recent years. The products of several international companies like Diners Club, Visa International, MasterCard and American Express are widely used in India along with the cards offered by several domestic banks.

The Economy

India has the largest youth population in the world — more than 867 million people below 45 years of

age! In addition, there are more English speaking citizens in India than in the whole of Europe. A 300-million-odd middle class is another striking feature. With more than 600 million effective consumers by year 2010, India will emerge as one of the largest consumer markets of the world.

Essential Oil Industry

With the initiation of the globalization process and the falling values of currency from Southeast Asian countries (India's immediate competitors for agricultural produces), it has become imperative for India to look into priorities with more serious thought.

The increasing importance of natural extracts as pharmaceutical and natural cosmetic aids, in addition to their use as nutraceutical ingredients in recent times, has opened up new vistas for this sector beyond their widespread use as flavor and fragrance ingredients. India will play a dominant role in the production and processing of these natural extracts. The country's biodiversity, coupled with competent scientific force, make India the most likely choice to become a leader in aroma business in the coming years.

Our national vision is to become a significant global player by the year 2010, increasing our share in world markets from 16 percent to 25-30 percent. We have to spread our technology base and utilize the

Estimated world production of essential oils for processing (isolates/chemicals)

T-1

Essential oil	Quantity in tons	Producing countries
basil	350	India
camphor	100	China, Taiwan
cedarwood	2000	China, United States, India
citrata	40	India
citrodora	1000	China, Brazil, India, South Africa
citronella	2000	China, Indonesia, India
clove leaf/stem	1500	Madagascar, Indonesia, Tanzania
eucalyptus	3000	China, India, Australia
howood/leaf	100	China
jamrosa	20	India
lemongrass	300	India, China, Guatemala
<i>Litsea cubeba</i>	600	China
<i>Mentha arvensis</i>	18,000	India, China, Brazil
sassafras	400	China, Brazil
orange	50,000	Brazil, United States, Israel, Argentina
Others	1000	
Total	80,410	

vast resources and opportunities made available by the rest of the world.

Present scenario: The world's total production of essential oils is estimated at about 100,000 to 110,000 tons, and India stands as the number three contributor with a share of 16-17 percent. In value terms, India's position is second, with a share of 21-22 percent, thanks to the mint

revolution in North India. Brazil, with its production of citrus oil at 40,000 tons, is the largest producer of essential oils in the world. However, its share in value terms is only 9 percent. (The United States, by the way, is undoubtedly the largest producer and consumer of essential oils.) Turpentine oil is not included in the data.

T-1, T-2 and T-3 depict the share of various countries in the production of essential oils. For clarity,

Estimated world production of essential oils for fragrances (exotic)

T-2

Essential oil	Quantity in tons	Producing countries
amyrin	40.00	Haiti
aromise	15.00	Morocco, Tunisia
basil (exotic)	50.00	Egypt, Comoros, France
bay	40.00	Dominica, Puerto Rico
bergamot	60.00	Italy, Ivory Coast, Guinea
cajuput	40.00	Vietnam, Indonesia
cananga	40.00	Indonesia, Madagascar
chamomile	10.00	Morocco, Egypt, Belgium, Italy, France
cistus	20.00	Spain, France, the former Yugoslavia
clary sage	150.00	Russia, France
cinnamon leaf	100.00	Sri Lanka, Seychelles, India
cypress	10.00	North Africa, France, Brazil
geranium	200.00	China, Egypt, Reunion Island, India
galbanum	10.00	Iran, Turkey
jasmine absolute	20.00	Egypt, India, China
juniper berry	30.00	Former Yugoslavia, Italy, Turkey, India
lavandin	1000.00	France, Spain
linalool berry	50.00	Bulgaria, France, Russia, Australia, Mexico
lavender (spike)	30.00	Spain, France,
marjoram	40.00	Morocco, Egypt
neroli	4.00	Spain, Paraguay, Tunisia
palmarosa	50.00	India, Brazil, Paraguay
patchouli	800.00	Indonesia, China, Malaysia
petitgrain	200.00	Paraguay, Italy, Israel, Brazil, Argentina
pine needle	40.00	Russia, China
pimento leaf/berry	30.00	Jamaica
origanum	15.00	Albania, Spain, the former Yugoslavia
rose oil/absolute	40.00	Turkey, Bulgaria, India, China
rosemary	150.00	Spain, Morocco, Tunisia
rosewood	60.00	Brazil, Paraguay
sandalwood	60.00	India, Indonesia, Australia
sage	80.00	Spain, Former Yugoslavia, Albania
styrax	25.00	Haiti, Turkey
thyme	100.00	Spain
tea tree	300.00	Australia
tagetes	5.00	South Africa, Egypt, Reunion, India
taragon	10.00	Morocco, Former Yugoslavia, Hungary
vetiver	100.00	Haiti, Indonesia, China, India, Reunion, Brazil
wintergreen	20.00	China, Nepal
ylang ylang	100.00	Comoros, Madagascar, Indonesia
Others	200.00	
Total	4344.00	

these have been divided into three categories: essential oils for processing (isolate/chemicals), fragrances (exotic) and flavors. This categorization is not in strict terms as there are some overlaps and common uses other than specified.

T-4, T-5 and T-6 show the details of world production of essential oils for flavors. In addition, T-7 presents a comparison between global production and India's share of production for the three categories of essential oil usage. To elaborate further, essential oils for flavors have been subdivided into three categories (T-8).

From the data, it can be concluded that India has a strong base for essential oils that can be enhanced even further. Another obvious conclusion is that India has taken a lead in mint oils, which in subsequent years will make the industry's position stronger, provided the country continues improving the yield and quality of oils.

Aroma Chemicals/Isolates

Now, let us consider the position of synthetic aroma chemicals and natural isolates/chemicals. The world production of synthetic aroma chemicals and natural isolates and chemicals is estimated at above 230,000 tons. For better clarity, these two categories of chemicals will be taken up separately (T-9).

Export potential: India has become self-sufficient in many essential oils and their isolates; imports have been restricted to a few exotic oils, like geranium, patchouli, clary sage, lavender, clove, cinnamon, etc. However, imports of aroma chemicals are still substantial.

India's present exports of essential oils and their value-added products, including menthol, have crossed US\$230 million. It

Estimated world production of essential oils for flavors

T-3

Essential oils	Quantity in tons	Producing countries
ajowan	20.00	India
anethi/dill seed	70.00	Poland, Russia, India
anise	10.00	Spain, Egypt
caraway	30.00	Poland, Netherlands, Egypt
cardamom	40.00	India, Sri Lanka, Guatemala
cassia	300.00	China, Indonesia
cassia/cinnamon bark	100.00	United States, Sri Lanka, China
celery	50.00	India, United States
clove bud	100.00	Madagascar, Indonesia, Sri Lanka, India
coriander	250.00	Russia, Egypt, Poland, Romania
cumin	30.00	Iran, Turkey, Egypt, Spain, India
dill seed	80.00	United States, Hungary, Bulgaria, Russia, Egypt
fennel	40.00	Spain, Egypt, Russia, Portugal
ginger	50.00	India, China, United States
citrus (others)	100.00	United States, Israel, Spain, Argentina
grapefruit	350.00	Israel, Brazil, United States
lemon	3500.00	Argentina, Italy, United States, Brazil, Israel
lime	1200.00	Mexico, Peru, United States, Haiti, Brazil, Cuba, Ivory Coast, Italy, India
mandarin	100.00	Argentina, Italy
nutmeg	400.00	United States, Indonesia, Sri Lanka, India
onion/garlic	20.00	Mexico, China, Egypt, Spain, France
orange (folded)	5500.00	United States, Brazil, Dominica, Italy
orange (bitter)	40.00	India, Sri Lanka
pepper	90.00	United States, India
peppermint (<i>Mentha piperita</i>)	4000.00	United States, India
peppermint (<i>Mentha arvensis</i>)	2500.00	India, China
spearmint/scotch mint	2000.00	United States, India, China
tangerine	300.00	Brazil, Spain, Mexico
Others	400.00	
Total	21,670.00	

Citrus oils (in metric tons)

T-4

Essential oils	Global production	Indian production
grapefruit	350.00	0.00
lemon	3500.00	-
lime	1200.00	20.00
orange (sweet)	55,000.00	20.00
orange (bitter)	40.00	-
mandarin	100.00	-
tangerine	300.00	-
Others	200.00	-
Total	60,690.00	40.00

Mint oils (in metric tons)

T-5

Essential oils	Global production	Indian production
<i>Mentha arvensis</i>	16,000.00	12,000.00
<i>Mentha piperita</i>	4000.00	300.00
spearmint	2000.00	300.00
Others	200.00	-
Total	22,200.00	12,600.00

Spice oils in metric tons

T-6

Essential oils	Global production	Indian production
anise	40.00	-
anethi/dill seed	70.00	20.00
ajowan	20.00	20.00
caraway	30.00	-
cassia	300.00	-
celery	50.00	25.00
cardamom	40.00	25.00
cinnamon/cassia bark	100.00	-
coriander	250.00	-
cumin	30.00	5.00
clove bud	100.00	5.00
dill seed	80.00	-
fennel	40.00	01.00
ginger	40.00	20.00
nutmeg	400.00	40.00
onion/garlic	30.00	01.00
pepper	90.00	60.00
Others	150.00	40.00
Total	1860.00	262.00

Global production and India's market share in essential oil production

T-7

Category	Global production	Indian share (percent)
essential oils for fragrances (exotic)	4344.00	4.0
essential oils for processing	80,410.00	21.0
essential oils for flavors	21,670.00	14.0

Essential oils for flavors and India's production share of each category

T-8

Essential oils category	Production in tons	Indian share (percent)
citrus	60,690	0.06
mints	22,200	57.0
spices	1860	14.0

Global production and India's market share in chemical production

T-9

Chemical	Estimated global production in tons	Indian share, in tons/percentage
synthetic	180,000	5000/3.0
natural	50,000	7000/14.0

is estimated that by the year 2010 exports will reach US\$350 million.

Future scenario: The world has become a global neighborhood as a result of communication techniques and free market policies. No one is out of reach of developments taking place on the other side of the planet. The effect of globalization is particularly evident in the mergers and acquisitions of even the largest multinational companies that seek to broaden their operating base.

The challenges: Markets are demanding new value-added flavors and fragrances. Innovation and creativity are the most important factors for survival. In order to achieve this, companies are searching for new ingredients. Knowledge and expertise are getting costlier. Advanced countries are not investing in the production of traditional raw materials; they are concentrating on unusual raw materials and final products, i.e. flavors and fragrances. In the case of natural extracts, more emphasis is being given on the part of efficacy and utilization of knowledge in

creating novel products. Fast-moving consumer goods (FMCG) companies depend more and more on flavor and fragrance companies to develop their cosmetics, toiletries and other products.

Technologies, which do not guarantee performance, are of no value. Another trend, which is quite perceptible, is demand for green products: natural flavors, fragrances and other natural extracts of herbs, woods and spices.

Regulations are being made more stringent, while the importance of safety and health claims has become a top priority. The result is that it has become more and more difficult to introduce a new essential oil or aroma chemical or herbal extract without performing more than 100 tests and obtaining certifications from authentic laboratories on safety aspects. These tests are quite elaborate and require funding. Today's 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 on the basis of its major component.

A new strain has to be thoroughly investigated for all major, minor and trace constituents by advanced chromatographic techniques, and their safety data corroborated.

Consumers have become more discerning, de-

manding more intensive flavors and fragrances and healthy indulgence products. Products with anti-stress, anti-aging or health promoting benefits, but also possessing intensive flavor or sophisticated fragrance, are preferred.

The implication for ingredient suppliers is that more information on functionality and efficacy of ingredients will be needed. This means that more clinical studies need to be done, as authenticated results are needed by the users of flavors and fragrances in order to make health claims on products.

Aroma Chemicals

Environmental protection laws and safety considerations are becoming paramount throughout most of the developed world. Cost of investments and operations are also getting higher each year. Under these circumstances, the clearances for new projects are tough to obtain in developed countries; their project costs are running in the millions of dollars. As a result, the world is looking towards developing countries like India and China to take on the processing of aroma isolates and chemicals. This is to be accepted as a challenge and an opportunity to develop these isolates and chemicals with the large global markets in view.

Although it appears a rare possibility to take a lead in production of synthetic aroma chemicals, India has to develop suitable technologies to utilize its raw materials, especially by-products (T-10). Utilization of by-products will give more value addition and an extra edge over competitors. This will further ensure a better price for Indian oil producers.

Natural Chemicals/Isolates

Another factor, which goes in favor of India's richness in natural flora, is the awareness of and preference for natural oils and isolates for flavors, aromatherapy,

herbal cosmetics and even pharmaceuticals. This natural trend is booming in the United States, Europe and Japan. As a result, the demand for natural isolates has gone up. The world is looking towards novel isolates to be used as a part of their flavorings, which are preferred by end users from a safety point of view. Naturals have started replacing synthetic flavors all over the world. This market is enormous. The prices of natural chemicals are much higher than prices of similar synthetic ones.

India's share in natural isolates chemicals is around 14 percent. The focus, however, is in developing many isolates and chemicals by fractional distillation of new essential oils or utilizing biotechnology or reactions with natural chemicals. If the country's industry is successful in producing natural esters by fermentation or by natural reactions, its position will be quite strong. Even conversion of methyl chavicol to anethole by a natural process will be helpful to some extent.

Most of the natural alcohols are easily available in India. Even natural acetic acid (natural vinegar) is available. The country has to look for other acids and develop a technology to produce natural esters.

Minor/Trace Components of Essential Oils

This is another highly rewarding area to investigate. India's capacity to produce many oils having different compositions can prove a boon to this industry. Even if the country just screens different varieties of cymbopogon and ocimum, the industry will come across hundreds of isolates that have tremendous value and scope. One such guideline on "minor/trace constituents" has already been prepared. Some of these isolates, which need immediate attention, are listed in T-11.

Promising raw materials

T-10

Item	Quantity available in tons
l-limonene	200
3-octanol	40
menthone	600
δ -3-carene	1000
longifolene	600
himachalene	100

New aroma isolates of importance

T-11

anethole	<i>trans</i> -2-hexanal
aldehydes (C-7 to C-12)	<i>trans</i> -3-hexanal
bisabolene	<i>cis</i> -jasmone
bisabolol	lactones
benzyl alcohol	menthofuran
benzaldehyde	myrcene
borneol	neryl acetate
carvacrol	nerolidol
cedrol	nootkatone
cinnamic aldehyde	rose oxide
cinnamyl acetate and alcohol	sabinene
damascenone	sabinene hydrate
dimethyl sulphide	sinensals
eudesmol	terpineol
farnescene	d-terpinyl acetate
farnesol	terpin-4-ol
geranyl acetate	viridifloral
germacrene D	vanillin

Natural Essential Oils Sector

The use of natural essential oils is on the rise; present demand for exotic essential oils for use in natural cosmetics, aromatherapy, pharmaceuticals, and for combination with natural flavors is about 6500-7000 tons, and shall increase considerably in the future. India's production of exotic oils is far behind expectations. However, with the efforts of industry and associations, developmental work has already been taken up by R&D institutes. The hope is that India will be able to meet its own targets for many exotic oils like geranium, patchouli and lavender by 2010.

These days, advanced countries are demanding functional fragrances in which the odor value of a fragrance is reinforced with natural oils. Thus, many exotic essential oils like geranium, lavender, rosemary, clary sage, junipers and sandal are finding favor in

new blends. Many citrus oils, like orange, lemon and lime, are still to be introduced by India, followed by petitgrain and neroli oils. This will be possible when the food processing industry advances in India, which is likely to occur.

New sources of essential oils or new varieties of essential oils, such as ocimum and cymbopogon, can be made available on a sustainable basis and subsequently cultivated as a source of new aroma isolates.

Natural Flavors Sector

Japan and the developed western countries are moving towards green revolutions, stressing more natural flavors and fragrances. This is the reason that growth rate in

Essential oils (existing)			T-12
Essential oil	2005 production in tons	Estimated 2010 production in tons	Value: millions US\$
basil	500	1000	5.682
cedarwood	150	200	0.909
citronella Java	400	550	3.375
jamrosa	100	400	2.727
lemongrass	400	800	8.182
<i>Mentha citrata</i>	50	150	1.875
<i>Mentha piperita</i>	800	1500	20.455
<i>Mentha arvensis</i>	18,000	28,000	254.545
palmarosa	80	160	2.182
pepper	80	120	10.909
sandalwood	40	60	75.000
spearmint	800	1300	14.773
Others	400	800	10.909
Total		35,040	411.523

Essential oils (new)			T-13
Essential oil	2005 production in tons	Estimated 2010 production in tons	Value: million US\$
cymbopogon (new)	50	100	1.364
geranium	50	100	9.091
lavandin	10	50	1.364
lavender	05	10	0.454
patchouli	30	60	2.045
ocimum (new)	50	100	1.364
rosemary	20	40	1.364
Others	50	100	2.273
Total tons		560	19.319

this sector is 8-10 percent.

Natural flavors/fragrances are blended using only natural isolates or chemicals. It is worth noting that more than 10 producers of natural isolates and chemicals have emerged recently in the United States alone. Glancing in any widely circulated journals, one will observe that the ratio

of advertisements of natural chemicals vs. synthetic chemicals have increased from 20:80 to 50:50 (T-12 through T-14). This sector is going to outgrow synthetic flavor and fragrance by 2010.

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Value addition to oils

T-14

Essential oil	2005 production in tons	Estimated 2010 production in tons	Value: million US\$
anethole	300	900	8.182
methyl chavicol	100	200	1.818
linalool	77	150	1.704
linalyl acetate	12	20	0.364
menthol	11,000	18,000	245.454
menthone	1400	2100	9.545
liquid menthol	400	750	5.114
hexenols	05	05	2.841
octanol	15	15	0.170
thymol	150	150	1.705
carvone	50	100	1.818
citral	80	100	1.591
citronellol	150	200	0.227
geraniol	80	120	1.364
Others	400	800	7.273
Total		23,610	289.170
Less cost of essential oils used			216.870
Net value addition			72.300