PLANT BASED FRAGRANCE AND THEIR INDUSTRIAL APPLICATION

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CERTIFICATE

It is her by certified that the dissertation entitled "PLANT-BASED FRAGRANCE AND THEIR INDUSTRIAL APPLICATION" has been carried out entirely by MADHURIMA PAL, student of semester VI, B.Sc (Gen) in the department of Botany, M.U.C Women's college, University of Burdwan. It is further certified that the candidate had fulfilled all the conditions necessary for the partial fulfillment of her B.Sc. (Gen) degree achievement under this University and this work has not been submitted anywhere for any other degree to the best of my knowledge.

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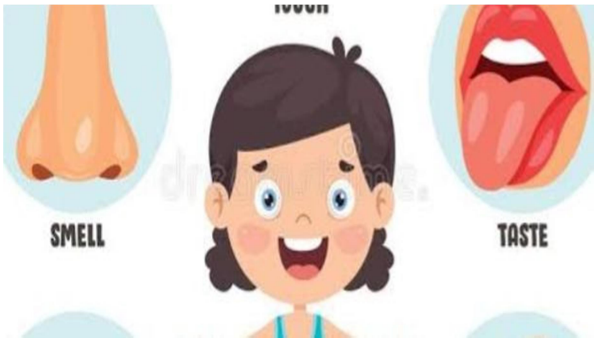
INDEX

INTRODUCTION



Smell and taste are the two most sensitive senses in the others human senses. The nose can often detect and distinguish odors at a level which even modern instrumentation is hard pressed to achieve, the natural world especially that of higher plants provides a multitude of flavors and fragrances, either directly or indirectly. Over the course of time and with the benefit of many thousands of species of plants from which to produce them, countless numbers of such flavours and fragrances have found their way via essential oils into life; into products for personal use like :- perfume, deodorants, shampoos, bath lotions, toilet soaps, tooth pastes and mouth washes; into food and drinks and confectionery item; into pharmaceutical preparations where flavors are added to make the product more appealing or to mask the taste of less agreeable ones; into items used about the house or office or in industry such as air freshness; laundry soaps, detergents, cleaning agents and the like:- int o tobacco products, the list is endless.

Fragrance is one of the most powerful and impressive features of plants. Scent- scattering plant can be found anywhere. However, research and studies about fragrant plants are rarely done and are not used much in our country. Today , in landscaping studies, the visual and ecological features of plants as well as the olfactory features are evaluated (Cockun,2011)

The use of fragrant flowers dates from the ancient past to the present. It was used as an ornament for the purpose of providing therapy to people with disabilities. These flowers have been circulated between countries and delivered to many consumers. Later, exotic scented

perfumes began to be produced from these flowers (Nesbitt,2005).

Figure:- The use of fragrant from ancient India to present

Natural Fragrance is a combination of naturally derived essential oils, floral extract and plant-based aroma.

Natural Fragrance is an important part of our life. It's needs in perfume industry, cosmetic and drug industry food and beverage and confessions industry. And its very safety and expensive because it's naturally derived from plant part like flowers, buds, seeds, leaves etc.

This study provides information about the concept of fragrance and fragrant ornamental plant and its application.

APPLICATION

Essential oil, floral extract and plant-based aromas have characteristics flavor and fragrances properties, possess biological activities and are widely applied in aromatherapy and healthcare in addition to several industries such as cosmetics, flavoring and fragrances, spices, pesticides, as well as herbal beverages.

SOME PLANTS ARE USE IN FOOD AND BEVERAGE AND BAKING INDUSTRY

NAME	SC NAME	FAMILY	FRAGRANCE	WHICH PART
Cardamom	*Elettaria cardamomum*	Zingiberaceae	1,8-cineole, α-terpinyl acetate, sabinene, and β-linalool	Whole dried fruits or seed pods
Cinnamon	*Cinnamomum verum*	Lauraceae	Cinnamaldehyde	Dried inner bark
Clove	Syzygium aromaticum	Myrtaceae	Eugenol	Flower buds
Fennel	*Foeniculum vulgare*	Apiaceae	p- propenilanisol	Leaves and seeds
Fenugreek	*Trigonella sp.*	Legumes	Eugenol, sotolon	Seeds
Curry tree	*Murraya sp.*	Rutaceae	Linalool, Elemol	Leaves
Mint	*Mintha spicata*	Lamiaceae	Menthol	Leaves
Asafoetida	*Ferula asafetida*	Apiaceae	Asaresinotannol	Resin
Pandan	*Pandanus sp.*	Pandanaceae	2-actyl-1- pyrroline	Leaves
Mustard	*Brassica sp*	Brassicaceae	Alkyl isothiocyanate	Seed
Coriander	*Coriandrum sativum*	Apiaceae	Linalool, geraniol	Leaves and seeds
Basmati rice	*Oryza sp*	Poaceae	2-acetyl-1- pyrroline	Grain
Strawberry	*Fragaria sp*	Rosaceae	Ethyl methylpheileglycidate	Fruits and extract
Vanilla	*Vanilla sp*	Orchidaceae	Vanillin	Fruit
Mango	*Mangiferasp*	Anacardiaceae	Ethyl butanote	Fruits and their extract
Tea	*Camellia sp.*	Theaceae	Geraniol	Leaves
Coffee	*Coffea*	Rubiaceae	2-methylpyridine	Beans
Cocoa	*Theobroma sp*	Malvaceae	Furans, lactones	Seeds and cocoa beans

SOME PLANTS ARE USE IN PERFUME INDUSTRY

NAME	SC NAME	FAMILY	FRAGRANCE	WHICH PART
Rose	*Rosa sp*	Rosaceae	Geraniol, Monoterpene	Petals
Jasmine	*Jasminum sp*	Oleaceae	Eugenol, geraniol	Flower
Plumeria	*Plumeria sp*	Plumeriaceae	Geraniol, Citronilol	Petals
Mimosa	*Mimosa sp*	Fabaceae	Sterols	Petals
Tuberose	*Polianthes sp*	Asparagaceae	Methyl isoeugenol	Petals
Cassia	*Cassia sp*	Cassiaceae		Flowers
Sandalwood	*Santalum sp*	Santalaceae	Santalol	Wood
Agar wood	*Aquilaria sp*	Thymelaeceae	Terpenoids	Wood
Pine	*Pinus sp*	Pinaceae	Terpenol	Wood, Resin
Juniper	*Juniperus sp*	Cupressaceae	Pinene, Carene	Wood
Birch	*Betula sp*	Betulaceae	Borneol, Germacrene	Wood
Cherries	*Prunus sp*	Rosaceae	Flavonols	Fruit
Apples	*Malus sp*	Rosaceae	Chlorogenic acid	Fruits
Litsea cubeba	*Laurels sp*	Lauraceae	Geranial	Fruits
Orange	*Citrus sp*	Rutaceae	Cyclic monoterpene	Fruits
Grapes	*Vitis sp*	Vitaceae	Methyl anthranilate	Fruits
Iris	*Iris sp*	Iridaceae	Linalool, geraniol	Rhizome
Lavender	*Lavandula sp*	Lamiaceae	Linalool	Leaf
Rosemary	*Salvia sp*	Lamiaceae	Pinene	Leaf
Citrus	*Citrus sp*	Rutaceae	Linalool, pinene	Leaf
Patchouli	*Pogostemon sp*	Lamiaceae	Seychellene	Leaf
Olibanum	*Boswellia*	Burseraceae	Pinene	Resins
Nutmeg	*Myristica sp*	Myristicaceae	Limonene, Pinene	Seeds
Vetiver	*Chrysopogon sp*	Poaceae	Vetisinol, khusimol	Roots
Anise	*Pimpinella sp*	Apiaceae	Anethol	Seed

SOME PLANTS ARE USE IN COSMETIC INDUSTRY AND HOUSE HOLD PRODUCTS :-

NAME	SC NAME	FAMILY	FRAGRANCE	WHICH PART
Rosewood	*Dalbergia sp*	Leguminosea	Linalool	Bark
Bergamot	*Citrus bergamia*	Rutaceae	Limonene, linalool	Peel
Palm	*Elaeis sp*	Arecaceae	Tocopherol, sterols	Fruit
Coconut	*Cocos sp*	Arecaceae	Linalool	Endosperm
Aloevera	*Aloe sp*	Lilaceae	Lignin	Leave
Hibiscus	*Hibiscus sp*	Solanaceae	Quinine, phenols	Flower
Olive	*Olea sp*	Oleaceae	Tocopherol, Sterols	Seed
Oat	*Avena sp*	Poaceae	Furanones	Grain
Saffron	*Crocus sp*	Iridaceae	Safranal	Stigma
Sweet flag	*Acorus sp*	Acoraceae	Camphor, acrone	Leave, Rhizomes
Zedoary	*Curcuma sp*	Zingiberacea	Turmerone	Rhizomes
Chamomile	*Matricaria sp*	Asteraceae	Bisoprolol	Flower
Tomato	*Solanum sp*	Solanaceae	Hexanal, Ionene	Leaves
Soapwort	*Saponaria sp*	Caryophyllaceae	Borneol, Camphor	Flower
Buffaloberry	*Shepherdia sp*	Eleagnaceae	Lilac alcohol	Fruit
Galanga	*Alpinia sp*	Zingibracea	Ethyle- cinnamate	Root
Soapweed yucca	*Yucca sp*	Asparagaceae	Saponins	Root
Soap plant	*Chlorogalum sp*	Liliaceae	Methylebenzoate	Leaves
Clematis	*Clematis sp*	Ranunculaceae	Kaiser	Flowers

SOME PLANTS ARE USE IN DRUGS INDUSTRY

NAME	SC NAME	FAMILY	FRAGRANCE	WHICH PART
Ageratum	*Ageratum sp*	Asteraceae	Stigmasterol, Echinatine	Whole plant extract
Giant onion	*Allium sp*	Liliaceae	Linalool, Cineole	Bulb
Capsicum	*Capsicum sp*	Solanaceae	Capsaicin	Pericalps
Gotu kola	*Centella sp*	Apiaceae	Pentacyclic triterapenes	Leaves
Sweet orange	*Citrus sp*	Rutaceae	Limonene	Leaves , Fruits
Flame nettle	*Coleus sp*	Lamiaceae	Linoleic acid	Leaves
Coriander	*Coriandrum sp*	Apiaceae	Pinene, camphor	Leaves, Seed
Saffron	*Crocus sp*	Iridaceae	Crocin, Safranol	Stigma
Turmeric	*Curcuma sp*	Zingibracea	ar-turmerone and β-turmerone	Root
Lemon grass	*Cymbopogon sp*	Poaceae	Neral,geranial	Leaves and oil
Cardamom	*Elettaria sp*	Zingibracea	Sabinene,linalool	Dried Fruits , Green pods
Star anise	*Illium sp*	Illiaciaceae	Linalool,farnesol	Dry fruits
Labandula	*Labandula sp*	Lamiaceae	Linalool,cineol	Flower's head
Peppermint	*Mentha sp*	Labiateae	Menthol,cineol	Leave
Curry leaf	*Murraya sp*	Rutaceae	Linalool,elemol	Leave
Nutmeg	*Myristica sp*	Myristicaceae	Tarpinol,sabinene	Seed
Black seed	*Nigella sp*	Ranunculaceae	Linolic acid, palmitic acid	Seed
Tulsi	*Ocimum sp*	Labiateae	Eugenol	Leave
Oregano	*Origanum sp*	Labiateae	Carvacorol,thymol	Leave , Flowering buds
Pipali	*Piper sp*	Piperaceae	Linalool, thymol	Root, Fruit

CONTRIBUTION OF PLANT IN MODERN FRAGRANCE INDUSTRY:

India has always been a land of olfactory indulgence, where aromatherapy, incense and attar have existed since ancient times, where essential oil perfume were a part of the ancient royal lore. The earliest scents used were the healing scents introduced through Ayurveda, which recommended the use of aromatic herbs and fragrant plants for mental well-being, beauty, treatment of ailments, hygiene and age-control which are well known even today.

This traditional fragrance industry in India has seen vast changes in the recent years with the introduction of technology and wider usage. The Indian fragrance industry is one of the largest in terms of production, consumption and at present, the fragrance market is set to grow and offer innumerable opportunities for new entrants to grow in this market.

India is among the leading country in the world with rich diversity in flora and fauna with its 15 Geo- climatic zone. India can produce organic fragrant raw materials which have great demand in the world. Considering its close linkages with grass-root economics, it can reboot Indian economy from ground level.

Global fragrance & flavor industry is worth $24.10 Billion and India contributes approximately $500 million. However, growth rate in India is approximately 11% in the last few years but is projected to grow exponentially in the upcoming years due to rising personal care, brand awareness, increasing disposable income, growing demand in middle class people and affordable price of fragrance in the form of mass perfumes & deodorants.

Looking into the success of Fragrance & Flavor Development Centre, Kannauj & its self-sustainability or last six year and increasing demand for its need across the country and potential, there exists need for opening such kind of center in all states. Different geographical locations need different approach for different products and technology to work with.

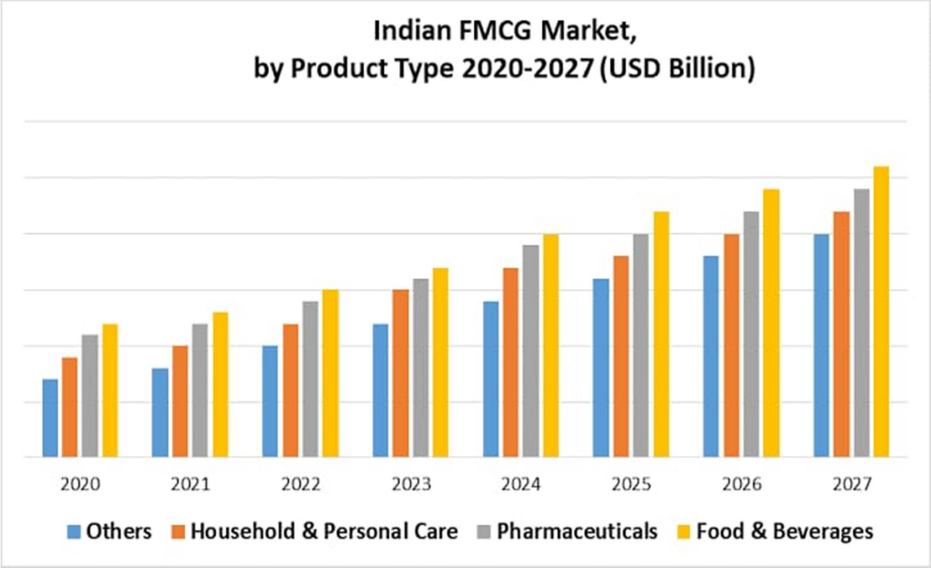
Potential for India:

Worldwide, approximately 300 important natural fragrant raw materials are in use. Out of these, only 50% are cultivated and rest are found in wild habitation (e.g. Nagrarmotha, Kewra etc). Out of the cultivated raw materials, 110 cultivated natural fragrant raw material cover 95% of the current global consumption is in fragrance & flavor. Out of these, there are 31 for which India is well known globally and there are nearly 21 which are grown but not to a level for global significance. India has made global impact with essential oils of Menthol mint, Sandalwood, Jasmine, Tuberose and spices.

Menthol Mint was introduced in India in 1954 and then different variants were developed by CSIR-CIMAP and extension work was done by different organizations including FFDC Kannauj. In 2007 FFDC, Kannauj made a tie up with MCX for analyzing the mint oil for forward trading and

thereafter, the sharp rise in Mint oil took place due to better benefit to farmers to the extent of 20-30% and hence more production making India a global leader with nearly 90% of total global production with nearly 40,000 tons of oil. Uttar Pradesh itself gives 80% of total produce of India while Bihar gives 13% and Madhya Pradesh gives 7%.

Fragrance & Flavor Development Centre, Kannauj (FFDC) has been set up in 1991 by Govt. of India with the assistance of UNDP/UNIDO and Govt. of U.P. UNDP/UNIDO has provided technologies, Govt. of U.P. has provided land, building and infrastructure, while Govt. of India is contributing for the recurring, non-recurring and indigenous apparatus & equipment's. The concept behind setting up of the center is to act as interface/bridge between research & industries of essential oils, fragrance & flavor.



CONCLUSION

Flavors and fragrances are an important group of non-wood forest products. This study contains information about the plant and their common and scientific name; and they are come from which family, and their fragrance's chemical compound and uses of some selected fragrances of plant origin representing the different varieties or types of the product. Countless flavors and fragrances have found their way via essential oils into everyday life. They are found, for example, in foods, drinks and confectionery items; in products of personal use such as perfumes, deodorants, shampoos, soaps, toothpastes and mouthwashes; in drug industry; and in cosmetic industry. The purpose of this study is too useful information on this important products and the plant's contribution in modern fragrance industry.

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